STELLER SEA LION AND NORTHERN FUR SEAL RESEARCH

FINAL PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

VOLUME I

EXECUTIVE SUMMARY, CHAPTERS 1-9

United States Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Office of Protective Resources, Permits Division

May 2007

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
PROGRAM PLANNING AND INTEGRATION
Silver Spring, Maryland 20910

APR 19 2007

Dear Reviewer:

In accordance with provisions of the National Environmental Policy Act (NEPA), we enclose for your review the National Oceanic and Atmospheric Administration (NOAA) Final Programmatic Environmental Impact Statement (FPEIS) for Steller Sea Lion and Northern Fur Seal Research.

This FPEIS is prepared pursuant to NEPA to assess the environmental impacts associated with NOAA proceeding with implementing future grants and Endangered Species Act/Marine Mammal Protection Act permit programs related to research on northern fur seals and threatened and endangered Steller sea lions throughout their ranges in the United States. In the United States, Steller sea lions and northern fur seals range from California, along the western coast of the continental United States, to the Aleutian Islands in western Alaska. The purpose of the research program on these species is to promote their conservation and recovery.

NOAA is not required to respond to comments received as a result of issuance of the FPEIS. However, comments will be reviewed and considered for their impact on issuance of a record of decision (ROD). Please send comments to the responsible official identified below. The ROD will be made available publicly following final agency action on or after June 11, 2007.

Responsible Official:

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Sincerely,

Rodney Weiher

Rodney F. Weiher, Ph.D.
NOAA NEPA Coordinator

Enclosure

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ACRONYMS AND ABBREVIATIONS

ACC	Alaska Coastal Current
ADF&G	Alaska Department of Fish and Game
ADNR	Alaska Department of Natural Resources
AFDF	Alaska Fisheries Development Foundation
AI	Aleutian Islands
AKRPRD	Alaska Region Protected Resources Division
AMAP	Arctic Monitoring and Assessment Program
AMNWR	Alaska Maritime National Wildlife Refuge
ANILCA	Alaska National Interest Lands Conservation Act
ANO	Alaska Native Organization
APHIS	Animal and Plant Health Inspection Service
ASLC	Alaska Sea Life Center
AWA	Animal Welfare Act
BIA	bioelectric impedance analysis
BLM	Bureau of Land Management
BSAI	Bering Sea/ Aleutian Islands
C	Centigrade
CEQ	Center for Environmental Quality
CFEC	Commercial Fisheries Entry Commission
CFR	Code of Federal Regulations
cm	centimeters
CVM	contingent valuation method
DAO	Department Administrative Order
DDT	Dichloro-Diphenyl-Trichloroethane
DEIS	draft EIS
DNA	Deoxyribonucleic Acid
DOC	Department of Commerce
DPS	Distinct Population Segment
EA	Environmental Assessment
EBS	Eastern Bering Sea
ECO	Ecosystem Conservation Office
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
ENSO	El Nino/ Southern Oscillation
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
EVOS	Exxon Valdez Oil Spill
F/PR1	NMFS Permits Division, Office of Protected Resources
FEIS	Final Environmental Impact Statement
FMP	Fishery Management Plan
FO	Frequency of Occurrence
FONSI	Finding of No Significant Impact
FR	Federal Register
Fr	recovery factor
ft	feet/foot
FY	Fiscal Year
GOA	Gulf of Alaska
IACUC	Institutional Animal Care and Use Committee
I-O	Input-Output

ACRONYMS AND ABBREVIATIONS

IWC	International Whaling Commission
kg	kilograms
kJ/g	kilojoules per gram
km	kilometers
L/min	liters per minute
LHX	Life History tag
m	meter
mb	millibar
mm	millimeter
MMC	Marine Mammal Commission
MMHSRP	Marine Mammal Health and Stranding Response Program
MMPA	Marine Mammal Protection Act
MSY	Maximum Sustainable Yield
mt	metric tons
NAICS	North American Industrial Classification System
NAO	NMFS Administrative Order
NEPA	National Environmental Policy Act
NFS	Northern fur seal
ng/g	nanograms per gram
NGO	Non-governmental organization
nm	Nautical Mile
NMFS	National Marine Fisheries Service
Nmin	minumum population estimate
NMML	National Marine Mammal Laboratory
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NOS	NOAA's National Ocean Service
NPFMC	North Pacific Fishery Management Council
NPO	North Pacific Ocean
NPR	North Pacific Rim
NPS	National Park Service
NPUMMRC	North Pacific University Marine Mammal Research Consortium
NRC	National Research Council
NWR	National Wildlife Refuge
OAR	NOAA's Office of Oceanic & Atmospheric Research
OSP	Optimum Sustainable Population
PacFin	Pacific Coast Fisheries Information Network
PBR	Potential Biological Removal
PCB	Polychlorinated Biphenyl
PI	Pribilof Islands
PICES	North Pacific Marine Science Organization
PIT	passive integrated transponder
PMR	Pacific Missile Range
POP	Persistent Organic Pollutants
PSEIS	Programmatic Supplemental Environmental Impact Statement
psu	Practical Salinity Unit
PWS	Prince William Sound
PWSSC	Prince William Sound Science Center
R&D	Research and Development

ACRONYMS AND ABBREVIATIONS

RFFA	Reasonably Foreseeable Future Action
R max	maximum net recovery rate
ROD	Record of Decision
RPA	Reasonable Prudent Alternative
SAFE	Stock Assessment and Fisheries Evaluation
SE	Southeast
SEAK	Southeast Alaska
SEIS	Supplemental EIS
SIC	Standard Industrial Classification
SLTDR	satellite-linked time depth recorder
SSL	Steller sea lion
SSLRI	Steller Sea Lion Research Initiative
SUA	Special Use Area
SW	Southwest
TAC	Total Allowable Catch
TASSC	The Alaska Sea Otter and Steller Sea Lion Commission
TGSNP	Tribal Government of St. Paul
U.S.	United States
UAF	University of Alaska Fairbanks
UK-CI	Upper Kenai-Cook Inlet
U.S.C.	United States Code
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
VHF	Very High Frequency
W	West
Zn	Zinc

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Steller Sea Lion and Northern Fur Seal Research Final Programmatic Environmental Impact Statement

May 2007

Lead Agency:	United States Department of Commerce National Oceanic and Atmospheric Administration National Marine Fisheries Service Office of Protected Resources Silver Spring, Maryland
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EXECUTIVE SUMMARY

ES-1.0 Introduction

This executive summary provides an overview of the findings contained in the Steller Sea Lion (SSL), *Eumetopias jubatus*, and Northern Fur Seal (NFS), *Callorhinus ursinus*, Research Programmatic Environmental Impact Statement (PEIS). This PEIS evaluates the effects of the type and range of SSL and NFS research activities (*i.e.*, the alternative actions) that may be exercised in current and future grants. This PEIS assesses the direct and indirect effects of various levels of funding and different research techniques on SSLs and NFSs throughout the entire range of these species in United States (U.S.) waters and on the high seas, which includes parts of Alaska, Washington, Oregon, and California. The effects of research on these species as well as other components of the marine ecosystem and human environment are presented. The PEIS assesses the contribution of research activities to the cumulative effects on these species and resources, including effects from past, present, and reasonably foreseeable future events and activities that are external to the research activities. National Marine Fisheries Service (NMFS) also acknowledges that other views of science exist than are contained in this review, including Alaska Native traditional knowledge. NMFS is committed to working with Alaska Native communities and strives to incorporate Native traditional knowledge into environmental documents.

The National Oceanic and Atmospheric Administration's (NOAA) NMFS is responsible for management, conservation, and protection of SSLs under the Endangered Species Act (ESA) (ESA; 16 United States Code [U.S.C.] 1531 *et seq.*) and the Marine Mammal Protection Act (MMPA) (MMPA; 16 U.S.C. 1361 *et seq.*) and NFSs under the MMPA. NFSs in the Pribilof Islands (St. Paul and St. George Islands) are also managed under the Fur Seal Act of 1966 (16 U.S.C. 1151 *et seq*.).

In 1990, NMFS listed SSLs as "threatened" under the ESA, and in 1997 the agency recognized two distinct population segments (DPSs): the western DPS and eastern DPS. The segment of the population west of 144° W longitude was listed as "endangered", while the segment of the population east of this delineation remained listed as "threatened". Both DPSs of SSLs are listed as depleted stocks under the MMPA. NFSs, recognized as two distinct stocks (Eastern Pacific and San Miguel Island [California]), have never been listed under the ESA, but the Eastern Pacific stock was listed as "depleted" in 1988 (then as the Pribilof Island population) under the MMPA (Figure 1.4-1).

ES-2.0 Proposed Action

NMFS administers a research program that includes (1) directed grants from the Alaska Region's operational budget, (2) "pass-through" grants detailed in the federal budget, and (3) permits issued pursuant to the MMPA and ESA for the purpose of facilitating research on SSLs and NFSs in lands and waters under U.S. jurisdiction. Most research activities on these species require permits, which NMFS administers to qualified individuals and institutions through the Office of Protected Resources, Permits Division (F/PR1). Permits are granted provided the proposed research activities are consistent with the requirements of the ESA, MMPA and the criteria in NMFS implementing regulations (50 Code of Federal Regulation [CFR] parts 216 and 222). The proposed action is to disburse federal funds and issue permits for research on SSLs and NFSs, consistent with applicable federal laws.

ES-3.0 Purpose and Need

The purpose of the research on SSLs and NFSs, as stated in the Steller Sea Lion Recovery Plan (NMFS 1992) and Northern Fur Seal Conservation Plan (NMFS 1993), is to promote the recovery of the species' populations to levels appropriate to justify removal from ESA listings (SSL) and to delineate reasonable actions to protect the depleted species under MMPA. NMFS awards grants to support research on SSLs and NFSs, and issues permits to allow an exemption to the prohibition on ''takes'' of SSLs and NFSs, established under the ESA and MMPA. The ESA and the MMPA prohibit ''takes'' of threatened and endangered species, and of marine mammals, respectively. Many research activities, including aerial and vessel-based surveys, tagging and marking procedures, attachment of scientific instruments, and collection of tissue samples, require approaching or capturing animals and may result in harassment or other acts otherwise prohibited under the ESA and MMPA.

The purpose of the analysis contained in this PEIS is to assess the effects of research activities on SSL and NFS populations and components of the marine ecosystem and human environment.

The project is needed to:

- Address NMFS' responsibility to implement the ESA and MMPA for species under its jurisdiction, including SSLs and NFSs, to: (1) promote recovery; (2) identify factors limiting the population; (3) identify reasonable actions to minimize impacts of human-induced activities; and (4) implement conservation and management measures.
- Satisfy NMFS' obligations under National Environmental Policy Act (NEPA) by analyzing the environmental consequences of research it funds and authorizes on SSLs and NFSs, sharing and soliciting public comments on this information, and providing the basis for NMFS research grant and permit decisions.

At present, 23 active grants fund research projects that involve human interaction with SSLs. All active and anticipated SSL research funded by past, present, and expected future federal grants are covered by this PEIS document. Research activities taking place under active grants range from actions such as aerial surveys, which could disturb individual SSLs, to the capture of sample populations, for collection of blood and tissue samples. A description of permits valid between January 1, 2006 and December 31, 2011 may be found in Appendix A of this PEIS. Together, these permits currently authorize takes of SSLs throughout their range in the U.S. by a variety of research activities. In addition to authorizing various studies, the permits allow for the mortality of up to 60 SSLs per year incidental to research activities, not to exceed 18 SSLs from the western population. Applications for additional permits for studies of SSLs using these and other methods are anticipated for at least as long as this species is listed under the ESA. Further, NMFS has an ongoing obligation under Section 117 of the MMPA to prepare stock assessments for each marine mammal stock in waters under the jurisdiction of the U.S. These stock assessments, which must describe the geographic range, minimum population estimate, current and net productivity rates, annual human-caused mortality and serious injury, and other factors that may be causing a decline or impeding recovery, are largely dependent upon information obtained from activities conducted under research permits. Thus, NMFS anticipates a need to continue to issue permits for research on SSLs for as long as this requirement of the MMPA is in place.

Consistent with the purpose of the MMPA (16 U.S.C. 1361 *et seq*.), the purpose of conducting research on NFSs is to contribute to the basic knowledge of marine mammal biology and ecology and to identify, evaluate, or resolve conservation problems for the species. Research needs for conservation of this species are identified in the Northern Fur Seal Conservation Plan. Currently, the Alaska Region has not made any specific grant awards for NFS research. However, one pass-through SSL grant does support a small NFS study. Six permits or authorizations are currently active for research directed at NFS in the wild and are valid through October 1, 2010. Active permits for research on NFSs in the wild, valid through October 1, 2010, may be found in Appendix A of this PEIS. The active permits authorize takes of NFSs in California, and in Alaska on the Pribilof Islands and Bogoslof Island. As with SSLs, these permits authorize a variety of research activities ranging from vessel or aerial surveys that may disturb animals, to capture and sampling of animals, which may result in injury or incidental mortality. Applications for additional permits for studies of NFSs using these and other methods are anticipated for as long as there is concern about the population status and potential impacts of human activities, and general interest in studies of the species biology and ecology. Further, as with SSLs, NMFS has an ongoing obligation under Section 117 of the MMPA to prepare stock assessments for each marine mammal stock in waters under the jurisdiction of the U.S. and therefore anticipates a need to continue to issue permits for research on NFSs for as long as this requirement of the MMPA holds.

ES-4.0 Issues Raised During Scoping and Where They Are Addressed

The first step in preparing an EIS is publishing a Notice of Intent (NOI) in the Federal Register (FR). On December 28, 2005, the NOI (70 FR 76780) announcing the preparation of this PEIS was published requesting public participation in the scoping process. In addition to providing background information on the purpose of issuing scientific research permits and providing the statutory requirements for permits that allow research on marine mammals, the NOI also provided a list of issues on which NMFS was seeking public input. These issues included: 1) types of research; 2) level of research; 3) coordination of research; 4) effects of research; 5) qualifications of researchers; and 6) criteria for allowing modifications or amendments to existing grants and permits; and for suspending or revoking permits. To provide a framework for public discussion, the NOI also presented preliminary concepts for alternatives that could be considered for the PEIS; however, the exact structure and number of alternatives were developed after the scoping process was complete.

Three scoping meetings were held early in the project to disseminate information to the public and obtain public input. The public comment period for scoping comments ran for 60 days (between December 28, 2005 and February 25, 2006, inclusive). The locations and dates for the scoping meetings were: Silver Spring, Maryland (January 18, 2006); Seattle, Washington (January 20, 2006); and Anchorage, Alaska (January 23, 2006). A brief summary of the substantive issues raised during public scoping is presented in more detail in Section 2.2. A more complete summary of formal comments is included in the Scoping Summary Report, attached as Appendix D. The following table provides general categories of the types of issue raised in the NOI and during the scoping process and where these issues are addressed in the PEIS.

Table ES-1
Issues Raised in the NOI and Scoping Comments and Where They Are Discussed in the PEIS

Issue	Sections in the PEIS where Issue is Discussed
Issues Identified in the NOI	
Types of Research	2.4.2 Components Common to All Alternatives; 2.6 Alternatives Carried Forward for Analysis; 3.2.1 Steller Sea Lions: 3.2.2 Northern Fur Seals: Chapter 4 Environmental Consequences; Appendix A Description of Active Permits; Appendix B Description of Research Methodologies
Level of Research	2.6 Alternatives Carried Forward for Analysis; 3.2.1.11 Past Research, Levels of Effort, Funding and Program Histories Chapter 4 Environmental Consequences; Appendix A Description of Active Permits
Coordination of Research	3.2.1 Coordination of Research: 3.7 Grant and Permitting Process; 4.7.2 Coordination; 5.3 Recommendations for Coordination of SSL and NFS Research
Effects of Research	2.3 Research Components of the Alternatives: 4.8 – 4.11 [Environmental Consequences of the Alternatives on Selected Resources]; Appendix B Description of Research Methodologies
Qualifications of Researchers	4.7.4 Mitigation and Conditions of Grants, Permits, and Authorizations; Appendix D Requirements for Obtaining a Grant or Permit for Research on Protected Species
Criteria for Allowing Modifications or Amendments to Existing Grants and Permits	4.7.4 Mitigation and Conditions of Grants, Permits, and Authorizations; Appendix D Requirements for Obtaining a Grant or Permit for Research on Protected Species
Issued Raised in Scoping Comments	
Alaska Native Issues	3.2.1 Steller Sea Lions; 3.2.2 Northern Fur Seals; 3.4.1 Subsistence Harvest; 3.5 Coastal Communities; 4.7.2.3 Coordination Required Under Co-Management Agreements; 4.9 Social and Economic Environment; 5.4 Recommendations for Coordination with Alaska Native Organizations; Appendix F Co-Management Agreements for St. George and St. Paul Islands
Alternatives	2.6 Alternatives; 4.7 Elements Common to All Alternatives; 4.8 – 4.11 [Environmental Consequences of the Alternatives on Selected Resources]
Branding/ Hot Branding	2.3 Research Components of the Alternatives: 3.2.1 Steller Sea Lions; 4.8 – 4.11 [Environmental Consequences of the Alternatives on Selected Resources]; Appendix B Description of Research Methodologies
Conservation of the Species/ Conservation Goals	1.2 Purpose and Need for Action; 3.2.1 SSLs; 3.2.2 NFSs; 4.8 – 4.11 [Environmental Consequences of the Alternatives on Selected Resources]
Coordination	3.2.1 Coordination of Research: 3.7 Grant and Permitting Process; 4.7.2 Coordination; 5.3 Recommendations for Coordination of SSL and NFS Research
Credentials of Researchers	4.7.4 Mitigation and Conditions of Grants, Permits, and Authorizations; Appendix D Requirements for Obtaining a Grant or Permit for Research on Protected Species

Table ES-1 (continued)
Issues Raised in the NOI and Scoping Comments and Where They Are Discussed in the PEIS

Issue	Sections in the PEIS where Issue is Discussed
Cumulative Effects	4.5 Steps for Identifying Cumulative Effects; 4.8 – 4.11 [Environmental Consequences of the Alternatives on Selected Resources]
Duplication of Research Effort	3.2.1 Coordination of Research: 3.7 Grant and Permitting Process; 4.7.2 Coordination; 5.3 Recommendations for Coordination of SSL and NFS Research
Editorial Comments	Editorial Comments Made During Scoping Related to the 2002 and 2005 EAs on the Effects of NMFS Permitted Scientific Research Activities on Threatened and Endangered SSLs and are not applicable to this PEIS.
Effects of Research	4.8 – 4.11 [Environmental Consequences of the Alternatives on Selected Resources]; Appendix B Description of Research Methodologies
Endangered Species Act	1.2 Purpose and Need for Action; 1.7 Federal Laws Applicable to SSL and NFS Research; 2.1.2 Relation of Alternatives to the Recovery and Conservation Plans; 1.9 Federal Permits, Licenses and Entitlements Necessary to Implement the Proposed Action; 3.2.1 Steller Sea Lions; 3.2.4 Other ESA-Listed Species; 4.8.4 Other ESA-Listed Species
Inadequate Information	4.3 Incomplete and Unavailable Information; Section 5.3.3 Monitoring Effects of Research
Methodology	Appendix B Description of Research Methodologies
Mitigation	4.7.4 Mitigation and Conditions of Grants, Permits, and Authorizations; Appendix B Description of Research Methodologies; Appendix E Requirements for Obtaining a Grant or Permit for Research on Protected Species
Marine Mammal Protection Act	1.2 Purpose and Need for Action; 1.7 Federal Laws Applicable to SSL and NFS Research; 2.1.2 Relation of Alternatives to the Recovery and Conservation Plans; 1.9 Federal Permits, Licenses and Entitlements Necessary to Implement the Proposed Action; 3.2.5 Other Marine Mammals; 4.8.5 Other Marine Mammals
Monitoring	4.7.5 Monitoring; 4.7.4 Mitigation and Conditions of Grants, Permits, and Authorizations; Section 5.3.3 Monitoring Effects of Research; Appendix D Requirements for Obtaining a Grant or Permit for Research on Protected Species
Mortality	2.5 Establishing Serious Injury and Mortality Limits Under the Alternatives; 4.8 – 4.11 [Environmental Consequences of the Alternatives on Selected Resources]
National Environmental Policy Act	1.2 Purpose and Need for Action; 1.5 Related NEPA Documents that Influence the Scope of this PEIS; 1.7 Federal Laws Applicable to SSL and NFS Research;
Potential Biological Removal	2.5 Establishing Serious Injury and Mortality Limits Under the Alternatives; 4.4.1 Impact Criteria for SSLs and NFSs; 4.8 – 4.11 [Environmental Consequences of the Alternatives on Selected Resources]
Permits, Grants and Applications	3.7 Grant and Permitting Process; 4.7.2 Coordination; 5.3 Recommendations for Coordination of SSL and NFS Research; 4.7.4 Mitigation and Conditions of Grants, Permits, and Authorizations; Appendix A Description of Active Permits; Appendix D Requirements for Obtaining a Grant or Permit for Research on Protected Species
Reporting Requirements	4.7.4 Mitigation and Conditions of Grants, Permits, and Authorizations; Section 5.3.2 Reporting Requirements; Appendix D Requirements for Obtaining a Grant or Permit for Research on Protected Species
Sample Sizes and Techniques	4.8.1 and 4.8.2 Environmental Consequences of the Alternatives on SSL and NFS: Appendix A Description of Active Permits; Appendix B Description of Research Methodologies
Take	2.5 Establishing Serious Injury and Mortality Limits Under the Alternatives; 4.4.1 Impact Criteria for SSLs and NFSs; 4.8 – 4.11 [Environmental Consequences of the Alternatives on Selected Resources]
Animal Welfare	1.2 Purpose and Need for Action; 1.7 Federal Laws Applicable to SSL and NFS Research 4.8.1 and 4.8.2 Environmental Consequences of the Alternatives on SSL and NFS

In addition to scoping, NMFS also conducted a series of focus group meetings in July and August 2006 with various agencies, researchers, Native Alaskan groups, and other interested parties to discuss the issues raised in scoping and previous NEPA-compliance activities, and to further inform the process of developing a reasonable range of alternatives.

ES-5.0 Public Comment Analysis and Response

The public comment period on the 2007 Draft PEIS began on February 16, 2007 and ended on April 2, 2007 for a total comment period of 45 days. During the public comment period three public hearings were held Silver Spring, Maryland; Seattle, Washington; and Anchorage, Alaska. Approximately 14 submissions were received by NMFS on the Draft PEIS by the deadline.

The Comment Analysis Report (CAR) appended to this document (Appendix C) summarizes the public comments. As the primary response-to-comment document for this PEIS, the CAR describes the methodology used by NMFS in reviewing and sorting the comments and presents a synthesis of all comments that address a common theme. It also documents changes made in the revised PEIS as a result of those comments. NMFS undertook a careful and deliberate approach to ensure that all substantive public comments were treated equally and reviewed, considered, and responded to on the basis of the quality and substantive content of the comment, and not on the basis of who wrote the comment or how many other comments agree with it. Commenters can reference how and where their comments were responded to by using the cross-reference tables in the CAR.

ES-6.0 Alternatives

Four alternatives were developed and are analyzed in this PEIS; they are described in more detail in Chapter 2. The alternatives represent a reasonable range of research granting and permitting options that fulfill the purpose and need for the federal action, (Chapter 1). The general policy direction of each alternative is described, followed by Table ES-2, which summarizes examples of specific research activities permitted under each alternative.

One way that the alternatives vary is that they have different thresholds for what would be considered an "acceptable" level of mortality associated with research activities. This threshold is based on a metric for fishery-related mortality that is defined in the MMPA; the Potential Biological Removal (PBR). The formula for PBR is a precautionary or conservative measure of human-caused mortality that could be expected to affect a population's ability to recover from a depleted state or to remain at a sustainable level. The PBR calculation contains provisions to account for uncertainty in population estimates and protects a larger fraction of annual productivity for depleted stocks through a recovery factor (Fr). For endangered populations, Fr is set at 0.1, so that 90 percent of the endangered population's annual net production is reserved for recovery of the population. NMFS has calculated that keeping human-caused mortality at or below PBR calculated with a recovery factor of 0.1 would increase the recovery time of endangered marine mammals by no more than 10 percent (Wade 1998). For threatened and depleted populations, Fr is generally set at 0.5 so that 50 percent of the population's annual net production is reserved for recovery. The MMPA requires NMFS to calculate PBR for each population of marine mammal in its annual stock assessment reports. PBR for the endangered western DPS of SSLs is 234 animals; PBR for the threatened eastern DPS of SSLs is 2,000 animals; PBR for the depleted eastern Pacific stock of NFSs is 15,262 animals; and PBR for the San Miguel Island stock of NFSs is 219 animals (Angliss and Outlaw 2007; Carretta *et al.* 2007).

There are a number of activities that do not require the types of research permits that are the subject of this PEIS, either because they would not result in takes of SSLs, NFSs, or other protected species; or because they are otherwise exempt from the prohibitions of the MMPA and ESA. These activities would be unaffected by any of the alternatives and are described in more detail in Section 2.4.1. There would be no impact on grant programs related to these types of activities under any of the alternatives. Common to all permits under any alternative are the statutory and regulatory criteria established under Section 10(a)(1)(A) of the ESA (16 U.S.C. 1539), Section 104 of the MMPA (16 U.S.C. 1374), and NMFS implementing regulations (50 CFR §216.31-216.41 and §222.301-222.309). Scientific research permits issued by NMFS pursuant to these statutes and regulations contain a number of conditions that are intended to ensure compliance of the research with the purposes of the MMPA and ESA. Other conditions commonly included in these permits are intended as measures to mitigate potential adverse impacts of the research. Mitigation for specific research procedures is discussed in Appendix B. Under any of the alternatives, researchers could obtain permits and be awarded grants for receipt and use of tissue samples from Alaska Natives who agree to provide samples from animals that have been taken legally for subsistence harvest or from animals that have been found dead (stranded) due to other causes.

A number of issues were raised by various stakeholders with regard to process and procedures associated with coordinating, conducting, and reporting on research activities. Though not specifically identified as elements of the alternatives, these issues and a discussion on how this PEIS will help guide future NEPA compliance, are discussed in Chapter 5.

Alternative 1 – No Action: No New Permits or Authorizations

Under Alternative 1, no incidental or intentional mortality due to research activities would be authorized. The No Action Alternative would only allow research activities on SSLs and NFSs that either do not require a permit (i.e., do not result in takes of SSLs and NFSs) or are currently allowed under permits that have not been vacated by the May 26, 2006 court order (Civil Action No. 05-1392 ESH). No grants would be awarded for research that requires a permit, except for those activities authorized under existing permits. When the existing permits expire, all research activities that require a permit would cease.

This alternative would allow researchers to only use techniques that do not disturb animals in the wild, in order to monitor the populations and collect information pertinent to their recovery. Research under this alternative would not involve approaching or capturing animals to collect data. Research techniques could include remote sensing, behavioral observations, scat collection from vacant haulouts and rookeries, and aerial surveys conducted at distances and conditions that are not likely to result in takes (and therefore would not require permits). Researchers could obtain permits and be awarded grants for receipt and use of tissue samples from Alaska Natives who agree to provide samples from animals that have been taken legally for subsistence harvest and for receipt and use of tissues from animals that have been found dead (stranded) due to other causes.

Research on captive SSLs and NFSs (those already in captivity at this time) would be unaffected by these alternatives, which are specific to permits for research on free-ranging animals. However, under the No Action alternative, no additional SSLs or NFSs could be brought into captivity, either by removal from the wild or via captive breeding. There would be no change in geographic restrictions, such as the 3 nautical miles (nm), no approach buffer areas near rookery sites and the one-half statutory mile on land. These geographic restrictions are described in detail in Chapter 2 of this document.

Alternative 2 – Research Program without Capture or Handling

The policy direction of this alternative would be to issue permits and provide grant support to conduct research on SSLs and NFSs using methods that do not involve capture, restraint, tissue sampling, or risk causing animals to leave rookeries during the breeding season. This alternative would also prohibit intrusive research, where intrusive is defined in 50 CFR 216.3 to mean a procedure conducted for bona fide scientific research involving: a break in or cutting of the skin or equivalent, insertion of an instrument or material into an orifice, introduction of a substance or object into the animal's immediate environment that is likely either to be ingested or to contact and directly affect animal tissues (i.e., chemical substances), or a stimulus directed at animals that may involve a risk to health or welfare or that may have an impact on normal function or behavior (i.e., audio broadcasts directed at animals that may affect behavior). This restriction on intrusive activities would essentially limit research to census surveys and behavioral observations that have a very small potential to cause injury to animals. Under Alternative 2, the total amount of incidental mortality allowed under all permits and authorizations would not exceed 5 percent of PBR for each stock. No intentional lethal take would be authorized under Alternative 2.

Scat collection would be allowed but only from haulouts and rookeries during the non-breeding season. For research on rookeries during the breeding season, observers and remote sensing equipment would need to be placed on sites at times and in such a manner as to avoid disturbing animals. No activities involving capture, restraint, or disturbance of animals on rookeries during the breeding season would be permitted but disturbance on haulouts for resighting efforts and scat collection could be authorized. It is assumed that, under this alternative, more emphasis would be placed on developing remote sensing and other techniques that allow collection of physiological and nutritional data without capturing animals than under the Status Quo. It is likely that under this alternative there would be a higher amount of survey and observational takes requested compared to the Status Quo, as researchers would re-allocate funds and other resources away from projects that would not be permitted. Under this alternative it is assumed that the same level of non-intrusive activity for research on other marine mammal species, especially other pinnipeds such as California sea lions, as under the Status Quo alternative would occur.

Alternative 3 – Status Quo Research Program

Under the Status Quo process, permits are issued to conduct research according to the scope and methods requested in the permit applications, with restrictions and mitigation measures required by the MMPA, ESA, and NMFS implementing regulations. Alternative 3 would implement the existing grant and permit process, which flexibly accommodates changes in funding levels, management priorities, scientific interests, research techniques, population status, and threats to the populations' recovery. Proposed research programs for SSLs must have impacts at a level below that which would jeopardize the continued existence of the species or result in adverse modification of critical habitat, as required by Section 7 of the ESA.

The scope of research activities conducted under this alternative depends substantially on the amount of funding that is available. Funding for SSL research peaked in 2001 and 2002, but has since decreased. For the purposes of this PEIS, the amount of funding and level of associated research on SSLs will be assumed to have reached peak levels under the permits issued at or before the initiation of this PEIS. For the purpose of analyzing the effects of that scope of research, the average number, types, and distribution of takes allowed by all permits before the court order will be used for the analysis of effects of this alternative. A peak funding and permit level probably has not been met for NFSs. Funding levels for research on NFSs have recently increased, as has interest in obtaining permits for research on this species. Depending on future funding opportunities and interest among the research community, both of which are linked to factors such as population trends, and speculation about the contribution of commercial fisheries and other factors to population status and prospects, funding for research on NFSs may increase over time. However, new permits have not been issued, pending completion of this PEIS. Thus, for this analysis we have used the number, types, and distribution of takes allowed by all permits approved by January 2006.

Under the Status Quo alternative, new permits would be issued for the same type and scope of research as occurred under SSL permits that existed before the court order vacated them in May 2006. It would also include all other existing permits for research on SSLs and NFSs that were not affected by that order (Appendix A). New permits would be issued to replace permits as they expire, such that the levels and types of research activities would continue to the extent that funding allowed. Under Alternative 3, the total amount of incidental mortality allowed under all permits and authorizations would not exceed 10 percent of PBR for each population.

New requests for permits and amendments to existing permits would be considered on a case-by-case basis and would be granted as long as the applicants satisfied all permit issuance criteria, including having a bona fide research project that was likely to contribute to recovery of the depleted, threatened, or endangered species. Under this alternative, each new permit request would be evaluated separately during Section 7 consultation, against the baseline of impacts from whatever permits were in effect at the time of the request. New permits would only be denied if it were determined that issuance would exceed the ESA jeopardy or adverse modification threshold when impacts were added to existing research and other activities in the baseline at the time the application was received.

Alternative 4 - The Preferred Alternative – Research Program with Full Implementation of Conservation Goals

This alternative would include not only those specific activities currently or previously permitted but any additional research activities or methods that are needed to implement the 2006 Draft Revised Recovery Plan for Steller Sea Lion (NMFS 2006a) (hereafter referred to as the 2006 Draft Recovery Plan) and the new revised 2006 Draft Conservation Plan for NFS (NMFS 2006b) (hereafter referred to as the 2006 Draft Conservation Plan), assuming they are consistent with the MMPA, ESA, and NMFS implementing regulations. These plans are discussed in more detail in Sections 3.2.1 and 3.2.2 and are included in their entirety in Appendix C.

Many of the research activities related to priorities listed in the 2006 Draft Recovery Plan have been used by past and current research programs under the Status Quo permits. However, there are some research questions listed in the plan that have not received adequate attention in the past, at least for certain sex/age classes. Some of these research questions may require use of techniques or protocols that have not previously been requested or permitted on SSLs and NFSs. As such, they may involve unique or uncertain risks to the animals.

Under Alternative 4, NMFS would consider proposals for research that posed a higher risk of injury to individual animals, including intentional lethal take of moribund animals or other specified individuals, if the permit applicant could demonstrate that the research had a reasonable chance of providing significant data relevant to conservation of the species. Permit issuance criteria under the MMPA and ESA would still prohibit research from putting the species at a disadvantage or in jeopardy. Under Alternative 4, the total amount of incidental mortality allowed under all permits and authorizations would not exceed 15 percent of PBR for each population.

Regarding the eastern DPS, the 2006 Draft Recovery Plan recommended the initiation of a status review to consider removing the eastern DPS from the ESA's List of Threatened and Endangered Wildlife. Key components of this plan relative to research activities have not been prioritized in the SSL plan but would be likely to include population trend monitoring, genetics research to refine population structure, monitoring terrestrial habitat threats, monitoring for unusual mortality events that may be related to contaminants or other human factors, and monitoring of fishery management plans to ensure that these remain consistent with SSL requirements. These are activities that have been permitted under the Status Quo and would be considered under Alternative 4.

Alternative 4 represents an extensive research program that would be able to simultaneously address multiple issues over a huge geographical space. To be fully implemented, such a program would require a much larger research budget than is currently allocated to these species. It would also require greater administrative support for the Grants, Permits, and Regional Offices of NMFS in order to process the large number of projects efficiently. For the purposes of this PEIS, it is assumed that the grants and permits processes will be essentially the same as under the Status Quo. However, if adequate funding was available to implement this expanded research program, it is likely that NMFS would adopt one or more of the measures, discussed in Chapter 5, to expedite the review process and to improve communication and coordination, not only between researchers, but between the various branches of NMFS involved in the research program, the Alaska Native communities affected by research, other federal and state agencies, and the general public.

As the Preferred Alternative, this approach allows the agency to fully implement the recommendations in the species' conservation and recovery plans. Full implementation of the plans would lead to a better understanding of these species, more informed management decisions and the prospect of recovery.

Table ES-2
Research Activities Allowed Under Each Alternative

Research Activities	Alternative 1 No Action: No New Permits or Authorizations	Alternative 2 Research Program Without Capture or Handling	Alternative 3 – Status Quo Research Program	Alternative 4 Research Program with Full Implementation of Conservation Goals
Research activities on live animals with NO capture, restraint, or collection of tissues				
Aerial surveys	*	√	√	√
Vessel surveys	*	√	√	√
Ground surveys	*	√	√	√
Scat collection	*	√	√	√
Remote video/photographic monitoring	*	√	√	√
Receipt of tissue samples from Alaska Natives that have taken the animal legally for subsistence harvest	√	√	√	√
Receipt of tissue samples from animals found dead from other causes	√	√	√	√
Research activities on live animals that requires capture, restraint, or collection of tissues				
Collection of morphometric measurements	--	--	√	√
Collection of blood samples	--	--	√	√
Muscle biopsies	--	--	√	√
Skin biopsies	--	--	√	√
Blubber samples	--	--	√	√
Fecal and fluid samples	--	--	√	√
Extraction of pre-molar teeth	--	--	√	√
Collection of vibrissae, hair, and nails	--	--	√	√
Enema or stomach intubation	--	--	√	√
Bioelectric Impedance Analysis	--	--	√	√
Ultrasound	--	--	√	√
Stable isotope injection	--	--	√	√
Chromic oxide and Co-EDTA	--	--	√	√
Temporary marking	--	--	√	√

Table ES-2 (continued)
Research Activities Allowed Under Each Alternative

Research Activities	Alternative 1 No Action: No New Permits or Authorizations	Alternative 2 Research Program Without Capture or Handling	Alternative 3 – Status Quo Research Program	Alternative 4 Research Program with Full Implementation of Conservation Goals
Research activities on live animals that requires capture, restraint, or collection of tissues				
Attachment (external) of scientific instruments measurements	--	--	√	√
Attachment (external) of scientific instruments measurements	--	--	√	√
Insertion/implantation (internal) of instruments	--	--	√	√
Temporary captivity	--	--	√	√
Intentional take of animals	--	--	--	√

Note: * No new permits or authorizations would be issued under Alternative 1. However, grants could be issued and surveys, observations, and scat collections could occur under circumstances that would not result in disturbance or takes.

Key: -- Not Allowed
√ Allowed

Alternatives Not Carried Forward for Analysis

A research moratorium, which would involve not allowing any research and revoking all active research permits, was not carried forward because it would not be consistent with NMFS legal mandates; to monitor the status of marine mammals and recover threatened and endangered species. A permanent "no research" policy would end all research activities and compromise NMFS' ability to monitor distribution and abundance of the species. Without some level of research surveys, NMFS would not be able to monitor the status of the endangered population, nor assess whether protective measures, such as regulations prohibiting fishing in critical habitat, were achieving the desired effect on recovery of the species.

Alternatives that would allow research not consistent with the requirements of the MMPA and ESA, or with NMFS implementing regulations, were also not carried forward because they would not meet the minimum environmental standards established by these laws, or would require revision of the statutes by Congress. For example, an alternative that would allow researchers to conduct research using methods that would not meet the humane standard under the MMPA or that would not be likely to contribute to conservation of the endangered species that was the subject of the permit, as required by the ESA, was not considered further because it would not meet these minimum requirements of the statutes governing research on protected species. Similarly, an alternative that would allow research permits to be issued for an indefinite time period, or for longer than five years, was not carried forward because it would not meet the minimum requirements for permits as currently stipulated in NMFS implementing regulations. It is not within the scope of this PEIS to address the substantial impediments to changing the governing laws (i.e., ESA, MMPA, and NEPA) and regulations concerning research on marine mammals.

ES-7.0 Summary of Environmental Consequences

Alternative 1 – No Action: No New Permits or Authorizations

Research conducted under Alternative 1 would not cause any mortalities or sub-lethal effects on SSLs or NFSs in the wild. Due to previously collected data and samples, research conducted under Alternative 1 would provide a minor amount of information to support the conservation objectives listed in the Recovery Plan.

Alternative 2 – Research Program without Capture or Handling

With the restrictions on authorized research methods, researchers might choose to expand efforts with non-intrusive techniques or might elect not to pursue research on SSLs and NFSs. In other words, the level of non-intrusive research authorized could be more or less than the Status Quo, depending on the response of individual researchers and agencies to the policy represented in this alternative. For the purposes of analysis, the number of takes under each research activity will be defined as the numbers of animals affected by non-intrusive research activities under the Status Quo for those activities (see mortality assessment Tables 4.8-1, -2, -13, -14, -25, -26, -37, and -38).

For the western DPS of SSLs, estimated mortality from research activities under Alternative 2 is 3.4 SSLs per year (1.5 percent of PBR) which is considered negligible on the population level. The magnitude of sub-lethal effects as they relate to population level changes in productivity under Alternative 2 is unknown. Research conducted under Alternative 2 could provide a moderate amount of information to support the conservation objectives listed in the Recovery Plan. For the eastern DPS of SSLs and both populations of NFSs, estimated mortality from research activities under Alternative 2 is less than 1 percent of PBR and is considered negligible. For all of these populations, the conclusions regarding sub-lethal effects and the contribution to conservation objectives are similar to those stated above for the western DPS.

Alternative 3 – Status Quo Research Program

For Alternative 3, the numbers of animals exposed to different research activities is taken directly from the permits that were valid on January 1, 2006, including those permits that were subsequently vacated by court order on May 26, 2006 (Civil Action No. 05-1392 [see mortality assessment Tables 4.8-3 through 4.8-7, 4.8-15 through 4.8-19, 4.8-27 through 4.8-31, and 4.8-39 through 4.8-43]). It does not include activities that had been applied for (permits or amendments) but not yet authorized at the time this PEIS was initiated. For survey and monitoring types of activities, the number of animals exposed to potential disturbance depends on how many animals are in a particular place at a particular time. To account for potential interannual variation in the distribution and abundance of animals within a survey area, researchers are encouraged to estimate the maximum number of animals that could be exposed (surveyed). Researchers generally estimate this number based on information in Stock Assessment Reports (SARs) and previous experience. When applying for permits, researchers may add a "buffer" to this maximum number of animals to make sure they do not exceed their permit allowance should the actual number of animals encountered be greater than predicted.

For some activities, such as capture of juveniles at sea, researchers have applied for and received permits to capture a specific number of animals. However, due to financial constraints or the logistical difficulty of capturing animals, the actual number of captures has been less than the number authorized. For procedures that are intended to test specific hypotheses or provide statistically robust data for modeling or other applications, the number of animals requested to be captured or sampled may be based on a "power analysis" determination of sample size. Such statistical power calculations depend on the level of statistical resolution needed to either test the hypothesis or detect an environmental pattern (the effect). In all cases, the analysis of effects will be based on the number of takes authorized in the permits rather than the number of actual takes reported after the field season.

For the western DPS of SSLs, estimated mortality from research activities under Alternative 3 is 15 SSLs per year (6.3 percent of PBR) which is considered negligible on the population level. The magnitude of sub-lethal effects as they relate to population level changes in productivity under Alternative 3 is unknown. Research conducted under Alternative 3 could provide a significant amount of information to support the conservation objectives listed in the Recovery Plan. For the eastern DPS of SSLs, estimated mortality from research activities under Alternative 3 is 26 SSLs per year (1.3 percent of PBR) which is considered negligible on the population level. For the eastern NFSs, estimated mortality is less than 1 percent of PBR and is considered negligible. For the San Miguel Island NFS, estimated mortality is 5 NFSs per year (2.3 percent of PBR) which is considered negligible. For the eastern DPS of SSLs and both populations of NFSs, the conclusions regarding sub-lethal effects and the contribution to conservation objectives are similar to those stated above for the western DPS.

Alternative 4 – The Preferred Alternative - Research Program with Full Implementation of Conservation Goals

Alternative 4 includes all research activities that would be needed to address all information objectives identified in the 2006 Draft Recovery Plan SSL (NMFS 2006a). While such a program would be likely to require a substantial increase in future funding levels and the sources of that funding have not yet been established, it will be assumed for the purposes of this PEIS analysis that sufficient funding would be secured to implement an expanded research program under Alternative 4.

This alternative would include the same types of research as described in the Status Quo, plus activities that have not been authorized under the Status Quo, including new permits and permit amendments that were pending as of January 2006. It could also include some types of techniques and activities that have not been previously requested or authorized, including intentional lethal take. The scope of research required to address all 2006 Draft Recovery Plan objectives has been estimated by NMML (see mortality assessment Tables 4.8-8 through 4.8-12, 4.8-20 through 4.8-24, 4.8-32 through 4.8-36, and 4.8-44 through 4.8-48) and is used in this analysis as a proxy for the scope of proposals that would arise from many sources under a favorable funding environment.

For the western DPS of SSLs, estimated mortality from research activities under Alternative 4 is 35 SSLs per year (12.7 percent of PBR), which is considered minor on the population level. The magnitude of sub-lethal effects as they relate to population level changes in productivity under Alternative 4 is unknown. Research conducted under Alternative 4 could provide a significant amount of information to support the conservation objectives listed in the Recovery Plan. For the eastern DPS of SSLs and both populations of NFSs, the scope of research conducted under Alternative 4 would be the same as under Alternative 3 and would yield the same conclusions regarding mortality (negligible), sub-lethal effects (unknown), and contribution to conservation objectives (major).

Cumulative Effects

The 2006 Draft Recovery Plan and the 2006 Draft Conservation Plan identified a host of anthropogenic and natural factors that could be contributing to the cumulative effects on these populations. The contribution of research activities to these cumulative effects is discussed, especially with regard to potential mortality, sub-lethal effects through disturbance and injury, and efforts to promote conservation of the species.

The primary contributors to cumulative anthropogenic mortality for the western DPS of SSLs are subsistence harvest (average 191 animals per year) and incidental take in fishing gear (average 25 animals per year). This totals 216 animals per year, which is 92 percent of PBR for this population (234 animals). Alternative 1 would contribute no mortalities to this total and would therefore have no cumulative effect on mortality. Alternative 2 would contribute an estimated 3 mortalities per year, raising the overall total to about 219 animals, which is 94 percent of PBR. Alternative 3 would contribute an estimated 15 mortalities per year, raising the overall total to about 230 animals, which is 98 percent of PBR. Alternative 4 would contribute an estimated 30 mortalities per year, raising the overall total to about 245 animals, which is 105 percent of PBR. Under the criteria developed to assess the impacts of the alternatives on the population level (Table 4.4-1), the estimated mortality due to research is considered negligible under Alternatives 1, 2, and 3 and minor under Alternative 4. Using the same impact criteria, the cumulative level of mortality for this population would be considered major under all alternatives even though the contribution of research would be negligible or minor. The cumulative levels of anthropogenic mortality for the eastern DPS of SSLs and both populations of NFSs are well below 10% of PBR under all alternatives and are considered negligible.

The conclusion of a major cumulative effect from mortality for the western DPS of SSLs in this NEPA analysis does not mean that the population would decline under any of the alternatives. The impact criteria developed for this PEIS are based on thresholds of fishery related mortality that result in major regulatory changes to the fisheries. These thresholds of mortality are expressed as a percentage of PBR. The formula for PBR, as defined in the MMPA, is a precautionary or conservative measure of human-caused mortality that could be expected to affect a marine mammal population's ability to recover from a depleted state. The formula compensates for uncertainties that might prevent population recovery, such as biases in the estimation of population size, reproductive rate, or stock structure. For endangered marine mammals such as the western DPS of SSLs, the formula reserves 90 percent of the population's annual net production for recovery of the stock. This means that human-caused mortalities that exceeded PBR would not cause the population to decline (unless human-caused mortality accounted for all of the annual net production, [i.e., 1,000 percent of PBR]), but could slow the rate at which the population recovers. Total cumulative human-caused mortalities approaching or slightly above 100 percent of PBR, as what occurs under all of the alternatives, would therefore be unlikely to cause the population to decline but could slow its recovery.

Tables ES-3 through ES-10 provide summaries of the environmental consequences of the alternatives on biological and socioeconomic resources analyzed in this PEIS.

Table ES-3
Summary of Direct/Indirect and Cumulative Effects – SSLs Western DPS - Section 4.8.1

	Alternative 1: No Action; No New Permits or Authorizations	**Alternative 2: Research Program Without Capture or Handling**	**Alternative 3: Status Quo Research Program**	**Alternative 4: (Preferred Alternative) Research Program with Full Implementation of Conservation Goals**
SSL Western DPS				
Direct / Indirect effects				
Mortality	• No mechanism for mortality.	• Mortality 3.4 SSLs/yr (1.5% of PBR[1]); negligible on population level. • Disturbance effects minor.	• Mortality 14.8 SSLs/yr (6.3% of PBR[1]); negligible on population level. • Individuals could be disturbed >4x/yr; moderate effect.	• Mortality 29.8 SSLs/yr (12.7% of PBR[1]); minor on population level. • Individuals could be disturbed >5-6x/yr; moderate effect.
Sub-Lethal Effects	• No mechanism for sub-lethal effects.	• Magnitude of sub-lethal effects to productivity unknown. • Disturbance effects minor.	• Magnitude of sub-lethal effects to productivity unknown. • Individuals disturbed >4x/yr; moderate effect.	• Magnitude of sub-lethal effects to productivity unknown. • Individuals disturbed >5-6x/yr; moderate effect.
Contribution to Conservation Objectives	• Increased level of scientific uncertainty over time.	• Increased level of scientific uncertainty over time.	• Major contribution to conservation efforts. • Contributes to both immediate and long-term needs.	• Major contribution to conservation efforts. • Contributes to both immediate and long-term needs; highly dependant on funding.
Cumulative Effects				
	• No additional anthropogenic mortalities. • No additional sub-lethal effects. • Contribution to conservation efforts minimal.	• Contributes 3.4 SSL mortalities/yr. • Total mortality[2] 219/yr (93.6% of PBR[1]); major cumulative effect. • Cumulative effects of disturbance and sub-lethal effects unknown. • Contributes more data to conservation objectives than Alt. 1.	• Contributes 14.8 SSL mortalities/yr. • Total mortality[2] 230/yr (98.5% of PBR[1]); major cumulative effect. • Cumulative effects of disturbance and handling, and sub-lethal effects unknown. • Contributes more data to conservation objectives than Alts. 1 and 2.	• Contributes 29.8 SSL mortalities/yr. • Total mortality[2] 245/yr (104.9% of PBR[1]); major cumulative effect. • Cumulative effects of disturbance and handling, and sub-lethal effects unknown. • Contributes more data to conservation objectives than Alts. 1, 2 and 3.

Table ES-3 (continued)
Summary of Direct/Indirect and Cumulative Effects – SSLs Eastern DPS – Section 4.8.1

	Alternative 1: No Action; No New Permits or Authorizations	Alternative 2: Research Program Without Capture or Handling	Alternative 3: Status Quo Research Program	Alternative 4: (Preferred Alternative) Research Program with Full Implementation of Conservation Goals
SSL Eastern DPS				
Direct / Indirect effects				
Mortality	• No mechanism for mortality.	• Mortality 3.2 SSLs/yr (0.2% of PBR[1]); minor on population level. • Disturbance effects minor.	• Mortality 25.5 SSLs/yr (1.3% of PBR[1]); negligible on population level. • Individuals could be disturbed >4x/yr; moderate effect.	• Same as Alt. 3.
Sub-Lethal Effects	• No mechanism for sub-lethal effects.	• Magnitude of sub-lethal effects to productivity unknown. • Disturbance effects minor.	• Magnitude of sub-lethal effects to productivity unknown. • Individuals disturbed >4x/yr; moderate effect.	• Same as Alt. 3.
Contribution to Conservation Objectives	• New analyses and syntheses from existing data but increased scientific uncertainty over time.	• Contributes to most conservation objectives except perhaps genetics.	• Major contribution to conservation efforts. • Contributes to conservation objectives.	• Same as Alt. 3.
Cumulative effects				
	• No additional anthropogenic mortalities. • No additional sub-lethal effects. • Contribution to conservation efforts minimal.	• Contributes 3.2 SSL mortalities/yr. • Total mortality[2] 13/yr (0.7% of PBR[1]); negligible cumulative effect. • Cumulative effects of disturbance and sub-lethal effects unknown. • Contributes to all conservation objectives except perhaps monitoring disease and genetic refinement.	• Contributes 25.5 SSL mortalities/yr. • Total mortality[2] 36/yr or 1.8% of PBR[1]); negligible cumulative effect. • Cumulative effects of disturbance and handling, and sub-lethal effects unknown. • Contributes to all conservation objectives.	• Same as Alt. 3.

[1] - PBR = potential biological removal
[2] - Total mortality = total human-caused mortality (i.e., research, subsistence, commercial fishing, etc.)
Note: For more detail on effects please see Chapter 4 of the PEIS.

Table ES-4
Summary of Direct/Indirect and Cumulative Effects – NFSs -Section 4.8.2

	Alternative 1: No Action; No New Permits or Authorizations	**Alternative 2: Research Program Without Capture or Handling**	**Alternative 3: Status Quo Research Program**	**Alternative 4: (Preferred Alternative) Research Program with Full Implementation of Conservation Goals**
Eastern Pacific Stock NFS				
Direct / Indirect effects				
Mortality	• No mechanism for mortality.	• Mortality 1.2 NFSs/yr (<0.1% of PBR[1]); negligible on population level.	• Mortality 47.8 NFSs/yr (0.3% of PBR[1]); negligible on population level.	• Mortality 67 NFSs/yr (0.4% of PBR[1]); negligible on population level.
Sub-Lethal Effects	• No mechanism for sub-lethal effects.	• Duration of activities short-term. • Effects of disturbance and sub-lethal effects negligible.	• Magnitude of sub-lethal effects to productivity unknown; large number of animals disturbed. • Geographic extent and frequency/duration of disturbance moderate.	• Magnitude of sub-lethal effects to productivity unknown; large number of animals disturbed. • Geographic extent and frequency/duration of disturbance moderate.
Contribution to Conservation Objectives	• Contribution to conservation objectives minor.	• Contribution to conservation objectives minor.	• Addresses many immediate and long-term needs. • Moderate contribution to conservation efforts.	• Addresses most immediate and long-term needs. • Major contribution to conservation efforts; highly dependant on funding.
cumulative effects				
	• Mortality negligible; (< PBR of 14,546). • No cumulative sub-lethal effects. • Contribution to conservation efforts minimal.	• Contributes 1.2 NFS mortalities/. • Total mortality[2] 757/yr (5.0% of PBR[1]); negligible cumulative effect. • Cumulative effects of disturbance and sub-lethal effects unknown; contribution of research considered negligible. • Contributes more data to conservation objectives than Alt. 1.	• Contributes 47.8 NFS mortalities/yr • Total mortality[2] 804/yr (5.3% of PBR[1]); negligible cumulative effect. • Cumulative effects of disturbance and handling, and sub-lethal effects unknown. • Moderate contribution to conservation objectives; contributes more than Alts. 1 and 2.	• Contributes 67 NFS mortalities/yr • Total mortality[2] 823/yr (5.4% of PBR[1]); minor cumulative effect. • Cumulative effects of disturbance and handling, and sub-lethal effects unknown. • Major contribution to conservation objectives; contributes more than Alts. 1, 2 and 3.

Table ES-4
Summary of Direct/Indirect and Cumulative Effects – NFSs - Section 4.8.2

	Alternative 1: No Action; No New Permits or Authorizations	Alternative 2: Research Program Without Capture or Handling	Alternative 3: Status Quo Research Program	Alternative 4: (Preferred Alternative) Research Program with Full Implementation of Conservation Goals
San Miguel Island Stock NFS				
Direct / Indirect effects				
Mortality	• No mechanism for mortality.	• Mortality 0; negligible on population level.	• Mortality 5.0 NFSs/yr (2.3% of PBR[1]); negligible on population level.	• Same as Alt. 3.
Sub-Lethal Effects	• No mechanism for sub-lethal effects.	• Duration of activities short-term. • Effects of disturbance and sub-lethal effects negligible.	• Magnitude of sub-lethal effects to productivity unknown. • Geographic extent of disturbance is major (concentrated on San Miguel Island). Duration and frequency is minor	• Same as Alt. 3. Additional methods/ procedures could be authorized but are unknown at this time.
Contribution to Conservation Objectives	• Not listed as threatened or endangered; no conservation objectives.	• Not listed as threatened or endangered; no conservation objectives.	• Not listed as threatened or endangered; no conservation objectives.	• Not listed as threatened or endangered; no conservation objectives.
cumulative effects				
	• No additional anthropogenic mortalities. • No additional sub-lethal effects. • Not listed as threatened or endangered; no conservation objectives.	• Population is increasing; no population-level effects expected therefore, cumulative effect negligible. • Cumulative effects of disturbance and sub-lethal effects unknown; contribution of research considered negligible. • Not listed as threatened or endangered; no conservation objectives.	• Contributes 5.0 NFS mortalities/yr • Total mortality[2] 5.7/yr (2.7% of PBR[1]); negligible cumulative effect. • Cumulative effects of disturbance and handling, and sub-lethal effects unknown. • Not listed as threatened or endangered; no conservation objectives.	• Same as Alt. 3. • Additional methods/ procedures could be authorized but are unknown at this time.

[1] - PBR = potential biological removal
[2] – Total mortality = total human-caused mortality (i.e., research, subsistence, commercial fishing, etc.)
Note: For more detail on effects please see Chapter 4 of the PEIS.

Table ES-5
Summary of Direct/Indirect and Cumulative Effects - Killer Whales, other ESA-Listed Species, and Other Marine Mammals (Cetaceans, Pinnipeds) - Sections 4.8.3, 4.8.4, 4.8.5

Effect		Alternative 1 No Action: No New Permits or Authorizations	Alternative 2 Research Program without Capture or Handling	Alternative 3 Status Quo Research Program	Alternative 4 (Preferred Alternative) Research Program with Full Implementation of Conservation Goals
Direct/Indirect	Effects on survival or reproductive success due to SSL and NFS research	• Research vessels investigating the role of killer whale in SSL and NFS population dynamics not requiring authorization for incidental take or disturbance could result in rare injury or death from strikes, as well as short-term discharges and increased turbidity. • Effects of research on California sea lions as a surrogate species for SSLs would be short-term and negligible. • Overall effects considered negligible.	• Likely increase in marine vessel research due to permitted incidental take or disturbance of SSL and NFS; potential effects resulting mortality, injury, and disturbance considered negligible. • Potential local increase in available killer whale prey around rookeries and haulouts. • Overall effects considered negligible.	• The frequency and geographic extent of marine vessel use for the purposes of research could increase; potential effects resulting mortality, injury, and disturbance considered negligible. • Overall effects considered negligible.	• Similar to Alternative 3, effects considered negligible.
	Disturbance due to SSL and NFS research	• Marine research vessel disturbance from visual cues and noise pollution could result in stress and avoidance behavior, displacement, interference with whale communication and echolocation, modifications to whale surfacing, respiration, and diving cycles. • Short-term disturbance of other animals during California sea lion research activities is considered negligible. • Overall effects considered short-term and negligible.	• Marine research vessel disturbance would result in the same effects as Alternative 1. • Opportunistic sightings during SSL and NFS low-altitude aerial surveys could cause negligible behavioral changes in a few individuals. • Sea otters concentrated in the vicinity of SSL and NFS haulouts could potentially be disturbed, effects considered negligible. • Overall effects considered negligible.	• Few or no marine vessels or aircraft would seek out or occur in the vicinity of whales under this alternative, there would be no measurable effects of disturbance. • Few sea otters are likely to occupy areas where research activities occur. • Overall effects considered negligible.	• Similar to Alternative 3, effects considered negligible.

Table ES-5 (continued)
Summary of Direct/Indirect and Cumulative Effects - Killer Whales, other ESA-Listed Species, and Other Marine Mammals (Cetaceans, Pinnipeds) - Sections 4.8.3, 4.8.4, 4.8.5

Effect		**Alternative 1** **No Action: No New Permits or Authorizations**	**Alternative 2** **Research Program without Capture or Handling**	**Alternative 3** **Status Quo Research Program**	**Alternative 4** **(Preferred Alternative) Research Program with Full Implementation of Conservation Goals**
Cumulative		• Potential killer whale cumulative effects difficult to predict (commercial fisheries, intentional shooting, vessel traffic, and marine pollution, global climate change, long-term regime shifts). • Internal (few) and external (numerous) factors could affect survival and reproductive success of other ESA species. De-listing likely prevented as a result of past actions. • There has been no apparent affect on California sea lions from past or present actions, including incidental research. • California sea lions removed from the wild for research as a surrogate to SSLs would not approach the species' PBR. • Negligible contribution to overall cumulative effects from SSLs and NFSs research activities.	• Same as Alternative 1. • Negligible contribution to overall cumulative effects from SSLs and NFSs research activities.	• Same as Alternative 1. • Negligible contribution to overall cumulative effects from SSLs and NFSs research activities.	• Same as Alternative 1. • Negligible contribution to overall cumulative effects from SSLs and NFSs research activities.

Table ES-6
Summary of Direct/Indirect and Cumulative Effects – Seabirds - Section 4.8.6

Effect		**Alternative 1** **No Action: No New Permits or Authorizations**	**Alternative 2** **Research Program without Capture or Handling**	**Alternative 3** **Status Quo Research Program**	**Alternative 4 (Preferred Alternative)** **Research Program with Full Implementation of Conservation Goals**
Direct/Indirect	Effects on survival or reproductive success due to SSL and NFS research	• Potential effects when accessing high ground above the SSL and NFS rookeries for behavioral observation or installation/maintenance of remote sensing equipment. • Negligible affect on survival and reproductive success.	• Aerial surveys not anticipated to affect nesting seabird ESA-listed bird species. Mortality of adults or chicks unlikely based on aircraft elevation. • Effect of research activity considered negligible.	• Potential disturbance increase to adjacent nesting seabirds from land-based census activities and intensive sampling. • Effects to reproductive success from land-based activities would be very low. • Effects of disturbance from research activity on seabird survival or productivity would be negligible. • Effects on ESA-listed species are unlikely and are considered negligible.	• Same as Alternative 3, effects considered negligible.
	Disturbance due to SSL and NFS research	• Potential nesting disturbance associated with remote observations of SSL or NFS, installation and maintenance of remote camera equipment, especially if helicopters use is required. • Effects are considered negligible.	• Potential effects from short-term aerial survey overflights and land-based observations. Potential for small loss of eggs or chicks from panic flights. • Effects considered negligible.	• Potential effects from short-term aerial survey overflights and land-based observations would be the same as Alternative 2. Effects from scat collection or other survey activity would be negligible. • Effects considered negligible.	• Potential effects from short-term aerial survey overflights and land-based observations would be the same as Alternative 2. • Effects considered negligible.
Cumulative		• All seabird groups have experienced infrequent mortality events in the recent past, and all are susceptible to future human-caused mortality factors. • Negligible contribution from SSLs and NFSs research activities.	• Same as Alternative 1. • Negligible contribution from SSLs and NFSs research activities.	• Same as Alternative 1. • Negligible contribution from SSLs and NFSs research activities.	• Same as Alternative 1. • Negligible contribution from SSLs and NFSs research activities.

Table ES-7

Summary of Direct/Indirect And Cumulative Effects – Subsistence Harvest – Section 4.9

Effect	Alternative 1: No Action; No New Permits or Authorizations	Alternative 2: Research Program Without Capture or Handling	Alternative 3: Status Quo Research Program	Alternative 4: (Preferred Alternative) Research Program with Full Implementation of Conservation Goals
SUBSISTENCE HARVEST				
Direct/Indirect	• None of the research methods would directly affect the subsistence harvest of SSLs or NFSs, therefore direct effects are considered to be negligible. • Depending on the ultimate biological consequences of the reduced scope of research, the indirect effects could be minor.	• It is unlikely that any of the research methods would directly affect the subsistence harvest of SSLs or NFSs, therefore direct effects are considered to be negligible. • Depending on the ultimate biological consequences of the reduced scope of research, the indirect effects could be minor.	• It is likely that only a few, if any, of the same individual SSLs or NFSs used for research would be included in the subsistence harvest, therefore direct effects are considered to be negligible. • Because basic informational needs outlined in the Plans would be addressed, indirect effects are considered positive and minor.	• The possible intensity and wide geographic area of permitted research has the potential to affect SSL subsistence harvest, therefore direct impacts are considered to be moderate. • Because research would directly address the needs outlined under the Plans, indirect effects to SSL are considered positive and minor. • It is likely that only a few, if any, of the same individual NFSs used for research would be included in the subsistence harvest, therefore direct and indirect effects are considered to be negligible.
Cumulative	• Depending on how economic change is negotiated, small communities that rely heavily on SSL and NFS subsistence harvest may result in a minor cumulative effect.	• Depending on how economic change is negotiated, small communities that rely heavily on SSL and NFS subsistence harvest may result in a minor cumulative effect.	• Subsistence activities of SSLs and NFSs would return to level prior to vacation of permits, resulting in negligible cumulative effects.	• The extent of the effect on harvesters is unknown and is ultimately dependent on the level of overlap between SSL and NFS subsistence populations and those studied by researchers. • Cumulative effects are considered moderate to major, with major effects being more possible in small communities.

Table ES-8

Summary of Direct/Indirect And Cumulative Effects – Interactions with Communities – Section 4.9

Effect		Alternative 1: No Action; No New Permits or Authorizations	Alternative 2: Research Program Without Capture or Handling	Alternative 3: Status Quo Research Program	Alternative 4: (Preferred Alternative) Research Program with Full Implementation of Conservation Goals
INTERACTIONS WITH COMMUNITIES					
Direct/ Indirect	Economic	• For larger and more economically diversified communities, the decrease in revenue associated with less research is likely to result in negligible direct impacts. • Smaller communities, such as St. George and St. Paul, could experience minor direct impacts. • A redirection of research funds could result in minor indirect effects.	• For both small and large communities, the potential decrease (but possible maintenance) in revenue associated with different research methods is likely to result in negligible direct impacts. • A redirection of research funds could result in minor indirect effects.	• As research practices would be the same as those prior to the court order, direct and indirect effects are considered negligible.	• The proposed intensity and wide geographic range of research, direct effects are considered to range between minor and major, on a localized basis in some communities. • The possible intensity and wide geographic area of permitted research would result in moderate direct impacts. • Indirect effects considered negligible.
	Educational	• For more populous communities, the decrease in education opportunities is likely to result in negligible direct impacts. • Communities such as St. George and St. Paul, where research related education opportunities are important to a higher proportion of the population, could experience minor indirect impacts. • A redirection of research funds could result in minor indirect effects.	• The educational opportunities that remain would be less engaging than the Status Quo, but still available, therefore the direct educational effects are considered negligible. • A redirection of research funds could result in negligible indirect effects.	• As research practices would be the same as those prior to the court order, direct and indirect effects are considered negligible.	• Educational opportunities would likely increase, therefore direct effects would range from negligible in large communities to major in small communities. • Indirect effects are considered negligible.

Table ES-8

Summary of Direct/Indirect And Cumulative Effects – Interactions with Communities – Section 4.9

Effect		Alternative 1: No Action; No New Permits or Authorizations	Alternative 2: Research Program Without Capture or Handling	Alternative 3: Status Quo Research Program	Alternative 4: (Preferred Alternative) Research Program with Full Implementation of Conservation Goals
INTERACTIONS WITH COMMUNITIES					
Direct/ Indirect	Sociocultural	• The potential for positive and/or negative sociocultural interactions would decrease, therefore direct effects are considered negligible. • A redirection of research funds could result in negligible indirect effects.	• The potential for positive and/or negative sociocultural interactions would decrease, therefore direct effects are considered negligible. • A redirection of research funds could result in longer stays in local communities to collect data, therefore indirect effects range from minor to negligible.	• As research practices would be the same as those prior to the court order, direct and indirect effects are considered negligible.	• The proposed intensity and wide geographic range of research would result in some direct sociocultural interactions. Therefore effects are considered to be negligible (especially if community collaboration continues). • Indirect effects are considered negligible.
Cumulative		• Cumulative effects would be considered minor, depending of how members of the community negotiate economic growth or recession.	• Cumulative effects would be considered minor, depending of how members of the community negotiate economic growth or recession.	• Cumulative effects would be considered negligible, depending of how members of the community negotiate economic growth or recession.	• The proposed intensity and wide geographic range of research has the potential to result in major cumulative effects in smaller communities and minor to moderate cumulative effects in larger communities

Table ES-9
Summary of Direct/Indirect And Cumulative Effects – Environmental Justice – Section 4.9

Effect	Alternative 1: No Action; No New Permits or Authorizations	Alternative 2: Research Program Without Capture or Handling	Alternative 3: Status Quo Research Program	Alternative 4: (Preferred Alternative) Research Program with Full Implementation of Conservation Goals
ENVIRONMENTAL JUSTICE				
Direct/Indirect	• No direct effects on subsistence harvest. Educational outreach would likely decrease. Therefore, direct effects are considered minor. • Permitting restrictions and lack of research may potentially contribute to a failure to stop or reverse population declines which may influence subsistence harvesting in some small communities. Therefore, indirect effects are considered minor.	• No direct effects on subsistence harvest. Educational outreach and volunteer opportunities would likely continue. Therefore, direct effects are considered negligible. • Permitting restrictions and lack of research may potentially contribute to a failure to stop or reverse population declines which may influence subsistence harvesting in some small communities. Therefore, indirect effects are considered minor.	• As research practices would be the same as those prior to the court order, direct and indirect effects are considered negligible.	• Due to increased research scope and intensity, some of the research practices (i.e., chemical and drug injections and aerial surveys) could influence Alaska Native subsistence use of SSL and/or NFS in small coastal communities. Therefore, direct effects are considered moderate. • Indirect effects are considered negligible.
Cumulative	• Lower research levels could lead to a decrease in educational interaction opportunities and lower numbers of animals available for subsistence. Therefore, cumulative effects are considered minor.	• Lower research levels could lead to a decrease in educational interaction opportunities and lower numbers of animals available for subsistence. Therefore, cumulative effects are considered minor.	• As research practices would be the same as those prior to the court order, direct and indirect effects are considered negligible.	• Due to increased research scope and intensity, some of the research practices (i.e., chemical and drug injections and aerial surveys) could influence some subsistence animals used by small communities. Therefore, cumulative effects are considered minor.

Table ES-10
Summary of Direct/Indirect And Cumulative Effects –Economic Effects of Funding for Research– Section 4.10

Effect	Alternative 1: No Action; No New Permits or Authorizations	Alternative 2: Research Program Without Capture or Handling	Alternative 3: Status Quo Research Program	Alternative 4: (Preferred Alternative) Research Program with Full Implementation of Conservation Goals
ECONOMIC EFFECTS OF FEDERAL FUNDING FOR SSL AND NFS RESEARCH				
DIRECT/INDIRECT EFFECTS				
Economic Effects of Changes in Research Expenditures	• Due to permitting restrictions, research would be of limited value, which would likely lead to less available research funding. Reduced funding would likely have major negative direct and indirect effects to both institutional and independent researchers.	• Depending on the amount of funding for non-intrusive research that could be procured, direct and indirect negative effects would be considered minor to both institutional and independent researchers.	• Because funding would maintain at about Status Quo levels, direct and indirect effects would be considered negligible to both institutional and independent researchers.	• Because it is unclear whether a more extensive research program would actually lead to greater funding levels, direct and indirect positive effects would be range from minor to moderate to both institutional and independent researchers.
Economic Effects of Changes in Research Output	• Permitting restrictions and a lack of research might contribute to a failure to stop or reverse population declines Therefore, negative direct and indirect effects would be considered major to the concerned public. • The direct and indirect effects among the public concerned about research-associated mortality would be negligible.	• To the extent that conservation objectives would be addressed, direct and indirect positive effects to the concerned public could be minor to major, depending on the ultimate biological outcome of the research. • The direct and indirect effects among the public concerned about research-associated deaths would be minor.	• To the extent that conservation objectives would be addressed, direct and indirect positive effects to the concerned public could be minor to major, depending on the ultimate biological outcome of the research. • The direct and indirect effects among the public concerned about research-associated deaths would be moderate.	• To the extent that conservation objectives would be addressed, direct and indirect positive effects to the concerned public could be minor to major, depending on the ultimate biological outcome of the research. • The direct and indirect effects among the public concerned about research-associated deaths would be moderate to major.

Table ES-10
Summary of Direct/Indirect And Cumulative Effects –Economic Effects of Funding for Research– Section 4.10

Effect	Alternative 1: No Action; No New Permits or Authorizations	Alternative 2: Research Program Without Capture or Handling	Alternative 3: Status Quo Research Program	Alternative 4: (Preferred Alternative) Research Program with Full Implementation of Conservation Goals
CUMULATIVE				
Economic Effects of Changes in Research Expenditures	• The highly restrictive research environment (and lack of new scientific contributions) would offer the least incentive for federal research investments. Therefore, cumulative effects would be considered major.	• The moderately restrictive research environment would offer moderate incentive for federal research investments. Therefore, cumulative effects would be considered minor.	• The permissive research environment (and possibility of new scientific contributions) would offer researchers a greater ability to offset federal funding losses with other sources. Therefore, cumulative effects would be considered minor.	• The highly permissive research environment (and possibility of new scientific contributions) would offer researchers the greatest ability to offset federal funding losses with other sources. Therefore, cumulative effects would be considered moderate.
Economic Effects of Changes in Research Output	• The highly restrictive research environment might contribute to a failure to stop or reverse population declines. Therefore, cumulative effects on public welfare loss associated with extinction of populations are considered major. • Cumulative effects on public welfare loss due to research-associated mortality are considered negligible.	• The moderately restrictive research environment might help to stop or reverse population declines. Therefore, cumulative effects on public welfare gain associated with survival of populations are considered minor. • Cumulative effects on public welfare loss due to research-associated mortality are considered minor.	• The permissive research environment might help to stop or reverse population declines. Therefore, cumulative effects on public welfare gain associated with survival of populations are considered moderate to major. • Cumulative effects on public welfare loss due to research-associated mortality are considered moderate.	• The highly permissive research environment might help to stop or reverse population declines. Therefore, cumulative effects on public welfare gain associated with survival of populations are considered moderate to major. • Cumulative effects on public welfare loss due to research-associated mortality are considered moderate to major.

ES-8.0 NEPA Compliance Implementation and Recommendations

The SSL and NFS Research PEIS addresses research permit and grant activities that are expected to occur over the foreseeable future. The process for preparing grant and research permit applications and how they will be reviewed for NEPA compliance using this PEIS is described in more detail in Chapter 5. In addition to providing a NEPA compliance "road map", Sections 5.1 and 5.2 provide guidance to research permit and grant applicants in preparing their applications, and provide other stakeholders with an understanding of the level of subsequent NEPA review that will take place.

NMFS anticipates that applications for grants, new permits, and amendments to permits will be submitted in the future. There is no formal schedule for submission of permit applications or limitation on the date by which applications must be received, meaning they can be submitted at any time throughout a calendar year. The permit process schedule is thus initiated and driven by the applicants. In contrast, the schedule for submission of grant applications is initiated by NMFS with a call for proposals, the timing of which will depend on availability of funds. Each time a permit application is received or a grant cycle is initiated, the requests will be reviewed by NMFS to determine whether the activity proposed by the applicant is covered by the assessment of impacts in the Final SSL and NFS Research PEIS.

The Final SSL and NFS Research PEIS identifies Alternative 4 as the Preferred Alternative. The Record of Decision (ROD) associated with the PEIS will identify any conditions of approval that are relevant to permit and grant applications, and will provide a listing of research permit and grant activities addressed by the Preferred Alternative. Both constitute a decision document that will be used for the purpose of documenting NEPA compliance of ongoing and future activities addressed within the PEIS. Proposed research permit and grant activities that are identified and analyzed within the Preferred Alternative will be subject to routine NEPA compliance implementation. Proposed research permit and grant activities that are not identified and analyzed within the Preferred Alternative will be subject to a separate NEPA compliance action, to be determined at the time the application is submitted.

Coordination of the Grant and Permit Review Process

At present, grant and research permit applications are submitted separately, and often at different times, therefore individual NEPA compliance reviews are conducted separately by F/PR1 and Grants Program staff for permits and grants, respectively. Staff from these two program offices coordinate to the extent practicable, and share NEPA compliance documentation where applicable. This process will be reviewed by NMFS to determine whether more formalized coordination is appropriate. NMFS will develop a process for linking permit and grant reporting compliance, including enforcement purposes.

Coordination of Research and Monitoring of Effects

There is a need to analyze the results of monitoring that has occurred, and to establish new monitoring requirements and incorporate them in a long-term monitoring plan. Therefore, in response to this concern, NMFS intends to phase-in the implementation of the Preferred Alternative during 2007, and 2008 if necessary, to limit approval of intrusive activities associated with rookery research during pupping season to a specific set of rookeries and haulouts, some of which will be subject to a permit condition to conduct a post-research activity monitoring program to observe the potential effects of research activities. Results of the monitoring program will be assessed to determine the uncertainty that currently exists regarding research effect, and determine what conditions subsequent to intrusive actions at rookeries and haulouts should be permitted and implemented into a long-term research coordination and monitoring plan (Section 5.2.1).

Development of a Formalized Research Implementation Plan

The 2006 Draft SSL Recovery Plan describes the need for an implementation plan and team as follows: "An implementation plan should be developed that includes a comprehensive ecological and conceptual framework that integrates and further prioritizes the numerous recovery actions provided in this plan. The implementation plan should provide a synthesis of the individual actions and coordinate their implementation in a cohesive strategy (Section V.B)". The 2006 Draft NFS Conservation Plan also references the need for an implementation schedule.

- The 2006 Draft SSL Recovery Plan also places the responsibility for monitoring of combined impacts of research at the NMFS Alaska Region. While the implementation of that plan may rest at a NMFS regional office, NMFS believes the development of that plan should be the responsibility of an independent review group. Section 202 of the MMPA recommends that the Marine Mammal Commission (MMC) and its Committee of Scientific Advisors, or a similar body, undertake, or cause to be undertaken, reviews and studies as it deems necessary in connection with its assigned duties as to the protection and conservation of marine mammals, and conduct reviews of, amongst other activities, research programs conducted under the authority of the MMPA, and of all applications for permits for scientific research, and further to recommend to the Secretary such steps as it deems necessary or desirable to protect and conserve marine mammals with regards to these activities. NMFS believes the development of this plan is of such importance that the MMC and its Committee of Scientific Advisors should oversee the development of the research implementation plan and provide that plan to the Secretary as a recommendation for its implementation. At this time demonstration of an effective effort to implement a long-term research plan for SSLs and NFSs may be the single most important thing that NMFS can do to instill a sense of confidence and trust in the research and management efforts on behalf of the species of concern.

Animal Welfare Act Compliance and Best Practices

NMFS recognizes the need for an IACUC committee and has determined that an IACUC review process must be common to all alternatives. Thus, NMFS will be developing an IACUC independent of this NEPA process. SSL and NFS research, as well as all other marine mammal research, will be subject to the IACUC review once the process is established. At present NMFS has appointed a committee to develop a policy on how to implement this process. The committee will determine whether IACUCs should be established for each science center, regionally, or nationally. For more detail, please see Chapter 5.

Coordination with Alaska Native Organizations

NMFS has formally established co-management agreements with Alaska Native organizations for specific marine mammals, including SSLs and NFSs (Appendix F). In addition, the agency recognizes both the special relationship provided under Government-to-Government Consultation requirements (Executive Order 13175), and potential contribution of traditional knowledge to the management of SSLs and NFSs. Chapter 5 provides some recommendations for additional coordination with Alaska Natives regarding SSL and NFS research.

ES-9.0 Next Steps

This executive summary is a snapshot of the contents of the Steller Sea Lion and Northern Fur Seal Research Final PEIS. Following release of the final PEIS to the public in May 2007, the Agency will make its decision concerning SSL and NFS research. NMFS will issue its ROD no later than June 2007. This decision document will conclude the NEPA process on the proposed action. For updates on the Final PEIS, please visit the NMFS website at http://www..nmfs.noaa.gov/pr/permits/eis/steller/htm.

1.0 PURPOSE AND NEED

1.1 Introduction

The National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS) is responsible for management, conservation, and protection of Steller sea lions (SSLs), *Eumetopias jubatus*, under the Endangered Species Act (ESA) (16 United States Code [U.S.C.] 1531 *et seq.*) and the Marine Mammal Protection Act (MMPA) (16 U.S.C. 1361 *et seq.*) and of Northern fur seals (NFSs), *Callorhinus ursinus*, under the MMPA. NFSs in the Pribilof Islands are also managed under the Fur Seal Act of 1966 (16 U.S.C. 1151 *et seq*.).

In 1990, NMFS listed SSLs as "threatened" under the ESA, and in 1997 it recognized two distinct populations: western and eastern. The segment of the population west of 144° West (W) longitude was listed as "endangered," while the segment of the population east of this delineation remained listed as "threatened." Both distinct populations of SSLs are listed as depleted stocks under the MMPA. NFSs, recognized as two distinct stocks (eastern Pacific and San Miguel), have never been listed under the ESA, but the eastern Pacific stock was listed as "depleted" in 1988 (then as the Pribilof Islands population) under the MMPA. A detailed history of these two species is provided in Chapter 3, Affected Environment.

NMFS administers a research program that includes (1) directed grants from the Alaska Region's operational budget, (2) "pass-through" grants detailed in the federal budget, and (3) permits issued pursuant to the MMPA and ESA for the purpose of promoting research on SSLs and NFSs in lands and waters under United States (U.S.) jurisdiction. Most research activities require permits, which NMFS administers to qualified individuals and institutions from the NMFS Office of Protected Resources, Permits Division (F/PR1). Permits are granted provided the proposed research activities are consistent with the requirements of the ESA, MMPA and the criteria in NMFS implementing regulations (50 Code of Federal Regulations [CFR] parts 216, 222, 223, and 224). The proposed action is to disburse federal funds and issue permits for research on SSLs and NFSs, consistent with applicable federal laws.

In determining which research activities are likely to contribute to the recovery of an ESA-listed species, NMFS refers to the species recovery plan. A recovery plan, as required under Section 4 of the ESA, describes site-specific management actions necessary to help the population stabilize and recover to the point at which it can be delisted from the ESA. NMFS published the original SSL Recovery Plan in 1992 (NMFS 1992a) and recently released an updated 2006 Draft SSL Recovery Plan (NMFS 2006a) to reflect new information on the status of both the western and eastern stocks. Research efforts on SSLs during most of the 1990s were guided by recommendations contained in the 1992 SSL Recovery Plan. Research funding for federal agencies during this period was less than $1 million annually, of which over half was required for population monitoring surveys.

During the late 1990s, SSL research activities intensified as recent scientific findings, litigation, and new legislation focused increasing attention on the species' ongoing population decline and concerns over possible impacts by commercial fisheries in Alaskan waters. This renewed attention was manifested in a seven-fold increase in research funding between 2000 and 2001, with over 125 individual projects planned or implemented. This increase in funding resulted in a corresponding increase in the number of permits requested and issued for research on this species. A wide spectrum of research entities were engaged in these studies, including federal and state agencies, universities, and non-governmental research organizations. In cooperation with the entities that received federal funding, NMFS developed a research coordination framework to clarify the context of individual research projects, to show their relationships to each other, and to link them to the underlying hypotheses that might explain the continued decline of the western SSL population.

Research on NFSs has, to date, received less attention. However, the similarity of NFS population decline to that of the western SSL population has prompted increased interest in understanding the reasons for the NFS decline. As a result, there has been a three-fold increase in the number of applications for permits to conduct research on NFSs. In response to this increased interest in research, and in anticipation of further increases in the number of permit applications to study NFSs, NMFS is evaluating the potential effects of research on this species as well in this Programmatic Environmental Impact Statement (PEIS). For species listed as depleted under the MMPA, NMFS is required to develop a Conservation Plan to help guide research and management activities and to promote the recovery of the species. A NFS Conservation Plan was originally published in 1993 (NMFS 1993) and was updated in 2006 (NMFS 2006b).

Most federal agencies are required by the National Environmental Policy Act (NEPA) (42 U.S.C. 4321 *et seq.*) to prepare an environmental assessment (EA) or EIS prior to any decision-making on actions that may have the potential to cause environmental impacts. NMFS complies with this NEPA requirement under the NOAA Administrative Order (NAO) 216-6 prior to such decision-making. Generally, NEPA requirements for preparing an EA or EIS are not triggered by issuance of scientific research permits and awarding research grants. However, when the activities that would be authorized in a scientific research permit (1) would have uncertain environmental impacts or unique or unknown risks; (2) would establish a precedent or decision in principle about future proposals; (3) may result in cumulatively significant impacts; or (4) may have any adverse effects upon threatened or endangered species and their habitats, the preparation of an EA or EIS is required (NMFS 2005b). For these reasons, this EIS is programmatic in nature to address the impacts of pending and future research activities and provide guidance for subsequent tiered NEPA compliance.

NMFS has determined that the act of awarding research grants is a federal action requiring compliance with NEPA. Similarly, issuance of permits for research activities on marine mammals is a federal action requiring NEPA compliance. These permits are issued pursuant to the provisions of the ESA, the MMPA, and NMFS regulations implementing these statutes.

1.2 Purpose and Need for Action

1.2.1 Purpose

The purpose of the research on SSLs and NFSs, as stated in the 1992 SSL Recovery Plan and the 1993 NFS Conservation Plan, is to promote the recovery of the species' populations to levels appropriate to justify removal from ESA listings, and to delineate reasonable actions to protect the depleted species under MMPA. NMFS awards grants to support research on SSLs and NFSs, and issues permits to allow an exemption to the prohibition on ''takes[1]'' of SSLs and NFSs, established under the ESA and MMPA. By awarding research grants and permitting investigators to monitor these species and their populations and conduct studies that enhance NMFS' understanding of the causes of population decline, NMFS can subsequently develop more informed and effective management actions that promote recovery and conservation of the species.

The ESA and the MMPA prohibit takes of threatened and endangered species, and of marine mammals, respectively. Many research activities, including aerial and vessel-based surveys, tagging and marking procedures, attachment of scientific instruments, and collection of tissue samples, require approaching or capturing animals and may result in harassment or other acts prohibited under the ESA and MMPA. There are two basic ways NMFS counts takes for permitting research: the number of takes per species/stock and the number of takes per animal. In the first case, any animal exposed to an activity with the potential to disturb or injure is considered a take under the MMPA definition. Thus, all animals exposed to an aerial survey, regardless of their response, are permitted as a take. For the later case, each capture event, type of mark or instrument applied, type of sample collected, or procedure performed is considered a take because each act has the potential to disturb or injure the animal.

[1] ESA defines ''take'' as ''to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.'' Under the MMPA, ''take'' is defined as to ''harass, hunt, capture, collect or kill, or attempt to harass, hunt, capture, collect or kill any marine mammal.'' Since research activities in the field often involve close approach or capture of animals, the purpose of issuing permits is to allow researchers specific exemptions to the prohibition on ''takes'' under the ESA and MMPA.

1.2.2 Need

The need for research is rooted in fundamental questions related to understanding the biology and ecology of SSLs and NFSs, including population trends, reproductive mortality rates, foraging behavior, and energetics, as well as other factors that may be limiting the populations, such as habitat loss or degradation, predation, parasitism, and disease. The need for the proposed action stems from the responsibility of NMFS to implement the ESA and MMPA for species under its jurisdiction. For SSLs and NFSs, the need is to facilitate research to: (1) promote recovery; (2) identify factors limiting the population; (3) identify reasonable actions to minimize impacts of human-induced activities; and (4) implement conservation and management measures.

The need for this PEIS includes satisfying NMFS' obligations under NEPA by analyzing the environmental consequences of research it authorizes on SSLs and NFSs, sharing and soliciting public comments on this information, and providing the basis for NMFS research grant and permit decisions. As part of this action, Chapter 5 of this PEIS explores measures that could improve efficiency and avoid unnecessary redundancy in SSL and NFS grant and permit process, best management practices, and coordination of research.

1.3 Current Research and Associated Permits

1.3.1 Steller Sea Lions

At present, 23 active grants fund research projects that involve human interaction with SSLs. All active and anticipated SSL research funded by past, present, and expected future federal grants are covered by this PEIS document. Research activities taking place under active grants range from actions such as aerial surveys, which could disturb individual sea lions, to the capture of sample populations, for collection of blood and tissue samples. A description of permits valid between January 1, 2006 and December 31, 2011 may be found in Appendix A of this PEIS. Together, these permits currently authorize takes of SSLs throughout their range in the U.S. by a variety of research activities. In addition to authorizing various studies, the permits allow for the mortality of up to 60 SSLs per year incidental to research activities, not to exceed 18 SSLs from the western population. Applications for additional permits for studies of SSLs using these and other methods are anticipated for at least as long as this species is listed under the ESA. Further, NMFS has an ongoing obligation under Section 117 of the MMPA to prepare stock assessments for each marine mammal stock in waters under the jurisdiction of the U.S. These stock assessments, which must describe the geographic range, minimum population estimate, current and net productivity rates, annual human-caused mortality and serious injury, and other factors that may be causing a decline or impeding recovery, are largely dependent upon information obtained from activities conducted under research permits. Thus, NMFS anticipates a need to continue to issue permits for research on SSLs for as long as this requirement of the MMPA holds.

Other permits authorized for research on captive animals, studies involving tissue samples only, studies related to killer whale predation, and studies in which harassment of SSLs is incidental to other marine mammal research are not listed above. Permitted activities are described in Section 2.3 and include the following general research activities:

- Aerial, vessel, and ground surveys
- Scat collection
- Capture and temporary restraint
- Standard morphometric procedures (external measurements of an animal)
- Tissue sampling (e.g., skin, muscle, blubber, vibrissae, teeth, blood)
- Body composition analysis by injection of stable isotopes, ultrasound, bioelectric impedance analysis (BIA), portable metabolic chamber
- External and internal scientific instruments

- Stomach intubation and enemas
- Removal from the wild for temporary captivity and associated studies

However, the current status of permits for SSL research has been affected by a recent court ruling related to a lawsuit initiated by The Humane Society of the United States (HSUS). On May 26, 2006, the U.S. District Court in the District of Columbia vacated six SSL research permits and amendments and directed NMFS to prepare an EIS (The Humane Society of the United States v. Department of Commerce, 05-1392-ESH, D.D.C.). On June 30, 2006, the court allowed a very limited number of activities to go forward, in accordance with a settlement agreement between NMFS and plaintiff, HSUS. This research was limited to activities that did not involve capture or handling of animals and resulted in only minimal disturbance (i.e., aerial and vessel surveys and remote observations).

Appendix B provides an overview of the current (prior to the court vacating any permitted activities) research techniques used on SSLs and NFSs, summarizes the potential effects of these techniques, and describes the types of information collected using different techniques and how that information may be used.

1.3.2 Northern Fur Seals

Consistent with the purpose of the MMPA the purpose of conducting research on NFSs is to contribute to the basic knowledge of marine mammal biology and ecology and to identify, evaluate, or resolve conservation problems for the species. Research needs for conservation of this species are identified in the NFS Conservation Plan. Currently, the Alaska Region has not made any specific grant awards for NFS research. However, one pass-through SSL grant does support a small NFS study. Six permits or authorizations are currently active for research directed at NFS in the wild and are valid through October 1, 2010. Active permits for research on NFSs in the wild, valid through October 1, 2010, may be found in Appendix A of this PEIS. The active permits authorize takes of NFSs in California, and in Alaska on the Pribilof Islands and Bogoslof Island. As with SSLs, these permits authorize a variety of research activities ranging from vessel or aerial surveys that may disturb animals, to capture and sampling of animals, which may result in injury or incidental mortality. Applications for additional permits for studies of NFSs using these and other methods are anticipated for as long as there is concern about the population status and potential impacts of human activities, and general interest in studies of the species biology and ecology. Further, as with SSLs, NMFS has an ongoing obligation under Section 117 of the MMPA to prepare stock assessments for each marine mammal stock in waters under the jurisdiction of the U.S. and, therefore, anticipates a need to continue to issue permits for research on NFSs for as long as this requirement of the MMPA holds.

Generally, types of research on NFSs include the following activities:

- Aerial and ground surveys
- Scat collection
- Capture and temporary restraint
- Standard morphometric procedures (external measurements of an animal)
- Tissue sampling (e.g., skin, muscle, blubber, vibrissae, teeth, blood)
- Temporary marking (e.g., flipper tags)
- External scientific instruments
- Behavioral observations

1.4 Description of the Project Area

NMFS is preparing a PEIS that will address both NMFS' administration of federal grants and issuance of research permits that may have impacts to SSLs, and NFSs, throughout their ranges in U.S. waters. SSLs range along the North Pacific Rim from Northern Japan to California (Loughlin *et al.* 1984), with centers of abundance and distribution in the Gulf of Alaska (GOA) and Aleutian Islands (AI), respectively. NFSs range from southern California north to the Okhotsk Sea and Honshu Island, Japan. During the breeding season, approximately 57 percent of the worldwide population is found on the Pribilof Islands in the southern Bering Sea, 40 percent are on islands off the coast of Russia, 2 percent on Bogoslof Island in the southern Bering Sea, and less than 1 percent on San Miguel Island in California (Ream *et al.* 2005). A map of the project area is shown in Figure 1.4-1.

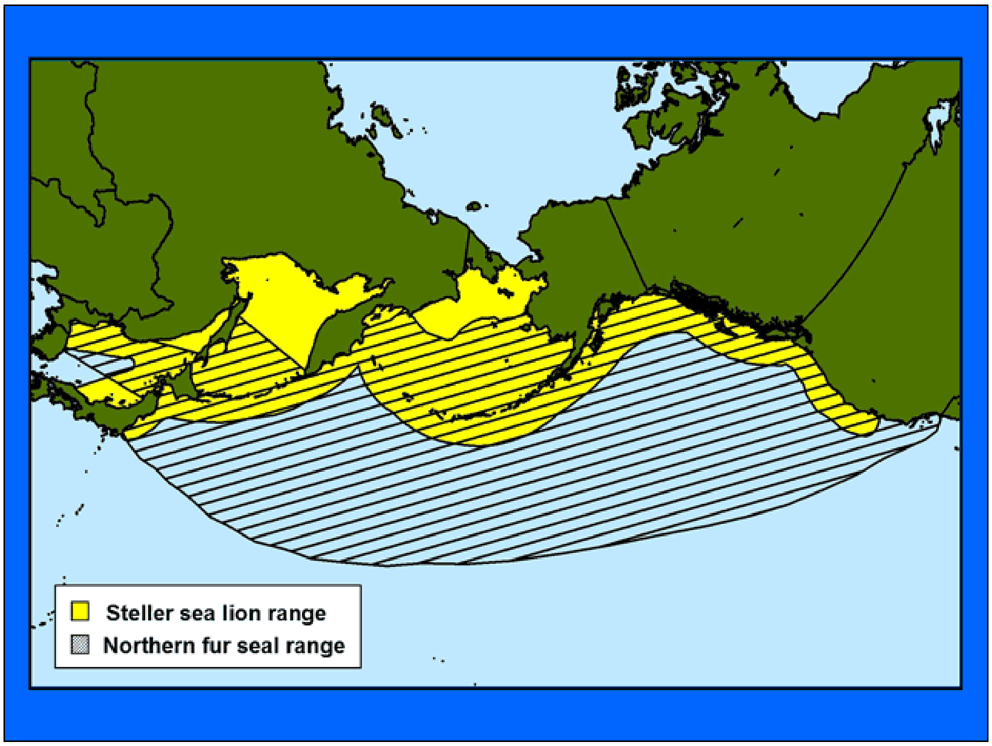

Figure 1.4-1. Project Location Map

1.4.1 Intent of the Environmental Impact Statement

As some of the research activities may result in adverse effects on threatened and endangered SSLs and depleted NFSs, NMFS is preparing this PEIS to evaluate the direct, indirect, and cumulative impacts of funding and permitting proposed research activities. This PEIS will evaluate the effects of the type and range of SSL and NFS research activities (i.e., the alternative actions) that may be exercised in current and future grants and permits.

The PEIS will assess the direct and indirect effects of various levels of funding and different research techniques on SSLs and NFSs throughout the entire range of these species in U.S. waters and on the high seas, which includes parts of Alaska, Washington, Oregon, and California. The effects of research on these species as well as other components of the marine ecosystem and human environment will be assessed. The PEIS will also assess the contribution of research activities to the cumulative effects on these species and resources, including effects from past, present, and reasonably foreseeable future events and activities that are external to the research activities.

The PEIS is intended to provide a clear and comprehensive process to determine how future grants and permits fall within the scope of this programmatic assessment, whether they are covered under the analysis of environmental consequences for the alternatives considered, and what type of further NEPA analysis is required, if any. If a future grant or permit activity does not fall within the scope of the PEIS, a specific supplemental document would be required. If the future grant or permit activity is determined to be within the scope of the programmatic document and Preferred Alternative, additional NEPA analysis would not be required. Section 5.2 provides a roadmap regarding which future grant and permit activities would require no additional NEPA analysis beyond this PEIS, those activities that may need supplemental NEPA analysis (i.e., those that would tier from this PEIS but require some further analysis), and future grant and permit activities that would require new NEPA analysis.

This document, as a programmatic analysis, covers expected and projected federally granted and permitted research projects for future years, until such time that a revision of the programmatic document is deemed necessary.

1.4.1.1 Programmatic Environmental Impact Statements

A PEIS is typically a broad-scale environmental evaluation that examines a program on a large scale. In keeping with the Center for Environmental Quality (CEQ) regulations, agencies often prepare this type of PEIS when considering new federal programs or regulations (40 CFR 1502.4[b]). However, a PEIS may also be used to evaluate an ongoing program and alternative directions that the program may take in the future. To streamline the NEPA process and avoid repetition, the CEQ regulations encourage federal agencies to develop a tiered approach to their analyses (40 CFR 1502.20). This allows broad, program-oriented issue analyses to be incorporated by reference into subsequent EAs or EISs that focus on specific proposed federal actions (40 CFR 1500.4[I]). NOAA, in its own NEPA guidelines (NAO 216-6, Section 5.09a), states that “a programmatic environmental review should analyze the broad scope of actions within a policy or programmatic context by defining the various programs and analyzing the policy alternatives under consideration and the general environmental consequences of each (alternative).”

1.5 Related National Environmental Policy Act Documents that Influence the Scope of this Environmental Impact Statement

There are one supplemental EIS (SEIS) and four EAs that influence the scope of this PEIS. The 1993 EA (NMFS 1993a) evaluated the impacts of hot-branding and other techniques for marking marine mammals. The 2001 SEIS evaluated the impacts of SSL protective measures in the federal groundfish fisheries off Alaska (NMFS 2001b). The 2002 EA evaluated the impacts of issuing permits for research on threatened and endangered SSLs (NMFS 2002). The 2003 EA, a supplement to the 2002 EA, evaluated the impacts of issuing amendments to two of the research permits considered under the proposed action of the 2002 EA. The 2005 EA evaluated the relevant effects of a variety of scientific research activities on SSLs under several alternative permitting options (NMFS 2005b). Each of the documents is summarized below. There have been previous NEPA documents that assessed the effects of fishing and subsistence hunts on NFSs (NMFS 2004a and 2005b), but there have been no previous NEPA analyses on research permits for NFSs.

1.5.1 1993 Environmental Assessment

The 1993 EA analyzed the effects of branding pinnipeds in Washington, Oregon, and California and was prepared in response to public comments received concerning two applications for permits to hot-brand harbor seals and SSLs. The EA included a review of some techniques for marking pinnipeds (e.g., natural markings, plastic flipper tags, tattooing, toe-clipping, web punching, hot-branding, and freeze-branding) and an assessment of the consequences of each technique. It was determined that a method of permanently marking pinnipeds in a way that allowed reliable identification of individuals (from a distance) was needed for effective monitoring of the status and health of harbor seal and SSL populations in Washington, Oregon, and California. The Preferred

Alternative (proposed action) was issuance of authorization to hot-brand with specific conditions to mitigate the effects, including monitoring of the short- and long-term effects of hot-branding on these two species of pinnipeds.

A Finding of No Significant Impact (FONSI) was signed by the Acting Assistant Administrator for Fisheries on July 16, 1993. The scope of the EA did not include SSLs in Alaska and it did not consider the potential cumulative effects of the currently permitted and proposed scientific research activities. In addition, the status of SSLs has changed significantly since the time the EA was prepared: the western population was listed as endangered in 1997 and the population continued to decline until approximately 2000 (Angliss and Outlaw 2005).

1.5.2 2001 Steller Sea Lion Protection Measures in the Federal Groundfish Fisheries Off Alaska Supplemental Environmental Impact Statement

The 2001 SEIS evaluated alternatives to mitigate potential adverse effects resulting from the controversial issue of competition for fish between SSLs and commercial fisheries. These fisheries had been identified as jeopardizing the continued existence of SSLs and adversely modifying their critical habitat (NMFS 2000). While environmental groups contended that fisheries compete with SSLs for prey, thereby reducing the survival of SSLs and contributing to continued population declines, the fishing community contended that other factors, such as climate change and predation by killer whales, are to blame for the SSL population decline. The lack of scientific evidence directly linking fisheries with effects on SSLs, combined with ESA requirements relative to burden of proof, have heightened the controversy over the impacts of commercial fisheries on the status of SSLs.

NMFS' Preferred Alternative (proposed action) involved application of different types of management measures by area and fishery, such as fishery-specific closed areas around rookeries and haulouts, and season and catch apportionments. Uncertainty remains regarding the nature of the effects of fisheries on SSLs and about the effectiveness and socioeconomic impacts of conservation measures intended to minimize the potential for adverse impacts, thereby heightening both the controversy and the sense of need for continued and additional research on the causes of the decline of SSLs.

Similar to the situation with SSLs, a potential indirect impact of competition for prey species between commercial fisheries and NFSs has also been suggested in recent years. However, there are currently no protection measures proposed or in place for NFSs.

1.5.3 2002 Environmental Assessment on the Effects of NMFS Permitted Scientific Research Activities on Threatened and Endangered Steller Sea Lions

In response to applications for permits to conduct research on threatened and endangered SSLs, NMFS prepared an EA in 2002 to evaluate the effects of scientific research on these animals (NMFS 2002). The magnitude and intensity of the proposed research was unprecedented, and included multiple intrusive research procedures for relatively large numbers of animals compared to previous research efforts. The permit applications were largely related to substantial funding opportunities made available through Congressional appropriations. The funding was made available with the purpose of determining the cause of the population decline. The language of the appropriations directed research into the cause of the population decline, the development of conservation and protective measures to ensure recovery of the species, and contribution of immediate, short-term information relevant to adaptive fishery management strategies in the Bering Sea/Aleutian Islands (BS/AI) and the GOA groundfish fisheries.

The Proposed Action was to issue the permits as requested by the applicants but with a number of mitigation measures, some of which were intended to minimize the potential for adverse impacts by requiring researchers to use commonly accepted "best practices" in capture and handling of animals. Other measures were intended to limit the duration of adverse impacts while simultaneously collecting information on the effects of the research program on SSLs. In June 2002, the Assistant Administrator for Fisheries signed a FONSI, which concluded that the issuance of the permits and permit amendments as described in the Proposed Action would not significantly affect the human environment. The 2002 EA analyzed the effects of the research over just a two-year period, from 2002-2004.

1.5.4 2003 Supplemental Environmental Assessment

NMFS prepared a Supplemental EA in 2003 to assess the impacts of issuing major amendments to two of the permits analyzed under the Proposed Action of the 2002 EA (NMFS 2003). The 2002 EA did not discuss collection of muscle tissue incidental to remote blubber biopsy sampling under one of the permits (University of Washington, Permit No. 1016-1651) because the request for that activity was received after the analyses were completed. The 2002 EA also did not discuss the transport of wild SSLs to the Alaska SeaLife Center (ASLC) for temporary captivity and associated experiments included in the original application because NMFS determined there was not enough information in the application on the proposed activities to perform an analysis of effects. The 2003 Supplemental EA analyzed the impacts of issuing the proposed amendments under the existing mitigation measures of the permits as previously issued, with the addition of a few activity-specific mitigation measures agreed upon by the permit holders. A FONSI was signed on July 21, 2003 and permit amendments were issued. As with the 2002 EA, the Supplemental EA only analyzed the effects of the research through 2004.

1.5.5 2005 Environmental Assessment on the Effects of NMFS Permitted Scientific Research Activities on Threatened and Endangered Steller Sea Lions

As with the 2002 EA, NMFS prepared an EA in 2005 in response to applications for permits to conduct research on SSLs (NMFS 2005b). The 2005 EA evaluated the relevant effects of a variety of scientific research activities on SSLs because NMFS determined that better information was needed regarding the effects of human activities on SSLs, and that such information would facilitate informed management decisions about whether or how to modify human activities to promote recovery of SSLs.

The objective of the Proposed Action in the EA was to allow conduct of bona fide scientific research that would be likely to contribute to recovery of SSLs. As with the 2002 EA, the Proposed Action was to issue the permits as requested by the applicants, but with some exceptions and a number of mitigation measures. Mitigation measures were generally intended to minimize the potential for adverse impacts by requiring researchers to use commonly accepted “best practices” in capture and handling of animals. In May 2005, the Assistant Administrator for Fisheries signed a FONSI, which concluded that the issuance of the permits and permit amendments as described in the Proposed Action would not significantly affect the human environment. Public comments received on the 2002 and 2005 EAs are included in Appendix C.

1.6 Required Decisions and Other Agencies Involved in this Analysis

NMFS must decide whether awarding grants and issuing the proposed permits and permit amendments for conducting research on SSLs and NFSs would be consistent with the purposes and policies of the MMPA, ESA, and their implementing regulations. This includes making certain the grants and permitted activities would qualify as bona fide research;[2] directly benefit a species or stock, or fulfill a critically important research need if the research involves the lethal taking of a threatened, endangered, or depleted marine mammal (16 U.S.C. 1374 [c][3][B]); and that the research does not operate to the disadvantage of any species listed as threatened or endangered (ESA Section 10 [a][2][B][iv]). NMFS consults with the Marine Mammal Commission (MMC) and other appropriate federal or state agencies in reviewing permit applications. However, NMFS has sole jurisdiction for issuance of permits for research on SSLs and NFSs. Thus, no other agencies are directly involved

[2] The MMPA defines “bona fide research” as “scientific research on marine mammals, the results of which: likely would be accepted for publication in a referenced scientific journal; are likely to contribute to the basic knowledge of marine mammal biology or ecology; or are likely to identify, evaluate, or resolve conservation problems” (16 U.S.C. § 1362[22]).

in this analysis. Researchers may require permits from other agencies for access to lands and waters, and these permits are subject to separate NEPA compliance (see Section 1.9).

1.7 Federal Laws Applicable to Steller Sea Lion and Northern Fur Seal Research

The federal act of awarding grants and issuing permits for research activities on marine mammals is subject to a number of federal laws and regulations. These are briefly summarized in the following section.

1.7.1 National Environmental Policy Act of 1969

NEPA establishes the nationwide policy, goals, and legal authority for federal agencies regarding the environment (40 CFR 1500.1[a]). It requires federal agencies to study the environmental consequences of their actions and to use an interdisciplinary framework for environmental decision-making.

NEPA also requires federal agencies to make environmental information available to the public and to public officials, and to consider their comments, before making decisions that could affect the environment. Documents prepared by federal agencies in compliance with NEPA must be streamlined in that they focus on the issues that are truly significant to the action in question and present alternatives in a way that allows potential environmental consequences to be clearly distinguished, along with “advice and information useful in restoring, maintaining, and enhancing the quality of the environment” (43 Federal Register [FR] 55990, November 28, 1978, and 40 CFR 1502.1, 1502.2, and 1502.14).

The provisions of NEPA require that an EIS have the following elements:

1. Statement of Purpose and Need for the Proposed Action
2. Description of Alternatives Evaluated in the EIS, including the Proposed Action, the No Action Alternative, and Alternatives Evaluated but Eliminated from Further Consideration
3. Description of the Affected Environment
4. Analysis of Environmental Consequences of Alternatives Carried Forward in the EIS
5. The Relationship Between Local Short-Term Uses of Man’s Environment and the Maintenance and Enhancement of Long-Term Productivity
6. Any Irreversible and Irretrievable Commitments of Resources Which Would be Involved in the Proposed Action Should it be Implemented

The preparation of an EIS must include the following five basic steps:

1. **Scoping**. As the first step in the NEPA process, scoping provides an opportunity for the public, government agencies, and other interested groups to provide information and advice on issues that might be associated with the proposed project, so that the lead federal agency can decide whether and how to address them in the EIS. Scoping can also identify new alternatives to be considered in the EIS. This step is usually accomplished by publishing a Notice of Intent (NOI) in the FR and through a combination of written communications, statements made at public meetings, and consultation with agency officials, interested individuals, organizations, and groups.
2. **Draft Environmental Impact Statement**. After scoping is completed, a draft EIS (DEIS) is prepared. The DEIS describes and evaluates all reasonable alternative actions, including no action. If the lead agency has decided upon a preferred alternative by the time a DEIS is prepared, it is identified. The DEIS evaluates physical, biological, socioeconomic, and environmental impacts that might result from the alternatives carried forward for analysis, and it identifies those impacts that are likely to be significant. It focuses on cause-and-effect relationships and provides sufficient evidence and analysis for determining the probable magnitude of predicted impacts. Finally, it identifies ways to mitigate the impacts – to

avoid, minimize, rectify, reduce, or eliminate those impacts over time, or to compensate for any potential harm to the environment that might be caused by any of the alternatives.

3. **Public Comment**. Following publication of a DEIS, a public Notice of Availability (NOA) for review is published in the FR, and a public comment period of no less than 45 days ensues. A public hearing may be conducted to provide an opportunity for interested parties to provide oral comments on the DEIS. Following the public comment period, the lead agency considers all of the comments received and prepares a final EIS (FEIS) to incorporate responses to the comments. The responses to public comments can range from major document revisions to simple acknowledgments, depending on the nature of the comment, but the FEIS must address all of the comments received on the DEIS–except when the public comments are particularly voluminous, in which case the federal agency may respond to comment summaries.
4. **Final Environmental Impact Statement**. The lead agency is required to address all substantive comments received on the DEIS and include copies of the comments in the FEIS (40 CFR 1503). The FEIS must also identify the lead agency's preferred alternative and may identify the environmentally preferable alternative. These may be different: the preferred alternative is usually the one that the lead agency believes would best accomplish its mission and goals, whereas the environmentally preferable alternative is the one that would best promote NEPA's goals–that is, cause the least overall harm, on balance, to physical, biological, and socioeconomic resources. There may be more than one environmentally preferable alternative; if so, each must be identified and discussed. Once the FEIS is completed and published, agencies and the public may comment on the FEIS before a final decision is made by the lead agency (40 CFR 1503.1[6]). Public comments received on the FEIS are collected and considered by the lead agency prior to making a final decision regarding which of the alternatives to implement. No decision on the action may be made by the lead agency within the 30-day period following publication of the FEIS.
5. **Record of Decision**. Following completion of the FEIS process as described above, the lead agency prepares a Record of Decision (ROD). The ROD must: (1) state what the decision was; (2) identify all alternatives considered in reaching the decision and which were considered to be environmentally preferable; and (3) state whether all practicable means to avoid or minimize environmental harm have been adopted, and if not, why not (40 CFR 1505.2). If a monitoring and enforcement program is applicable for any mitigation, it must be adopted and summarized in the ROD (40 CFR 1505.2).

1.7.2 National Oceanic and Atmospheric Administration Administrative Order 216-6

NOA 216-6 describes NOAA's policies, requirements, and procedures for complying with NEPA and the implementing regulations issued by CEQ as codified in Parts 1500-1508 of Title 40 of the CFRs (40 CFR Parts 1500-1508) and those issued by the Department of Commerce (DOC) in Department Administrative Order (DAO) 216-6, Implementing the NEPA. NAO 216-6 incorporates the requirements of Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. Also, the Order reiterates provisions to EO 12114, Environmental Effects Abroad of Major Federal Actions, as implemented by DOC in DAO 216-12, Environmental Effects Abroad of Major Federal Actions (NAO 216-6).

1.7.3 Endangered Species Act

The requirements for award of funds and issuance of permits to allow research on SSLs are described in Sections 2, 7, and 10 of the ESA. Section 7 also stipulates requirements for federal actions that may indirectly affect ESA-listed species, including issuance of permits under the MMPA that are likely to adversely affect ESA-listed species.

- The purposes of the ESA, as stated in Section 2, are to provide a means whereby the ecosystems upon which threatened and endangered species depend may be conserved[3], to provide a program for the conservation of such threatened and endangered species, and to take such steps as may be appropriate to achieve the purposes of the treaties and conventions set forth in Section 2(a) of the ESA.
- Section 7(a)(2) of the ESA, as amended (ESA; 16 U.S.C. 1531 *et seq.*), requires each federal agency to ensure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of critical habitat of such species. According to Section 7 of the ESA, NMFS must ensure that any action authorized (such as permits), funded, or carried out, is not likely to jeopardize the continued existence of listed species or result in destruction or adverse modification of critical habitat.
- Section 10(a)(1)(A) of the ESA specifically states that the Secretary of Commerce (Secretary) may issue permits for otherwise prohibited acts for scientific purposes or to enhance the propagation or survival of the affected species. Section 10(d) of the ESA goes on to state that NMFS may grant exceptions under Subsection 10(a)(1)(A) only if the agency finds and publishes these findings in the FR that: (1) such exceptions were applied for in good faith; (2) if granted and exercised will not operate to the disadvantage of such endangered species; and (3) will be consistent with the purposes and policies set forth in Section 2 of the ESA.

Section 4(f) of the ESA directs the responsible agency to develop and implement a Recovery Plan. The general research needs and objectives identified in the original Recovery Plan for SSLs include research to: identify habitat requirements and areas of special biological significance; identify management stocks; monitor status and trends of sea lion abundance and distribution; monitor health, condition, and vital parameters; assess and minimize causes of mortality; and investigate feeding ecology and factors affecting energetic status (NMFS 1992a).

The 2006 Draft Recovery Plan[4] (NMFS 2006) examines the relative contribution of various factors to the current threats to SSL recovery, primarily in the western Distinct Population Segment (DPS), and develops an action plan for research and conservation measures that address the different threats. The Recovery Team was divided on the relative importance of three factors that affected the decline and recovery of the western DPS: predation by killer whales, environmental variability, and competition with fisheries. For each of these threats, some members of the Recovery Team thought the threat level was high and others thought the threat level was low. Recognizing the uncertainty regarding the magnitude and likelihood of these threats, the Draft Recovery Plan takes a precautionary approach by listing all three of these threats as "potentially high." All other threats, including impacts of research, were rated as either medium or low.

- The Recovery Action Implementation Schedule in the Draft Recovery Plan ranks the priorities of different conservation measures and research needs. Two items received the most critical Priority 1 rating; 1) estimating population trends for pups and non-pups via aerial surveys on an annual basis, and 2) designing and implementing an adaptive management program for fisheries, climate change, and predation. Numerous other research needs and conservation measures received the next highest priority rating under the general categories of baseline population monitoring, insuring adequate habitat and range for recovery, protection from over-utilization for various purposes, protection from disease, contamination, and predation, and protection from other natural and man-made factors. Section 3.2.1.14 describes the 2006 Draft Recovery Plan in more detail.

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[3] The ESA defines "conserve" and "conservation" as "...to use and the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to [the ESA] are no longer necessary. Such methods and procedures include, but are not limited to, all activities associated with scientific resources management such as research, census, law enforcement, habitat acquisition and maintenance, propagation, live trapping, and transplantation, and, in the extraordinary case where population pressures within a given ecosystem cannot be otherwise relieved, may include regulated taking."

4 At the time this DEIS was prepared, the 2006 Recovery Plan for Steller Sea Lions was available in draft for public comment and had not been finalized or adopted by NMFS. The final version of this Recovery Plan adopted by NMFS may differ from the draft.

1.7.4 Marine Mammal Protection Act

The requirements for permits to allow research on SSLs and NFSs are described in Section 104 of the MMPA. Section 104(c)(3)(A) of the MMPA states that the Secretary may issue a permit for scientific research purposes to an applicant who submits with the permit application information indicating that the taking is required to further a bona fide scientific purpose. Section 104(c)(4)(A) states that a permit may be issued for enhancing the survival or recovery of a species or stock only with respect to a species or stock for which the Secretary, after consultation with the MMC and after notice and opportunity for public comment, has first determined that:

1. Taking or importation is likely to contribute significantly to maintaining or increasing distribution or numbers necessary to ensure the survival or recovery of the species or stock; and
2. Taking or importation is consistent (I) with any conservation plan adopted by the Secretary under Section 115(b) of this title or any recovery plan developed under Section 4(f) of the ESA for the species or stock, or (II) if there is no conservation or recovery plan in place, with the Secretary's evaluation of actions required to enhance the survival or recovery of the species or stock in light of the factors that would be addressed in a conservation plan or a recovery plan.

Both the MMPA and ESA stipulate that no provision of the statute shall take precedence over any more restrictive conflicting provision of another statute. Whereas the MMPA allows for taking of marine mammals for research that is *likely to contribute to the basic knowledge of marine mammal biology or ecology in general*, the ESA only allows for issuance of permits to conduct research that is *likely to further the conservation of the affected species*. Under the ESA "conserve" is effectively synonymous with recover since the definition of conserve indicates an ultimate goal of bringing a species to the point where listing under the ESA is no longer necessary for its continued existence. Thus, the objective of funding and issuing permits for NFS and SSL research is to allow conduct of bona fide scientific research that will be likely to contribute to recovery of those species (NMFS 2005b).

Public Law 100-711, a 1988 amendment to the MMPA, directed the Secretary of Commerce to develop a Conservation Plan on NFSs for "conserving and restoring the species or stock to its optimum sustainable population." In 1993, NMFS developed the first NFS Conservation Plan and in May 2006 released a new Draft Conservation Plan (NMFS 2006b) with valuable input from the Tribal Governments of St. Paul Island and St. George Island, Alaska, both of which have Co-Management Agreements with NMFS for NFSs (Section 3.2.10). The 2006 Draft NFS Conservation Plan presents the latest information on population status, reviews and outlines potential causes for their decline, and provides a strategy for designing research. The Conservation Plan reviews and assesses potential factors contributing to their decline including: natural factors such as predation, parasitism, disease, and environmental change; as well as human-induced factors including subsistence harvest, direct and indirect effects of commercial fishing, marine debris, poaching, pollution, vessel and air traffic, tourism, coastal development, noise, and oil and gas activities.

Four objectives are listed in the NFS Conservation Plan, and NMFS has outlined an action plan to address each of these objectives (Section 3.2.2.13 has or more details on the objectives). The action plan presents a series of tasks that address factors NMFS believes may be contributing to NFS population decline. The implementation schedule included in the Conservation Plan provides a list of these tasks in order of priority, duration, and regularity, and is intended to act as a guide for future research.

1.7.5 Executive Order 12898: Environmental Justice

Executive Order (EO) 12898, signed by the President on February 11, 1994, and published February 16, 1994 (59 FR 7629), requires that federal agencies make achieving "environmental justice" part of their mission by identifying and addressing disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low income populations in the U.S. A number of Alaska Natives harvest SSLs and/or NFSs. As a result, coastal Native communities harvesting these animals benefit from their continued existence. The effects of the federal action on minority populations are described in Chapter 4.

1.7.6 Executive Order 13175: Consultation and Coordination with Indian Tribal Governments

This EO, signed by the President on November 6, 2000, and published November 9, 2000 (65 FR 67249), is intended to establish regular and meaningful consultation and collaboration between federal agencies and Native tribal governments in the development of federal regulatory practices that significantly or uniquely affect their communities. This EO prohibits regulations that impose substantial direct compliance costs on Native tribal communities. In preparing this PEIS, NMFS has initiated a government-to-government consultation process with affected Native communities. On January 27, 2006, a letter was sent from NMFS to several federally recognized Native tribes within the project area inviting those governments to participate in the PEIS process, and provide some background information on both SSL and NFS research. NMFS values the contribution that Alaska Native knowledge and experience can provide NMFS with regard to marine mammals and the environment in general.

In addition to these letters, NMFS also held a teleconference on February 7, 2006 for government-to-government consultation. The purpose of the call was to brief Native communities on preparation of the PEIS and solicit comments and suggestions regarding SSL and NFS research. Three Native governments participated in this call.

1.8 Federal Permits, Licenses, and Entitlements Necessary to Implement the Proposed Action

The purpose of issuing permits and awarding funds to conduct research on threatened and endangered SSLs is to:

- promote the recovery of the species' populations such that the protections of the ESA (16 U.S.C. 1531 *et seq.*) are no longer needed, and
- contribute to the basic knowledge of SSL biology and ecology or to identify, evaluate, or resolve conservation problems, which would ultimately facilitate maintaining the species at an optimum sustainable population, as defined in the MMPA (16 U.S.C. 1361 *et seq.*).

Persons wishing to conduct research on marine mammals or ESA-listed species and seeking an exemption from the take moratoria established by the MMPA and ESA must apply for permits. In the case of marine mammals (except walrus, polar bears, sea otters, manatees, and dugong), such permits must be obtained from NMFS. Section 3.7 and Appendix D describe the statutory and regulatory requirements for obtaining a permit for research on marine mammals, including species listed as threatened or endangered. Appendix D also lists the statutory and regulatory terms and conditions with which permit holders must comply.

In general, NMFS does not require permits, licenses, and entitlements from other federal agencies in order to issue permits for scientific purposes under the MMPA or ESA. However, if NMFS' issuance of permits may adversely affect ESA-listed species, NMFS is required under section 7(a)(2) of the ESA to consult with NMFS and/or the U.S. Fish and Wildlife Service (the Services). If the Services determine that permit issuance would result in taking of listed species where such taking is incidental to the purpose of the action and would not be likely to jeopardize the continued existence of listed species, or destroy or adversely modify critical habitat, the Services may provide an exception for specified levels of "incidental take." An incidental take statement provides an exemption from the taking prohibitions of Section 9 of the ESA, but only where NMFS and/or the permit applicant can demonstrate clear compliance with the implementing terms and conditions. These terms and conditions are binding on NMFS and constitute reasonable and prudent measures intended to minimize the impact of incidental take on listed species. These measures may in turn become binding conditions of any permit issued by NMFS.

If the Services determine that NMFS' issuance of permits would jeopardize the continued existence of listed species under United States Fish and Wildlife Service (USFWS) jurisdiction, or destroy or adversely modify critical habitat, reasonable and prudent alternatives may be identified. Reasonable and prudent alternatives are actions the Services believe would avoid the likelihood of jeopardy to the species or destruction or adverse modification of critical habitat. NMFS must agree to adopt these measures in issuing permits in order to avoid jeopardy or adverse modification.

Some research permit holders may need to secure additional federal, state, or local permits or licenses to conduct the research specified in their NMFS permit. For example, some of the proposed research could occur within the boundaries of state or national wildlife refuges or parks, such as the Alaska Maritime National Wildlife Refuge (AMNWR). The AMNWR encompasses coastline, islands, reefs, etc., extending from southeast Alaska on the border of British Columbia, to Cape Lisburne in the Chukchi Sea. Some islands within the AMNWR have restricted access in order to protect wildlife (including seabirds, SSLs, and other mammals), and special use permits must be obtained from the USFWS prior to conduct of certain activities within the refuge. Military clearance is required for access to Adak, Shemya, Amchitka, and Attu Islands along the Aleutian Chain in Alaska. San Miguel Island is located within the Pacific Missile Range (PMR) administered by the U.S. Navy and U.S. Air Force. Researchers must check in with PMR control to find out whether the range is closed or open due to missile launch activity. In addition, NMFS regulatory permit issuance criteria (50 CFR § 216.35) stipulate that, "Persons who require state or federal licenses to conduct activities authorized under the permit must be duly licensed when undertaking such activities." This regulatory requirement is a made a condition of all NMFS permits (NMFS 2005b).

2.0 ALTERNATIVES

2.1 Introduction

This chapter describes the range of potential alternatives determined reasonable to meet the purpose and need of the proposed action to disperse federal funds and issue permits for research on Steller sea lions (SSLs) and Northern fur seals (NFSs). This chapter also summarizes how the alternatives would achieve the purpose and need as defined in Chapter 1. National Marine Fisheries Service's (NMFS) evaluation of the potential environmental impacts of the alternatives is summarized in Chapter 4.

The Council for Environmental Quality (CEQ), created under Title II, Section 202 of the National Environmental Policy Act (NEPA) (42 United States Code [U.S.C.] 4332), is responsible for the development and oversight of regulations and procedures implementing NEPA. The CEQ regulations provide guidance for federal agencies regarding NEPA's requirements (40 Code of Federal Regulations [CFR] Part 1500), and require agencies to identify processes for issue scoping, consideration of alternatives, developing evaluation procedures, involving the public and reviewing public input, and coordinating with other agencies—all of which are applicable to NMFS' development of the SSL and NFS research alternatives.

In keeping with CEQ requirements for implementing NEPA, this Programmatic Environmental Impact Statement (PEIS) offers a reasonable range of alternatives, including the No Action Alternative, and a discussion of the environmental impacts of activities associated with each alternative. Each alternative is based on a distinct philosophy and management approach, but all are consistent with NMFS statutory and regulatory responsibilities for conservation and recovery of the species.

This PEIS presents a spectrum of alternative policies for facilitating SSL and NFS research ranging from a "hands-off" policy that limits the scope of research and collection of scientific information to methods not requiring capture or handling of animals to a "maximum" policy that does not limit the scope of research or methods used to collect scientific information. Within this spectrum of alternatives is the Status Quo alternative, which is characterized by the levels and types of research that were funded and permitted at the start of the PEIS process. Although many of the permitted activities within the Status Quo alternative were suspended subsequent to initiation of this PEIS, when certain permits were vacated by court order on May 26, 2006 (Civil Action No. 05-1392 ESH), the scope of research authorized prior to the court order represents a baseline with which to compare each alternative.

The impacts of the alternatives are evaluated based on information on the resources, as summarized in Chapter 3 (Affected Environment), and the analyses are presented in Chapter 4 (Environmental Consequences). The analyses provide the basis for decision-makers to evaluate each alternative and to ultimately choose a preferred alternative.

2.1.1 Relation of Alternatives Evaluated to the Statement of Purpose and Need

The range of alternatives evaluated in an EIS must achieve the objectives of the proposed action as stated in the statement of purpose and need, without violating any of the minimum environmental standards mentioned in Chapter 1. The purpose and need also helps determine which alternatives are carried forward for analysis in the EIS. An alternative that does not satisfy at least some of the agency's purpose and need, or would not meet minimum environmental standards, is not considered reasonable and need not be carried forward for evaluation in the EIS. An alternative cannot be dismissed from further analysis arbitrarily; justification must be provided for elimination of an alternative from further consideration.

2.1.2 Relation of Alternatives to the Recovery and Conservation Plans

Recovery and conservation plans outline information needs and, in some cases, specify research activities, determined by NMFS to be essential to conservation of a species. The 1992 SSL Recovery Plan and the 1993 NFS Conservation Plan have played important roles in guiding past research on these species. In 2006, NMFS released draft revised plans for both species (NMFS 2006a and 2006b) that will help guide research in the future. The purpose and need for future research on SSLs and NFSs is based on the purposes and policies of the Marine Mammal Protection Act (MMPA) and the Endangered Species Act (ESA) as they relate to conservation and recovery of these protected species.

In general, research permits for takes of any ESA-listed species must be justified by the likelihood of contributing to the species' recovery. Similarly, research permits for takes of marine mammals must only be issued for research reasonably likely to achieve the objectives of the MMPA. Through regulations, NMFS requires that applicants for permits for research on marine mammals listed as depleted, threatened, or endangered demonstrate how the results of their proposed research would directly benefit that species or would fulfill a critically important research need. For those species which have recovery or conservation plans, such as SSLs and NFSs, applicants can most easily satisfy this requirement by demonstrating how the proposed research would contribute to fulfilling a research need or recovery objective identified in the species recovery or conservation plan.

The research priorities listed in the SSL Recovery Plan and the NFS Conservation Plan provided a general framework for tools chosen to structure each of the alternatives analyzed in this document. Chapter 3 of this PEIS describes the old and 2006 draft recovery and conservation plans in more detail (Sections 3.2.1.12, 3.2.1.13, 3.2.2.11, and 3.2.2.12).

2.2 Scoping Issues Considered in Developing Alternatives

The first step in preparing an EIS is publishing a Notice of Intent (NOI) in the Federal Register (FR). On December 28, 2005, the NOI (70 FR 76780) announcing the preparation of this PEIS was published requesting public participation in the scoping process. In addition to providing background information on the purpose of issuing scientific research permits and providing the statutory requirements for permits that allow research on marine mammals, the NOI also provided a list of issues on which NMFS was seeking public input on. These issues included: 1) types of research; 2) level of research; 3) coordination of research; 4) effects of research; 5) qualifications of researchers; and 6) criteria for allowing modifications or amendments to existing grants and permits; and for suspending or revoking permits. To provide a framework for public discussion, the NOI also presented preliminary concepts for alternatives that could be considered for the PEIS; however, the exact structure and number of alternatives were developed after the scoping process was complete.

Below is a brief summary of the substantive issues raised during public scoping meetings. A more complete summary of formal comments is included in the Scoping Summary Report, included as Appendix C.

Alaska Native Issues

- Discuss environmental justice in the PEIS.
- Discuss the role of Tribal governments in the PEIS and in the decision-making process.
- Present effects of the proposed action on subsistence users.

Alternatives

- Alternatives analyzed in the 2002 and 2005 SSL Permit Environmental Assessments (EAs) were inadequate.
- Comments in support of, or against, alternatives analyzed in the 2002 and 2005 SSL Permit EAs.
- Incorporate suggested alternative components in the PEIS analyses.
- Comments and discussions related to determining a reasonable range of alternatives.

Branding/Hot-Branding

- Hot-branding is an inhumane, intrusive method for marking animals and should not be used; the risks associated with hot-branding outweigh the benefits.
- Branding causes too much disturbance on rookeries and should not be used.
- Effects of hot-branding should be studied further before additional hot-branding is authorized.
- Post-branding monitoring is needed to understand its effects.
- Too many animals are branded each year.

Conservation of the Species/Conservation Goals

- Permitted research should be focused on contributing to the conservation of the species.
- The permitted research activities are not contributing to the conservation of the species.
- Proposed research does not appear to be conducted in a manner that promotes conservation of the species.
- Research objectives should be coordinated with the overall goal of recovering and conserving the species.

Coordination

- There is a lack of coordination among permitted research and it needs to be coordinated.
- NMFS has authorized permits without regard to how they all fit together to answer questions related to recovery and conservation of the species; without such an approach, populations and areas are being over-sampled.
- Research must be coordinated to ensure that methodologies being used are comparable.
- Research needs to be coordinated with the goals in the species recovery and conservation plans.

Credentials of Researchers

- Only veterinarians should administer anesthesia or dart animals.
- Comments related to the qualifications/credentials of researchers conducting certain types of research, particularly invasive research.

Cumulative Effects

- The PEIS should include discussion of the cumulative or synergistic effects of research on the animals.
- Cumulative effects were not addressed in the 2002 or 2005 Steller Sea Lion Permit EAs.
- Research is causing significant adverse cumulative effects on the species.
- The cumulative effects of research exceed the sustainability of the population.
- All permits should be suspended until cumulative effects of research are analyzed.
- Comments related to specific issues that should be included in the cumulative effects analysis.

Duplication of Research Effort

- Due to the lack of coordination of research activities permitted, there is duplication of effort that is harmful to the species.
- Some of the methodologies being used appear duplicative.

Editorial

- Editorial comments regarding text, tables, or figures in the 2002 or 2005 SSL Permit EAs.

Effects of Research

- The effects of the invasive research taking place on these animals needs to be addressed; this should be addressed before any additional permits are approved.
- NMFS has not demonstrated that the effects of research will be insignificant.

- Any given research method can have a wide range of disturbing effects.
- The cruelty of certain types of research is disturbing and lacks justification.
- The effects of administering multiple research methods on the same animal are not well documented and should be analyzed.
- Specific comments on the effects of particular methods being used during research.

Endangered Species Act

- NMFS cannot meet its burden of proof under the ESA and MMPA to show that this research will clearly benefit the species.
- This research is in violation of the ESA.
- The quality and level of analysis required under the ESA is lacking.

Inadequate Information

- There is inadequate information to fully understand the effects of research.
- Comments related to inadequate information provided in specific research permit applications (e.g., sampling locations, justification for specific protocols, mortality rates).

Methodology

- Research methods are inhumane; other methods that are less invasive should be used.
- Research methods are not justified.
- Effects of research methods are not well documented; not enough is known about the effects of certain research methods.
- Research methods should address questions or hypotheses related to the primary research goals listed in the SSL Recovery Plan.
- When there are conflicting methodologies, NMFS should clarify whether or not and how each fits within overall recovery goals.
- A power analysis for research methodologies should be done before any more invasive research is permitted.
- NMFS should create an independent research panel of outside experts to help identify the best methodologies to be used; a workshop that includes outside experts should be organized by NMFS to determine the best methodologies.
- When possible, new invasive methodologies should be tested on non-listed species first.
- Suggestions on specific methodologies and how they should be administered (e.g., only veterinarians should administer anesthesia, researchers working on rookeries should be briefed by biologists on how to minimize impacts).

Mitigation

- Mitigation measures are not discussed in all permit applications.
- The PEIS should discuss appropriate mitigation measures that should be implemented as part of the proposed action.

Marine Mammal Protection Act

- NMFS cannot meet its burden of proof under the MMPA to show that this research will clearly benefit the species and that the level of incidental mortality is acceptable.
- NMFS has not conducted the required level of analysis on the effects of research as required under the MMPA.
- Issuing permits for research violates the MMPA; approval of invasive research should be suspended until

a comprehensive evaluation of effects and the contribution to recovery and compliance with the MMPA are demonstrated.

Monitoring

- NMFS must suspend permits until an adequate monitoring program to evaluate effects of research is in place.
- Monitoring the long-term effects of research (e.g., hot-branding) should be done.
- A monitoring program administered by NMFS should include ways to assess cumulative effects.

Mortality

- The level of mortality (take) approved by NMFS is unacceptable, particularly for an endangered population.
- Comments expressing concern over the level of mortality described in specific permit applications; the rate of mortality described in some permit applications does not appear to be "insignificant" as NMFS concludes.
- Comments regarding research techniques that should not be used because they result in an increased level of mortality.

National Environmental Policy Act

- The 2002 and 2005 SSL Permit EAs are inadequate and violate the requirements of NEPA; NMFS Finding of No Significant Impact (FONSI) should be re-examined.
- The quality of analysis of the effects of research, as required under NEPA, is insufficient at this time.
- Preparation of an EIS should be undertaken prior to issuance of permits rather than after the fact.
- Permits and permit modifications or amendments should be suspended until the PEIS is complete.
- Specific comments on what should be included in the SSL and NFS research PEIS; direct, indirect, and cumulative effects should be analyzed in a single NEPA document.
- Though it is analyzing the effects of the grant and permit programs.

Potential Biological Removal

- The cumulative effect of research activities, when added to other factors, such as Native subsistence harvest, could exceed the Potential Biological Removal (PBR) and is clearly a significant impact.
- NMFS should require researchers to consult on how to reduce incidental mortality to ensure PBR is not exceeded.
- Concern that the cumulative level of take exceeds the PBR for western SSLs.

Permits and Applications

- Research permits should be carried out under the respective co-management agreements.
- An overall assessment or description of all permit modifications should be developed by the agency so the effects of these permit changes can be understood.
- Permit applicants should be required to identify how their activities address a critical need and justify why certain methodologies must be used, particularly if these are invasive.
- Comments expressing concern over the lack of sufficient information in specific permit applications to adequately assess impacts of research.
- Comments highlighting discrepancies in numbers or information presented in specific permit applications.
- Concerns related to invasive techniques described in specific permit applications.

Reporting Requirements

- Researchers are not doing an adequate job of reporting effects of their research activities to NMFS.
- Comments regarding discrepancies in permit applicant reports.

Sample Sizes and Techniques

- A power analysis should be undertaken to determine appropriate sample sizes, locations, and techniques.
- Specific suggestions for quality control of sample sizes, locations, and techniques used to minimize impacts to SSLs and NFSs; sampling techniques should be coordinated so results are comparable.
- Concerns related to sample sizes, locations, and techniques used for specific types of research; there is an apparent lack of integration and coordination of research for determining appropriate sample sizes, locations, and techniques.

Take

- Researchers increase the level of take each year and the overall effects of this increase are significant.
- The level of take is too high for the population to sustain itself.

Welfare

- NMFS must consider the welfare of individual animals when reviewing permit applications.
- Justification or sufficient information that the techniques used, or the level of take requested, meet the tests of the Animal Welfare Act (AWA) are lacking; each permit application should be able to pass scrutiny of an independent animal welfare/care committee.

A more complete summary of formal comments is included in the Scoping Summary Report, attached as Appendix C. The following table provides general categories of the types of issue raised in the NOI and during the scoping process and where these issues are addressed in the PEIS.

2.2.1 Additional Outreach to Inform Development of the Alternatives

NMFS conducted a series of focus group meetings in July and August 2006 with various agencies, researchers, Alaska Native groups, and other interested parties to discuss the issues raised in scoping and previous NEPA-compliance activities and to further inform the process of developing a reasonable range of alternatives. NMFS used the results of these meetings to further refine management measures that could be used as elements of programmatic alternatives and to finalize the reasonable range of alternatives to be considered in the Draft EIS (DEIS) (Appendix E).

2.3 Research Components of the Alternatives

The legal and regulatory framework for NMFS' responsibilities regarding marine mammals is described in Section 1.7, including the need to monitor, conserve, and promote the recovery of depleted, threatened, and endangered populations under the guidance of their respective recovery and conservation plans. All of the alternatives must meet these research and management needs within the scope of NMFS' legal limits and responsibilities. There is considerable flexibility under the MMPA, ESA, and NMFS regulations regarding the types of research objectives and procedures that can be permitted. If an applicant submits information demonstrating that a requested activity is consistent with the provisions of the MMPA, ESA, and permit regulations, and NMFS determines that issuance of the permit would not violate any other environmental laws, researchers can request and receive authorization for a wide variety of studies and protocols. The overall scope of research efforts permitted on a marine mammal species or stock at any time is dictated by the number and nature of permit applications received. The MMPA and ESA give NMFS authority to place such terms and conditions in research permits as are deemed appropriate. These conditions are typically specific mitigation measures that are required to minimize risk of adverse effects.

Table 2.2-1

Issues Raised in the NOI and Scoping Comments and Where They Are Discussed in the PEIS

	SECTIONS IN THE PEIS WHERE ISSUE IS DISCUSSED
Issues Identified in the NOI	
Types of Research	2.4.2 Components Common to All Alternatives; 2.6 Alternatives Carried Forward for Analysis; 3.2.1 Steller sea lions; 3.2.2 Northern fur seals; Chapter 4 Environmental Consequences; Appendix A Description of Active Permits; Appendix B Description of Research Methodologies
Level of Research	2.6 Alternatives Carried Forward for Analysis; 3.2.1.11 Past Research, Levels of Effort, Funding and Program Histories Chapter 4 Environmental Consequences; Appendix A Description of Active Permits
Coordination of Research	3.2.1 Coordination of Research; 3.7 Grant and Permitting Process; 4.7.2 Coordination; 5.3 Recommendations for Coordination of SSL and NFS Research
Effects of Research	2.3 Research Components of the Alternatives; 4.8 – 4.11 [Environmental Consequences of the Alternatives on Selected Resources]; Appendix B Description of Research Methodologies
Qualifications of Researchers	4.7.4 Mitigation and Conditions of Grants, Permits, and Authorizations; Appendix D Requirements for Obtaining a Grant or Permit for Research on Protected Species
Criteria for Allowing Modifications or Amendments to Existing Grants and Permits	4.7.4 Mitigation and Conditions of Grants, Permits, and Authorizations; Appendix D Requirements for Obtaining a Grant or Permit for Research on Protected Species
Issued Raised in Scoping Comments	
Alaska Native Issues	3.2.1 Steller Sea Lions; 3.2.2 Northern Fur Seals; 3.4.1 Subsistence Harvest; 3.5 Coastal Communities; 4.7.2.3 Coordination Required Under Co-Management Agreements; 4.9 Social and Economic Environment; 5.4 Recommendations for Coordination with Alaska Native Organizations; Appendix F Co-Management Agreements for St. George and St. Paul Islands
Alternatives	2.6 Alternatives; 4.7 Elements Common to All Alternatives; 4.8 – 4.11 [Environmental Consequences of the Alternatives on Selected Resources]
Branding/ Hot Branding	2.3 Research Components of the Alternatives; 3.2.1 Steller Sea Lions; 4.8 – 4.11 [Environmental Consequences of the Alternatives on Selected Resources]; Appendix B Description of Research Methodologies
Conservation of the Species/ Conservation Goals	1.2 Purpose and Need for Action; 3.2.1 SSLs; 3.2.2 NFSs; 4.8 – 4.11 [Environmental Consequences of the Alternatives on Selected Resources]
Coordination	3.2.1 Coordination of Research; 3.7 Grant and Permitting Process; 4.7.2 Coordination; 5.3 Recommendations for Coordination of SSL and NFS Research
Credentials of Researchers	4.7.4 Mitigation and Conditions of Grants, Permits, and Authorizations; Appendix D Requirements for Obtaining a Grant or Permit for Research on Protected Species
Cumulative Effects	4.5 Steps for Identifying Cumulative Effects; 4.8 – 4.11 [Environmental Consequences of the Alternatives on Selected Resources]
Duplication of Research Effort	3.2.1 Coordination of Research; 3.7 Grant and Permitting Process; 4.7.2 Coordination; 5.3 Recommendations for Coordination of SSL and NFS Research

Table 2.2-1 (continued)

Issues Raised in the NOI and Scoping Comments and Where They Are Discussed in the PEIS

	SECTIONS IN THE PEIS WHERE ISSUE IS DISCUSSED
Editorial Comments	Editorial Comments Made During Scoping Related to the 2002 and 2005 EAs on the Effects of NMFS Permitted Scientific Research Activities on Threatened and Endangered SSLs and are not applicable to this PEIS.
Effects of Research	4.8 – 4.11 [Environmental Consequences of the Alternatives on Selected Resources]; Appendix B Description of Research Methodologies
Endangered Species Act	1.2 Purpose and Need for Action; 1.7 Federal Laws Applicable to SSL and NFS Research; 2.1.2 Relation of Alternatives to the Recovery and Conservation Plans; 1.9 Federal Permits, Licenses and Entitlements Necessary to Implement the Proposed Action; 3.2.1 Steller Sea Lions; 3.2.4 Other ESA-Listed Species; 4.8.4 Other ESA-Listed Species
Inadequate Information	4.3 Incomplete and Unavailable Information; Section 5.3.3 Monitoring Effects of Research
Methodology	Appendix B Description of Research Methodologies
Mitigation	4.7.4 Mitigation and Conditions of Grants, Permits, and Authorizations; Appendix B Description of Research Methodologies; Appendix E Requirements for Obtaining a Grant or Permit for Research on Protected Species
Marine Mammal Protection Act	1.2 Purpose and Need for Action; 1.7 Federal Laws Applicable to SSL and NFS Research; 2.1.2 Relation of Alternatives to the Recovery and Conservation Plans; 1.9 Federal Permits, Licenses and Entitlements Necessary to Implement the Proposed Action; 3.2.5 Other Marine Mammals; 4.8.5 Other Marine Mammals
Monitoring	4.7.5 Monitoring; 4.7.4 Mitigation and Conditions of Grants, Permits, and Authorizations; Section 5.3.3 Monitoring Effects of Research; Appendix D Requirements for Obtaining a Grant or Permit for Research on Protected Species
Mortality	2.5 Establishing Serious Injury and Mortality Limits Under the Alternatives; 4.8 – 4.11 [Environmental Consequences of the Alternatives on Selected Resources]
National Environmental Policy Act	1.2 Purpose and Need for Action; 1.5 Related NEPA Documents that Influence the Scope of this PEIS; 1.7 Federal Laws Applicable to SSL and NFS Research;
Potential Biological Removal	2.5 Establishing Serious Injury and Mortality Limits Under the Alternatives; 4.4.1 Impact Criteria for SSLs and NFSs; 4.8 – 4.11 [Environmental Consequences of the Alternatives on Selected Resources]
Permits, Grants and Applications	3.7 Grant and Permitting Process; 4.7.2 Coordination; 5.3 Recommendations for Coordination of SSL and NFS Research; 4.7.4 Mitigation and Conditions of Grants, Permits, and Authorizations; Appendix A Description of Active Permits; Appendix D Requirements for Obtaining a Grant or Permit for Research on Protected Species
Reporting Requirements	4.7.4 Mitigation and Conditions of Grants, Permits, and Authorizations; Section 5.3.2 Reporting Requirements; Appendix D Requirements for Obtaining a Grant or Permit for Research on Protected Species
Sample Sizes and Techniques	4.8.1 and 4.8.2 Environmental Consequences of the Alternatives on SSL and NFS: Appendix A Description of Active Permits; Appendix B Description of Research Methodologies

Table 2.2-1 (continued)

Issues Raised in the NOI and Scoping Comments and Where They Are Discussed in the PEIS

	SECTIONS IN THE PEIS WHERE ISSUE IS DISCUSSED
Take	2.5 Establishing Serious Injury and Mortality Limits Under the Alternatives; 4.4.1 Impact Criteria for SSLs and NFSs; 4.8 – 4.11 [Environmental Consequences of the Alternatives on Selected Resources]
Animal Welfare	1.2 Purpose and Need for Action; 1.7 Federal Laws Applicable to SSL and NFS Research; 4.8.1 and 4.8.2 Environmental Consequences of the Alternatives on SSL and NFS

NMFS has flexibility in specifying the procedural requirements of grantees that are necessary to ensure sufficient oversight and exchange of information. The Grants Program Office can release funding for a program, but the grantee must send the grant manager proof that the needed permits have been obtained before spending any funds on those activities. In addition, the Grants Program Office defers to NMFS Permits Division, Office of Protected Resources (F/PR1) to establish any mitigation measures required as a condition under the authorized permit.

The procedural and mitigation requirements for research permits under the Status Quo are described in the following sections and in Section 3.7. Variations of and recommendations on these procedures and requirements that could be used are described in Chapter 5. Inclusion of a particular mitigation measure or administrative requirement in a given alternative does not preclude the use of that management tool in a different alternative.

The alternatives vary by management policy, including the types of research and the level of effort that would be permitted under each different policy. The specific research techniques that would be allowed under each alternative are limited only by whether or not an alternative allows capture or handling of animals. For example, under Alternative 2, capture and handling of SSLs or NFSs would not be permitted; research would be limited to activities such as aerial surveys, scat collection or other “hands-off” techniques. Otherwise, the alternatives do not restrict researchers to any specific capture, marking, or sampling methods. The following summary is provided in order to give the reader an idea of what the current research techniques on SSLs and NFSs are, what types of information they provide, and some of the potential risks involved with different procedures. A more detailed account of these procedures and risks is included in Appendix B.

The numbers of animals that would be subject to each procedure under the different alternatives are described in Chapter 4. Currently, not all of the research techniques used on SSLs have been used on NFSs, but there is growing interest (i.e., new permit applications) to implement similar techniques on NFSs. There are likely to be some modifications to procedures used on NFSs, especially for capture and restraint, given the differences between the species. In addition, researchers may develop methods and techniques that have not previously been permitted for either SSLs or NFSs.

Aerial Surveys: The purpose of aerial surveys is to obtain photographs from which to count the number of animals present on a rookery (breeding and pupping sites) or haulout (resting sites). Annual counts from many areas and selected “trend sites” are used to estimate population abundance and trends. The protocol currently employed for aerial surveys involves flying over rookeries and haulout sites at slow air speeds (100-150 knots), low altitudes (150-200 meters [m]), and close to shore (500 m), to take color photographs (35 millimeter [mm] slides) and videos (Calkins and Pitcher 1982). Since 2002, some researchers have used medium format color photogrammetry instead of 35 mm slides, which allowed them to count pups and improve counts of non-pups (Fritz and Stinchcomb 2005). The surveys typically include a single pass over each site, with additional passes made only when the photographers have reason to believe they may have missed part of the site. Mitigation used to minimize disturbance of the animals includes provisions to approach rookeries and haulouts from offshore in straight line flight and to avoid banking maneuvers. Replicate surveys on separate days are occasionally conducted to develop an estimate of the survey variance. Such estimates require multiple surveys at individual sites. Behavioral responses to aircraft range from none to complete and immediate departure from the haulout and stampedes (Calkins and Pitcher 1982, Sweeney 1990). Adults, juveniles, and pups can be injured during stampedes as animals run over each other or slide or crash into cliff facings or underwater rocks in their haste to escape.

Vessel Surveys: Marine vessels are used to approach rookeries and haulouts for the purpose of counting young pups, resighting animals tagged and branded by other permit holders, and for documenting behavioral observations. Research vessels may remain within close proximity to a rookery or haulout for up to two to three days at a time. The range of reactions to vessel surveys is similar to that for aerial surveys.

Ground Counts: Researchers come ashore during June and July to count young pups because aerial surveys are inadequate to reliably detect pups in some locations. Whenever possible, pups are counted from overlooks or other vantage points to minimize disturbance of rookeries. However, when these methods are unsuitable for accurate counts, or when tissue sampling or marking of animals is also part of the research protocol, adult and juvenile animals are intentionally driven or "spooked" from the rookery into the water in order to facilitate counting pups. The median pupping date in Alaska is June 12; therefore, the majority of pups on a rookery would be a greater than 2 weeks old, depending on the timing of parturition. As with the other surveys, there is a risk of injury and mortality when animals flee the rookery, especially for young pups that cannot get out of the way or are knocked into the water before they can swim. After all or the majority of non-pups have retreated, two or more biologists walk across the rookery, making independent counts of live and dead pups on the beach and in the water. Researchers typically occupy the rookery for approximately two hours for counting, except when a number of pups are captured for weighing, measuring, and collection of tissue samples. In these instances, time on the rookery is determined by the processing time associated with various sampling protocols. After researchers leave, displaced breeding males often need to fight other males to reestablish their territories, resulting in additional chance of injury to males and others nearby. The separation risk of mothers and pups in these situations has not been well studied but may result in mothers failing to locate their own pups, aggression toward pups from other females, or aggression between females who may fight over pups if confused about which pup is theirs. In 2002, some researchers began using a new aerial survey photographic technique, medium format color photogrammetry, which allowed counts of pups as well as non-pups (Fritz and Stinchcomb 2005). This technique provided accurate results compared to traditional drive-counts with essentially no disturbance of the rookery (Snyder *et al*. 2001).

Scat Collection: Scat (fecal) collection provides a mechanism for broad estimates of the recent prey consumed, with some limitations and biases (Bigg and Fawcett 1985, Antonelis *et al.* 1987, Harvey 1989). Personnel go ashore on rookeries and haulouts to collect scat samples for dietary studies, which can result in harassment and displacement of SSLs if they are present, but does not require capture. Scat samples are also analyzed for levels of hormones associated with stress and reproduction. Scat collection is typically conducted during ground counts or other research activities on rookeries and haulouts, such that little or no additional harassment results, and may also occur when animals are not present.

Behavioral and Demographic Observations and Remote Monitoring: Field teams are stationed at select locations to conduct counts of SSLs and NFSs by sex/age class, conduct studies of attendance patterns of branded, tagged, and naturally-marked animals, record the presence of tagged and branded animals, and record observations of entangled or injured SSLs and NFSs and the presence of other marine mammals and boat or air traffic. Remote monitoring stations are set up on selected islands to collect similar data on seasonal movements and changes in population structure of SSLs and NFSs using still photographs, video images, very high frequency (VHF) telemetry signals, and sonic transmitters. Observations are made from cliffs or other vantage points above rookeries and typically do not result in any takes. Establishing and servicing remote monitoring stations may result in harassment of some animals.

Capture and Restraint: It is usually necessary to restrain an animal in order to collect tissue samples, collect morphometric measurements, mark animals, or attach scientific instruments. Conducting physiological examinations, attaching flipper tags, or applying hot-brands can only be performed on animals that are physically or chemically restrained. There are a variety of available capture and restraint methods, depending on the size of the animal and the time of year for capture. After capture, several types of procedures are generally conducted on the animal.

On the rookery, very young pups are caught and picked up by researchers by hand or in a hoop net and may be restrained by gas anesthesia with isoflurane through a mask over the nose. Capture of older/larger animals usually requires the use of a net, trap, or an injectable immobilizing agent such as Telazol (tiletamine-zolazepam) administered remotely by dart. Animals in the water are captured using a hoop net, rope lasso/noose, or floating platform trap. Older animals may be restrained with a "fabric restraining wrap" and use of isoflurane or Valium (diazepam) for sedation. Determining the proper dose of immobilizing agent and anesthesia is dependent on a fairly accurate assessment of the animal's weight and condition; miscalculation of an animal's weight can lead to an overdose, which can have lethal consequences (Fowler 1986b).

Mitigation measures in permits include the condition that these procedures be performed or directly supervised by qualified personnel so that the operations go as quickly and efficiently as possible and recommend that an experienced marine mammal veterinarian be present for all use of anesthesia and sedatives. Other provisions describe "best practices" for equipment that should be used, sterile techniques, parts of the body best suited for different procedures, and how to position, monitor, and treat anesthetized animals with an emphasis on animal health and safety over experimental sampling. Special precautions are required for work with lactating females and pups. To the maximum extent practical without causing disturbance of the rookery/haulout, researchers are required to conduct post-handling monitoring of captured or sampled animals for signs of acute stress or injury. Researchers are also required to monitor rookeries/haulouts after disturbance to determine if any animals have been injured or pups abandoned.

Most of the following procedures, when conducted by qualified personnel using best practice techniques, result in small risks of injury to the animal aside from the risks posed by capture and restraint. A variety of somatic, psychological, and behavioral stressors can be associated with capture and restraint of wild animals. These include strange sounds, sights, and odors, the effects of chemicals or drugs, apprehension or fright, and territorial upsets from displacement of animals by researchers. Animals that are stressed can incur contusions, concussions, lacerations, nerve injuries, hematomas, and fractures in their attempts to avoid capture or escape restraint (Fowler 1986). The stress response can change an animal's physiological reaction to many drugs, including those commonly used for chemical restraint, which can have lethal consequences.

Morphometric/Physiological Measurements and Tissue Sampling: Most animals captured for sampling or marking are weighed and measured (e.g., standard length, girth). In addition to these morphometric measurements, blood samples are collected from pups and juveniles of both sexes by venipuncture for a variety of analyses ranging from basic health assessment to estimating blood volume. Muscle biopsies are obtained through small incisions with canula needles and can be used to analyze myoglobin content and fiber type. Evans blue dye is an injectable dye that is used to measure blood volume through a series of blood samples over 30 minutes. The technique is used in combination with muscle biopsies to estimate aerobic dive capacity, which could provide a better understanding of when young SSLs and NFSs become physiologically able to access various prey resources. Determining how aerobic dive capacity changes with developmental stage from pup to juvenile is also used in interpreting foraging behavior derived from telemetry data.

Skin biopsies are obtained by punching tissue from the webbing of the hind flipper, and are used for genetic analyses to identify biologically discrete (management) stocks, delineate home ranges, and evaluate site fidelity and the degree of population interchange. Blubber samples are taken through small incisions with a biopsy punch or a remotely-fired dart and are used to compliment studies of diet, feeding ecology (via analysis of fatty acids and stable isotopes), and contaminants. Wounds from tissue sampling procedures are usually left open (no sutures or other methods will be used to close the wounds) to allow any abscesses that may form from infection to drain.

Fecal and fluid samples are collected from dermal lesions, eyes, rectum, and vaginal areas with sterile culture swabs and used for determination of parasites, disease, and hormone concentrations.

One pre-molar tooth is extracted under general anesthesia in order to estimate the age of the animal by sectioning the tooth in a laboratory and counting incremental growth layers. An animal's size at a given age is one of the most useful measures of body condition and is important in measurement of weaning status.

Vibrissae, hair, and nails are clipped for analysis of stable isotopes to determine the trophic level at which an animal has been feeding over time and potentially for genetic analyses.

Enemas are used to collect the contents of the digestive tract for analyses of an animal's diet. The process involves insertion of a tube into the rectum of an anesthetized animal followed by flushing with several liters of water. Researchers may also use stomach intubation on anesthetized animals as an alternative to, or in conjunction with, enemas for collecting diet samples. Stomach intubation may also be used to test for the presence of milk in pups and to obtain a milk sample.

Bioelectric Impedance Analysis (BIA) is a method for measuring body composition by measuring the conductivity across electrodes inserted subcutaneously (under the skin). The procedure involves inserting four needles, two just behind the skull and two near the tail, to measure the rate of a small current between them.

Portable ultrasound equipment can be used to obtain two-dimensional visualization of many internal organs and to estimate blubber thickness. The ultrasound equipment is used outside of the body or inserted vaginally or rectally. Animals must be either physically or chemically restrained to accomplish this procedure. Portable metabolic chambers have also been used to measure oxygen consumption and other physiological variables that relate to energy budget calculations.

Measurements of energy expenditure, food consumption, water (and milk) influx, total body water, and body composition can be obtained through techniques using injection of stable isotopes such as deuterium labeled water. An initial blood sample must be taken to determine the animal's natural isotopic background concentration along with an accurate measurement of the animal's mass. A measured amount of isotope is administered and the animal is held or recaptured after one to three hours to allow for isotope equilibration, and a second blood sample is taken.

Chromic oxide and Co-EDTA can be used as markers in studies of the digestibility of food. These substances, administered in or with food, allow quantification of the rate of passage of food through the digestive track. They also allow measurement of the relationship between food intake and digestibility of various food items. This technique requires that animals be maintained in "dry holding" for up to 48 hours to eliminate access to additional food and water during the trial while allowing for collection of urine and feces.

Permanent and Temporary Marking: Animals that are captured are routinely marked to facilitate monitoring of post-procedure animals, to avoid or facilitate recapturing animals that have already been sampled, and to determine a population's vital rates such as age-specific survival and age at first reproduction. Studies on seasonal movements, site fidelity and dispersal are also facilitated by the ability to identify individuals at a distance. Brightly colored plastic tags bearing unique alphanumeric codes may be affixed to flippers of any animal captured, including pups as young as one week old. These types of tags are affixed to the trailing edge of each foreflipper, through the loose skin near the area where the flipper meets the body, using special pliers in a process similar to ear piercing. Flipper tags are subjected to extreme physical abuse and under typical field conditions they are expected to last four to six months before being torn loose or becoming unreadable.

Hot-branding is the technique currently used to permanently mark SSLs with a unique combination of numbers and/or letters. It involves the use of steel branding irons, heated to "red-hot" (about 500 ^{o}F) in a propane forge, and applied to the shoulder of an anesthetized animal to produce burns that penetrate the entire outer layer of the skin and into the inner skin layer (i.e., 2nd degree burns). These burns are characterized by formation of blisters, swelling, and fluids seeping from the burned area. Each brand requires about one minute to complete, exclusive of preparation and anesthesia. The effects of hot-branding and freeze-branding are discussed in more detail in Sections 2.9 and 2.10 of Appendix B. Any captured and sampled animals of all ages may be hot-branded for future identification. The process of branding pups on rookeries usually involves driving the majority of juvenile and adult animals from the rookery, as described for ground counts previously. Branding of animals captured at sea, outside of breeding season, or otherwise away from rookeries may not result in disturbance of other animals.

External Attachment of Instruments: Various instruments such as VHF transmitters and satellite-linked time depth recorders (SLTDR) may be attached to animals for remote collection of data on movement patterns and foraging behavior. Instrument packages are usually attached to the dorsal surface, head, or flippers by gluing to the hair with a fast-drying epoxy adhesive. The duration of instrument attachment is dependent on the timing of molt because the instrument will be shed as the hair is molted. The mass, dimensions, and drag characteristics of the instruments vary with the type of instrument and should be designed so that they do not interfere with an animal's ability to forage or function.

Insertion/Implantation of Instruments: Life History Transmitters (LHX tags) are data loggers equipped with sensors to monitor pressure, motion, light levels, temperature, and conductivity. They are surgically implanted in the peritoneal cavity under general anesthesia and record data from the sensors for up to 10 years. Surgical incisions are closed using absorbable sutures and the instrument is retrieved after the animal dies.

Other types of instruments, such as stomach temperature "pills," can be inserted under sedation or anesthesia into an animal's stomach through the mouth. Sensors measure changes in pressure, impedance, and stomach temperature that are correlated to feeding events and transmit the data to implanted data loggers or externally attached satellite transmitters. When used with external dive recorders and satellite tags, stomach temperature sensors can provide data about when and where geographically and in the water column prey are captured.

Transport and Temporary Captivity: The Alaska SeaLife Center (ASLC) has had permits to capture and transport SSLs to its facility in Seward, Alaska, where the animals are held for several months and used in a variety of nutritional and physiological studies before being released to the wild. While the NMFS research permit governs the capture, research conditions, and eventual release requirements, the conditions for their humane transport and care in the holding facilities are governed by the requirements of the AWA, which is administered by the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APHIS). Pursuant to the AWA, the research procedures must be reviewed and approved by the ASLC's Institutional Animal Care and Use Committee (IACUC). The experiments conducted on these "transient" SSLs involve a variety of feeding regimes, injection of various substances, and collection of various tissue samples, including blood and blubber. All animals are marked with a flipper tag or hot-brand and may have external scientific instruments attached prior to being returned to the wild. The studies conducted by the ASLC on these "transient" SSLs are intended to provide a basis for interpreting samples taken from animals in the wild with regard to nutritional and metabolic responses to different environmental variables.

Incidental Mortality: No existing permit authorizes intentional lethal takes of SSLs or NFSs. However, to acknowledge the fact that there is an inherent risk of serious injury and mortality associated with some research activities on wild animals, all permits allow for a limited number of mortalities incidental to the research. The number of incidental mortalities allowed is based on a permit holder's estimate of the potential for such mortalities.

Consistent with the broad definitions of "take" under the MMPA and ESA, permits issued pursuant to Section 104 of the MMPA and Section 10(a)(1)(A) of the ESA provide an exemption from the take prohibitions for any mortality resulting from the actions or presence of the researchers while conducting permit-authorized activities, as limited by the numbers specified in the permit. This exemption includes, but is not limited to: deaths of dependent pups by starvation following abandonment resulting from disturbance to a rookery or research-related death of a lactating female; adverse reactions to anesthetics or other chemical agents; infections resulting from intrusive research procedures; capture myopathy resulting from the stress of capture and handling; and serious injuries sustained in attempts to escape or evade capture or in response to stampedes, or aggressive social interactions caused by research activities.

One way to divide research activities into two broad categories is to consider them either non-intrusive or intrusive. Non-intrusive activities are those that do not result in physical contact between researchers and SSLs or NFSs (e.g., aerial surveys, vessel surveys, observational activities) and intrusive activities are those that require physical contact (e.g., capture/handling, tissue sampling, marking). In general, the risks of adverse effects (such as stress, pain, injury or mortality) on individual seal lions and fur seals are greater from intrusive activities than non-intrusive. However, non-intrusive activities may also have adverse effects due to disturbance, particularly for repeated disturbance or disturbances occurring over a broad area. It should also be noted that so called “non-intrusive” activities that affect a large number of individuals (e.g., groups of seals entering the water when disturbed on a haulout) may have a greater adverse impact on a population than an “intrusive” activity affecting just a few individuals (e.g., capturing a fur seal at the edge of a rookery without causing widespread disturbance in the vicinity).The following table summarizes the potential effects associated with the current research techniques on SSLs and NFSs and the level of potential risk involved with different procedures. A more detailed account of these procedures and risks is included in Appendix B.

Table 2.3-1 Summary of Potential Effects of Research Activities

	of Potential Effects	
		Northern Fur Seals
Non-Intrusive		
Aerial surveys	• Reactions to disturbance range from none to complete departure of individuals from haul-out • Effects of disturbance: - Pups may be trampled or abandoned - Pups may be knocked into water and not be able to climb cliffs to return - Pups that return, may suffer hypothermia or respiratory complications from aspirating water - Juveniles/adults may be injured by sliding/crashing into cliff facings or underwater rocks - Excessive metabolic heat from flight response - Cause aggressive interactions resulting in injury to adults and/or pups	• Same as SSL (although less chance of pups being knocked into water because of location of fur seal rookeries) • Potential masking of vocalizations because spectra of aircraft noise similar to vocalizations
Vessel surveys	• Disturbance effects (described for aerial surveys) when vessel approaches haul-out/rookery • Known to approach or avoid vessels at sea	• Same as SSL
Ground surveys	• Disturbance effects (described for aerial surveys) when researchers come onshore	• Same as SSL • Separation of mother/pup if disturbance occurs before vocal recognition is established for newborn pups
Scat collection	• Disturbance effects (described for aerial surveys) when researchers come onshore	• Same as SSL
Remote video/photographic monitoring	• Disturbance effects (described for aerial surveys) when researchers come onshore for installation/maintenance/repair (installation occurs outside breeding season)	• Same as SSL
Receipt of tissue samples from Alaska Natives that have taken the animal legally for subsistence harvest	• No effects	• Same as SSL
Receipt of tissue samples from animals found dead from other causes	• No effects	• Same as SSL
Intrusive		
Capture/ Restraint	• Variety of somatic, psychological, and behavioral stressors (strange sights, sounds, odors) • Incur injuries in their attempts to avoid capture or escape restraint • Unintended effects from chemical or drugs • Territorial/hierarchical modifications associated with displacement of animals by researchers • Capture myopathy	• Same as SSL

Table 2.3-1 (continued) Summary of Potential Effects of Research Activities

	of Potential Effects	
		Northern Fur Seals
Intrusive		
Anesthesia/ Sedation/ Drugs	• Stress/injury from capture/restraint • Potential infection at injection site • Puncture of organs from injection of darts • Apnea (stop breathing) or respiratory depression • Accumulation of fluid in lungs • Disorientation, blurred vision, nausea • Bradycardia (slowed heart rate)/Tachycardia (increased heart rate) • Hypothermia/Hyperthermia	• Same as SSL
Collection of morphometric measurements	• Stress/injury from capture/restraint	• Same as SSL
Collection of blood samples	• Stress/injury from capture/restraint • Infection of wound site • Damage to vein, clotting, abscess	• Same as SSL
Muscle/ Skin/ Blubber biopsies	• Stress/injury from capture/restraint • Risks associated with anesthesia • Infection from wound site	• Same as SSL
Fecal and fluid samples/enema/stomach intubation	• Stress/injury from capture/restraint • Perforation of stomach/rectum/bladder/urethra • Introduction of liquid into trachea	• Same as SSL
Tooth extraction	• Stress/injury from capture/restraint	• Same as SSL
Collection of vibrissae, hair, and nails	• Stress/injury from capture/restraint • No pain from clipping	• Same as SSL
Bioelectric Impedance Analysis	• Stress/injury from capture/restraint • Pain/infection from insertion of needles • Repeated BIA could cause skin and subcutaneous lesions	• Same as SSL
Ultrasound/X-Ray	• Stress/injury from capture/restraint	• Same as SSL
Stable isotope injection	• Stress/injury from capture/restraint • Infection of injection site	• Same as SSL
Chromic oxide and Co-EDTA	• Stress/injury from capture/restraint • Infection of injection site	• Same as SSL
Temporary marking	• Stress/injury from capture/restraint • Toxicity of marking substance through ingestion during grooming • No effects from shearing	• Thermal stress from shearing
Permanent marking	• Stress/injury from capture/restraint • Brief acute stress from branding (mitigated with anesthesia) • Pain from blisters/swelling and minor tissue trauma • Short-term immune response (increase in white blood cell, platelets, etc.) • Infection of wound	• Same as SSL

Table 2.3-1 (continued) Summary of Potential Effects of Research Activities

	of Potential Effects	
		Northern Fur Seals
Intrusive		
Flipper tagging	• Stress/injury from capture/restraint • Momentary pain • Infection at tagging site • Tag may tear out of flipper	• Same as SSL
Attachment (external) of scientific instruments measurements	• Stress/injury from capture/restraint • Pain from burning due to improper mixing of epoxy • Discomfort if placement of instrument causes pulling of hair/skin • Infection from wound site if instrument is torn off • Alter buoyancy or drag of animal thereby reducing foraging and/or predatory avoidance ability and increasing energy expenditure	• Same as SSL
Insertion/implantation (internal) of instruments	• Stress/injury from capture/restraint • Infection at wound site • Excessive tissue reaction • Rejection of implanted materials	• Same as SSL
Temporary captivity	• Stress/injury from capture/restraint • Stress of captivity	• Same as SSL

2.4 Components Common to All Alternatives

2.4.1 Activities that Do Not Require Permits

There are a number of activities that do not require the types of research permits that are the subject of this PEIS, either because they would not result in takes of SSLs, NFSs, or other protected species; or because they are otherwise exempt from the prohibitions of the MMPA and ESA. These activities would be unaffected by any of the alternatives. There would be no impact on grant programs related to these types of activities under any of the alternatives.

Analysis of existing data does not require a permit and could proceed under any of the alternatives. Certain types of research linked to investigating the decline of SSLs, such as oceanographic surveys, do not require the types of permits that are the subject of the PEIS. However, oceanographic surveys and certain other activities conducted in the marine environment that may affect SSLs, NFSs, or other marine mammals may require authorizations or permits such as Incidental Harassment Authorizations under Section 101 of the MMPA or Incidental Take Permits under Section 10(a)(1)(b) of the ESA. The requirements for these types of permits or authorizations are not within the scope of this PEIS.

The ESA contains provisions that specifically exempt Alaska Natives from prohibitions against "take" (except if the Secretary of Commerce, in consultation and collaboration with affected Alaska Natives, determines that such take "materially and negatively affects the threatened or endangered species"). The MMPA contains similar exemptions for Alaska Natives. These exempted activities by Alaska Natives include:

- subsistence hunting for consumption by "any Indian, Aleut, or Eskimo who resides in Alaska and who dwells on the coast of the North Pacific Ocean or the Arctic Ocean" if such taking is not done in a wasteful manner;

- disturbance of animals associated with subsistence hunting;
- transport, possession, and consumptive use of subsistence taken animals by Alaska Natives;
- sale of edible portions of animals in Native villages and towns in Alaska for Native consumption;
- possession of tissue samples from harvested animals for use in other research projects (non-Native researchers must have permits to possess and use such tissue samples); and
- sale of non-edible body parts that have been made into authentic Native articles of handicrafts and clothing without the use of pantographs, multiple carvers, or other mass copying devices.

These exempted activities by Alaska Natives do not require permits from NMFS and are therefore not affected by any of the alternatives presented in this PEIS. In addition, NMFS is obligated to conduct government-to-government consultations with Alaska Natives on issues concerning the health and well-being of their communities and the natural resources upon which they depend. NMFS has entered into co-management agreements for SSLs and NFSs with the Pribilof Islands communities and is in the process of negotiating co-management agreements for SSLs with other Alaska Native groups (Appendix F). Through these co-management agreements and other consultation processes, Alaska Native organizations have collaborated with NMFS, other agencies, and private institutions on several aspects of research related to SSLs and NFSs, including:

- developing research and management priorities;
- developing research plans;
- assisting with field logistics;
- participating with observations at remote sites;
- voluntarily supplying tissue samples from subsistence hunts; and
- contributing traditional ecological knowledge about SSLs, NFSs, and environmental factors.

The opportunity for researchers to engage in these or other collaborative efforts with Alaska Natives would be common to all alternatives, although the scope of research effort varies between alternatives.

2.4.2 Activities that Require Permits

There are two broad categories of research activities that require permits. One consists of research that does not involve capture, handling, or collection of tissue from live animals. The other consists of research that requires capture, handling, or invasive procedures on live animals. Both categories of research have some potential for direct and indirect mortality. Table 2-1 contains additional detail on what general types of research activities fall into each of these two categories. The type and amount of these activities would vary across the alternatives.

Common to all permits under any alternative are the statutory and regulatory criteria established under Section 10(a)(1)(A) of the ESA (16 U.S.C. 1539), Section 104 of the MMPA (16 U.S.C. 1374), and NMFS implementing regulations (50 CFR §216.31-216.41 and §222.301-222.309). Permits for research on all marine mammals must be consistent with the following criteria established under the MMPA:

- The proposed activity is humane and does not present any unnecessary risks to the health and welfare of marine mammals. "Humane" is defined in the MMPA as "that method of taking which involves the least possible degree of pain and suffering practicable to the mammal involved."
- The proposed activity by itself or in combination with other activities is not likely to have a significant adverse impact on the species or stock.
- The applicant's expertise, facilities, and resources are adequate to successfully accomplish the objectives and activities stated in the application.
- If a live animal will be held captive or transported, the applicant's qualifications, facilities, and resources are adequate for the proper care and maintenance of the marine mammal.

- The proposed activity furthers a bona fide scientific or enhancement purpose.
- If the lethal taking of marine mammals is proposed: (i) non-lethal methods for conducting the research are not feasible; and (ii) for depleted, endangered, or threatened species, the results will directly benefit that species or stock, or will fulfill a critically important research need.
- For species or stocks designated or proposed to be designated as depleted, or listed or proposed to be listed as endangered or threatened: (i) The proposed research cannot be accomplished using a species or stock that is not designated or proposed to be designated as depleted, or listed or proposed to be listed as threatened or endangered; (ii) The proposed research, by itself or in combination with other activities will not likely have a long-term direct or indirect adverse impact on the species or stock; (iii) The proposed research will either: (A) Contribute to fulfilling a research need or objective identified in a species recovery or conservation plan, or if there is no conservation or recovery plan in place, a research need or objective identified by the Office Director in stock assessments established under section 117 of the MMPA; (B) Contribute significantly to understanding the basic biology or ecology of the species or stock, or to identifying, evaluating, or resolving conservation problems for the species or stock; or (C) Contribute significantly to fulfilling a critically important research need.

Table 2.4-1 Research Activities Requiring Permits

Research Activities	
	That Require Capture, Handling, or Collection of Tissue
• Aerial, vessel, and ground surveys – conducted to count animals, resight animals that have been tagged and branded, and to document behavioral observations. • Scat collection – occurs on rookeries and haulouts and is used to estimate recent prey consumed. • Remote monitoring – includes photographs and video images from remote stations located to document seasonal movements, changes in population structure, number of entangled or injured animals, and record presence of tagged or branded animals. • Receipt of tissue samples from Alaska Natives who have taken the animal legally for subsistence harvest; used to measure chemical/physiological parameters. • Receipt of tissue samples from animals found dead from other causes; used to measure chemical/physiological parameters.	• Collection of morphometric measurements – includes external measurements of an animal. • Collection of tissue samples – including skin, muscle, blubber, vibrissae, teeth, blood, and fluids. • Analysis of body composition – through injection of stable isotopes, ultrasound, bioelectric impedance analysis, chromic oxide and Co-EDTA, and portable metabolic chamber. • Enema or stomach intubation – used to collect and analyze stomach/digestive tract contents. • Permanent or temporary marking of animals – includes plastic tags secured on the foreflipper, hot-branding, and freeze-branding, which are used to monitor animals, to facilitate recapture of sampled animals, and to determine population's vital rates. • Attachment of scientific instruments – used to collect information on movement patterns and foraging behavior. • Insertion/implantation of instruments – used to monitor pressure, motion, light levels, temperature, and conductivity. • Temporary captivity – temporary removal from wild, transportation, and studies of the animal's nutrition and physiology.

For ESA-listed species, in addition to the requirements under the MMPA, the following criteria must be considered in determining whether or not to issue a permit for scientific purposes:

- the permit would not operate to the disadvantage of the endangered species;
- the permit would enhance the survival of the endangered species, taking into account the benefits anticipated to be derived on behalf of the endangered species;
- the status of the population and the direct and indirect effects of the proposed action on the population;
- how the applicant's needs, program, and facilities compare and relate to proposed and ongoing projects and programs; and
- the opinions of scientists or other persons or organizations knowledgeable about the species or other matters germane to the application.

Scientific research permits issued by NMFS pursuant to the above statutes and regulations contain a number of conditions that are intended to ensure compliance of the research with the purposes of the MMPA and ESA. Other conditions commonly included in these permits are intended as measures to mitigate potential adverse impacts of the research. Mitigation for specific research procedures is discussed in Appendix B. Some conditions are discretionary and may not be incorporated into all permits, whereas others are dictated by the statutes or regulations and would be part of all permits. See Chapter 5 of this document for additional types of conditions that NMFS may consider for future permits. The following conditions have been incorporated into previous research permits:

- the duration of the permit (five year maximum by regulation);
- how requests for amendments could be addressed;
- requirements for how researchers notify the NMFS regional office about field logistics prior to each field season, with the intent that the information would be used to promote coordination between different research groups and to avoid excessive research activity in any one location;
- requirements for researchers to coordinate directly with other researchers doing similar work in the same areas, to reduce redundancy and repeated disturbance of the same animals;
- monitoring requirements to determine the status of individual animals after they have been handled and the effects of research-related disturbance on the rookery/haulout, especially in relation to the incidence of serious injury and mortality;
- reporting requirements for timely dissemination of research results and notification of publications;
- types of information required in annual and final reports; and
- conditions requiring annual reauthorization of multi-year permits based on the adequacy of information provided in the annual report.

2.5 Establishing Serious Injury and Mortality Limits Under the Alternatives

The alternatives presented in the following sections represent different levels of research effort, each with a range of research techniques and intensities that could be authorized (assuming all permit issuance criteria are met). NMFS acknowledges that all research activities create some risk of injury to animals. Some research activities, like aerial surveys, may cause disturbance reactions in a very small proportion of the animals being surveyed but will affect a large proportion of the entire population because the surveys are conducted over a large proportion of the population. Other research activities, like tissue sampling from captured animals, may result in stressful situations for every animal involved but will affect only a small proportion of the population because not all animals are captured or sampled.

Animals may display a wide range of reactions to a given research activity depending on the individual animal, the actions of the researchers, timing and location of the research, and environmental factors such as sea conditions and weather. Some reactions may be very minor and short-term, others may cause injuries that could temporarily hamper foraging, and others may constitute serious injuries that result in death. Each research activity, therefore, has different inherent risks to the population, measured by a combination of the intensity of possible responses and the number of animals affected. While decisions to issue permits should not be based solely on balancing relative benefits of the research against adverse impacts to the species, it is important to remember that research permits for threatened and endangered species are issued for conservation purposes, so the information collected should ultimately result in benefits to the recovery of the species.

Chapter 4 of this PEIS describes the methodology and risk assessment analysis for the research efforts represented by each of the alternatives. One of the metrics used to measure the possible risks of research is a calculation of potential serious injury and mortality that results from a given number of takes for different research activities. The importance of this number of potential mortalities to the species is relative to the status of the population or stock of animals it affects. This PEIS concerns research on two different species but four distinct management stocks as defined under the MMPA, each with different population trends and management status. In order to assess the potential effects of research on the four different management stocks, NMFS has decided to compare the number of potential research-related mortalities for each alternative with a well known measure of fisheries-related mortality that takes into account the stock's abundance, reproductive potential, and conservation status: the calculated value for Potential Biological Removal (PBR). PBR is used in this PEIS as a tool for gauging varying levels of accepted "mortality and serious injury risk" across the alternatives, which is described in more detail in Section 2.6.

The MMPA, as reauthorized in 1994, established a management objective to reduce incidental mortality of marine mammals in commercial fisheries. To this end it defined an upper limit guideline for fishery-related mortality for each species and/or management stock, its PBR. PBR is defined in the MMPA as "...the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population." The MMPA defines the calculation of PBR as the product of three elements: the minimum population estimate (Nmin); half the maximum net productivity rate (0.5 R max); and a recovery factor (Fr) based on the status of the stock. The technical justifications and statistical criteria for each of these elements are described by Wade (1998 and 2005).

PBR describes an upper limit of animals that could be removed from a population of marine mammals without causing the population to drop or remain below its optimal sustainable population (OSP). This limit is not meant to imply that if human-mortality is below PBR, a population below OSP would necessarily increase, because other resource limitations could be limiting population growth. Rather, this limit implies that for a declining population in which direct human-caused mortality is below PBR, the human-caused mortality is the cause of neither the decline nor the failure of the population to recover. The formula for PBR is therefore a precautionary or conservative measure of human-caused mortality that could be expected to affect a population's ability to recover from a depleted state or to remain at a sustainable level. It is based on the concept that each stock will have a natural ability to expand if it has a positive value for net production (gross reproduction minus natural mortalities). The idea is to prevent human-caused mortalities from creating a net production loss. The PBR calculation contains provisions to account for uncertainty in population estimates and protects a larger fraction of net production for depleted stocks through the Fr. The use of an Fr less than 1.0 allocates a proportion of expected net production towards population growth and compensates for uncertainties that might prevent population recovery, such as biases in the estimation of Nmin and R max, or errors in the determination of stock structure.

For endangered stocks, Fr is set at 0.1, so that 90 percent of the endangered stock's annual net production is reserved for recovery of the stock. Through a series of extensive simulation modeling, NMFS has calculated that keeping human-caused mortality at or below PBR calculated with a recovery factor of 0.1 would increase the recovery time of endangered marine mammals by no more than 10 percent (Wade 1998). For threatened and depleted stocks, Fr is set at 0.5 so that 50 percent of the stock's annual net production is reserved for recovery. However, because its population trend has been increasing for almost 20 years, Fr for the threatened eastern distinct population segment (DPS) of SSLs has been set at 0.75. For non-depleted stocks, Fr is set at 1.0 so that human-caused mortality could account for 100 percent of a stock's annual net production and still not cause a decline in the population. It is important to realize that for endangered, threatened, and depleted stocks, the use of an Fr <1.0 means that human-caused mortalities that exceed PBR would not cause the population to decline (unless human-caused mortality accounted for all of the annual net production), but could slow the rate that the population recovers. The PBR approach was tested extensively through simulation trials (Wade 1998) to evaluate robustness to variability or biased abundance estimates, mortality estimates and other parameters. These simulations demonstrated that 95% of the trials equilibrated within OSP levels when default parameters for Nmin, Rmax, and an appropriate recovery factor were used. Consequently, NMFS concluded that the PBR approach was an appropriately conservative mechanism to evaluate the effect of human-caused mortality on a stock, even for many declining populations (NMFS 1992, Barlow et al. 1995, Wade and Angliss 1997, Wade 1998, Wade 2005). Such a conclusion applied when the value for the recovery factor was 0.5. When the recovery factor value was 0.1, more than 95 percent of simulations equilibrated within OSP levels; thus, the approach is even more conservative for those stocks with the recovery factor of 0.1 (e.g., the western DPS of SSLs). Using the information from Wade (1998), human-caused mortality at a level equal to PBR of a stock with a recovery factor of 0.1 would cause the population to equilibrate within 95 percent of the abundance it would have achieved without such mortality. An equilibrium level so close to an unexploited population level indicates minimum impact to the population.

The MMPA requires NMFS to calculate PBR for each management stock of marine mammal, if possible, and to describe those calculations in its annual stock assessment reports. Based on the most recent stock assessment data (Angliss and Outlaw 2007, Carretta *et al.* 2007), PBR for the endangered western DPS of SSLs is 234 animals; PBR for the threatened eastern DPS of SSLs is 2,000 animals; PBR for the depleted eastern Pacific stock of NFSs is 15,262 animals; and PBR for the San Miguel Island stock of NFSs is 219 animals.

As described, the different levels of research activity represented in the alternatives correspond to different levels of risk to individual animals. Increased intensity of field research and more intrusive types of research pose greater risks to individuals, even if they provide useful information for conservation purposes. In order to provide a guideline for the maximum amount of risk to individuals that would be acceptable under each of the alternatives, NMFS has established an upper threshold level of mortality relative to PBR. This does not mean that NMFS would be obligated to authorize takes up to these threshold levels or that a certain percentage of PBR will be allocated to research regardless of other types of mortality. These upper limits will be used only as guidelines for the permitting process.

2.6 Alternatives Carried Forward for Analysis

Four alternatives will be carried forward for analysis of environmental consequences in this PEIS. These alternatives represent a reasonable range of research granting and permitting options that fulfill the purpose and need for the federal action as described in Chapter 1. The general policy direction of each alternative is described below, and examples of the specific research activities permitted under each alternative are listed in Table 2.6-1. Table 2.6-2 provides more detailed information on the types of research activities that would be granted and permitted under each alternative as well as the threshold level of total potential mortality authorized (incidental and intentional mortality combined) across each alternative.

Table 2.6-1 Research Activities Allowed Under Each Alternative

		–		**Alternative 4 – Research Program with Full Implementation of Conservation Goals**
Research activities on live animals with No capture, restraint, or collection of tissues				
Aerial surveys	*	√	√	√
Vessel surveys	*	√	√	√
Ground surveys	*	√	√	√
Scat collection	*	√	√	√
Remote video/photographic monitoring	*	√	√	√
Receipt of tissue samples from Alaska Natives that have taken the animal legally for subsistence harvest	√	√	√	√
Receipt of tissue samples from animals found dead from other causes	√	√	√	√
Research activities on live animals that requires capture, restraint, or collection of tissues				
Collection of morphometric measurements	--	--	√	√
Collection of blood samples	--	--	√	√
Muscle biopsies	--	--	√	√
Skin biopsies	--	--	√	√
Blubber samples	--	--	√	√
Fecal and fluid samples	--	--	√	√
Extraction of pre-molar teeth	--	--	√	√

Table 2.6-1 (continued) Research Activities Allowed Under Each Alternative

				Alternative 4 Research Program with Full Implementation of Conservation Goals
Collection of vibrissae, hair, and nails	--	--	√	√
Enema or stomach intubation	--	--	√	√
Bioelectric Impedance Analysis	--	--	√	√
Ultrasound	--	--	√	√
Stable isotope injection	--	--	√	√
Chromic oxide and Co-EDTA	--	--	√	√
Temporary marking	--	--	√	√
Research activities on live animals that requires capture, restraint, or collection of tissues				
Attachment (external) of scientific instruments measurements	--	--	√	√
Attachment (external) of scientific instruments measurements	--	--	√	√
Insertion/implantation (internal) of instruments	--	--	√	√
Temporary captivity	--	--	√	√
Intentional take of animals	--	--	--	√
Note:	* No new permits or authorizations would be issued under Alternative 1. However, grants could be issued and surveys, observations, and scat collections could occur under circumstances that would not result in disturbance or takes.			
Key:	-- Not Allowed √ Allowed			

2.6.1 Alternative 1 – No Action: No New Permits or Authorizations

The No Action Alternative, which must be considered in an EIS according to CEQ regulations, would only allow research activities on SSLs and NFSs that either do not require a permit or are currently allowed under permits that have not been vacated by the May 26, 2006, court order (Civil Action No. 05-1392 ESH), which are valid through 2010. No new permits would be issued to replace these permits as they expire, nor could existing permits be amended to allow modifications in research activities, sample sizes, or objectives. Further, no grants would be awarded for research that requires a permit, except for those activities authorized under existing permits. When the existing permits expire, all research activities that require a permit would have to cease, or researchers would risk violation of the MMPA, ESA, and NMFS regulations. Under Alternative 1, no incidental or intentional mortality due to research activities would be acceptable or authorized. This policy of not issuing new permits or grants for research-related takes would be applicable to both populations of SSLs and both stocks of NFSs.

Although researchers could not approach or capture animals to collect data, they could use remote sensing techniques, behavioral observations, scat collection from vacant haulouts and rookeries, and aerial surveys conducted at distances and conditions that are not likely to result in takes (and therefore would not require permits). Researchers could obtain permits and be awarded grants for receipt and use of tissue samples from Alaska Natives who agree to provide samples from animals that have been taken legally for subsistence harvest. Permits and grants could also be awarded for receipt and use of tissues from animals that have been found dead (stranded) due to other causes, but these samples could only be collected by means that would not result in takes of live SSLs or NFSs, or would be collected under the provisions of the MMPA's Marine Mammal Health and Stranding Response Program (MMHSRP)(Title IV, 16 U.S.C. 1421) and the permit held by the MMHSRP. This alternative would therefore allow researchers to use only techniques that do not disturb animals in the wild in order to monitor the populations and collect information pertinent to their recovery. Research on captive SSLs and NFSs (those already in captivity at this time) would be unaffected by these alternatives, which are specific to permits for research on free-ranging animals. However, under the No Action Alternative, no additional SSLs or NFSs could be brought into captivity, either by removal from the wild or via captive breeding.

For SSLs, research on the western population would be limited by exclusion from certain geographic areas in the Aleutian Islands (AI) and Gulf of Alaska (GOA) designated by federal regulation as “no-approach” buffer areas (50 CFR 223.202). These buffer areas extend 3 nautical miles (nm)(5.5 kilometers [km]) around SSL rookeries ranging from 59°20.5 N by 150°21.0 W to 52°54.5 N by 172°28.5 E (Table 1 to 50 CFR 223.202: Listed Steller Sea Lion Rookery Sites). By regulation, no vessel may approach within the 3-nm perimeter for these sites except by permit, for subsistence taking, or in an emergency. Further, these regulations prohibit any person from approaching by land (unless privately owned) within one-half statutory mile (0.8 km) of these sites or within sight of an SSL rookery listed in the regulations. For Marmot Island, no person may approach on land not privately owned within 1.5 statutory miles (2.4 km) or within sight of the eastern shore of Marmot Island. Thus, without permits, even those activities not likely to result in harassment takes (e.g., behavioral observations, scat collections from vacant haulouts) would be prohibited under this alternative for any western SSL population sites listed in these regulations.

2.6.2 Alternative 2 – Research Program without Capture or Handling

The policy direction of this alternative would be to issue permits and to provide grant support to qualified individuals and institutions to conduct research on SSLs and NFSs using methods that would not involve capturing and handling of animals or researcher presence on rookeries during the breeding season. This alternative would also prohibit intrusive research, where intrusive is defined at 50 CFR 216.3 to mean a procedure conducted for bona fide scientific research involving: a break in or cutting of the skin or equivalent, insertion of an instrument or material into an orifice, introduction of a substance or object into the animal’s immediate environment that is likely either to be ingested or to contact and directly affect animal tissues (i.e., chemical substances), or a stimulus directed at animals that may involve a risk to health or welfare or that may have an impact on normal function or behavior (i.e., audio broadcasts directed at animals that may affect behavior). This restriction on intrusive activities would essentially limit research to censusing surveys and behavioral observations that have a very small potential to cause injury to animals. Under Alternative 2, the total amount of incidental mortality allowed under all permits and authorizations would not exceed 5 percent of PBR for each stock (western SSL is 12 animals, eastern SSL is 100, eastern Pacific NFS is 763, San Miguel Island NFS is 11). No intentional lethal take would be authorized under Alternative 2.

As with the No Action Alternative, under this alternative, researchers could obtain permits and be awarded grants for receipt and use of tissue samples from Alaska Natives who agree to provide samples from animals that have been taken legally for subsistence harvest. Permits and grants could also be awarded for receipt and use of tissues from animals that have been found dead (stranded) due to other causes, but these samples could only be collected by means that would not result in takes of live SSLs or NFSs, or would be collected under the provisions of the MMHSRP (Title IV, 16 U.S.C. 1421) and the permit held by the MMHSRP.

Scat collection would be allowed but only from haulouts and rookeries during the non-breeding season. For research on rookeries during the breeding season, observers and remote sensing equipment would need to be placed on sites at times and in such a manner as to avoid disturbing animals. No activities involving capture, restraint, or disturbance of animals on rookeries during the breeding season would be permitted, but disturbance on haulouts for resighting efforts and scat collection could be authorized. It is assumed that, under this alternative, more emphasis would be placed on developing remote sensing and other techniques that allow collection of physiological and nutritional data without capturing animals than under the Status Quo. It is likely that under this alternative there would be a higher amount of survey and observational takes requested compared to the Status Quo, as researchers would re-allocate funds and other resources away from projects that would not be permitted.

2.6.3 Alternative 3 – Status Quo Research Program

The existing grant and permit process is somewhat flexible in that it can accommodate changes in funding level, management priorities, scientific interests, research techniques, population status, and threats to the populations' recovery. Under the Status Quo process, permits are issued to qualified individuals and institutions to conduct research according to the scope and methods requested in their applications, with permit restrictions and mitigation measures required by the MMPA, ESA, and NMFS implementing regulations. In addition to these statutory and regulatory permit restrictions, the impact of proposed research programs for SSLs must remain at a level below that which would jeopardize the continued existence of the species or result in adverse modification of critical habitat, as required by Section 7 of the ESA.

The scope of research activity conducted under this alternative depends substantially on the amount of funding that is available. Funding for SSL research peaked in 2001 and 2002 due to special congressional appropriations (Section 3.6). Funding levels have decreased since that time and are not expected to reach those levels again in the foreseeable future. For the purposes of this PEIS, the amount of funding and therefore research effort on SSLs will be assumed to have reached peak levels under the permits issued at or before the initiation of scoping for this PEIS. Six of those permits, encompassing the majority of field research on SSLs, were subsequently vacated by court order on May 26, 2006 (Civil Action No. 05-1392 ESH). However, for the purpose of analyzing the effects of that scope of research, the average number, types, and distribution of takes allowed by all permits before the court order will be used for the analysis of effects of this alternative. For NFSs, funding levels have recently increased; therefore, the number, types, and distribution of takes allowed by all permits approved by January 2006 will be used for the analysis of effects under this alternative. This may not represent a peak research effort for NFSs, depending on future funding opportunities and interest among the research community, both of which are linked to factors such as population trends and speculation about the contribution of commercial fisheries and other factors to population status and prospects.

Under the Status Quo alternative, new permits would be issued for the same type and scope of research as occurred under SSL permits that existed before the court order vacated them in May 2006 (Table 2-2). It would also include all other existing permits for research on SSLs and NFSs that were not affected by that order (Appendix A). New permits would be issued to replace permits as they expire such that the levels and types of research activities would continue to the extent that funding allowed. Under Alternative 3, the total amount of incidental mortality allowed under all permits and authorizations would not exceed 10 percent of PBR for each stock (western SSL is 23 animals, eastern SSL is 200, eastern Pacific NFS is 1,526, San Miguel Island NFS is 22).

New requests for permits and amendments to existing permits would be considered on a case-by-case basis and would be granted as long as the applicants satisfied all permit issuance criteria, including having a bona fide research project likely to contribute to the recovery of the depleted, threatened, or endangered species. Under this alternative, each new permit request would be evaluated separately during Section 7 consultation, against the baseline of impacts from whatever permits were in effect at the time of the request. New permits would only be denied if it were determined that issuance would exceed the ESA jeopardy or adverse modification threshold when expected impacts were added to existing research and other activities in the baseline at the time the application was received.

2.6.4 Alternative 4 – The Preferred Alternative - Research Program with Full Implementation of Conservation Goals

This alternative would include not only those specific activities currently or previously permitted but any additional research activities or methods that are needed to implement the new SSL Recovery Plan (NMFS 2006a) and the new NFS Conservation Plan (NMFS 2006b), assuming they are consistent with the MMPA, ESA, and NMFS implementing regulations. These plans are discussed in more detail in Sections 3.2.1.13 and 3.2.2.12.

The new 2006 Draft SSL Recovery Plan identifies 78 substantive actions needed to achieve recovery of the western DPS. All recovery actions were prioritized into three categories in the implementation schedule (NMFS 2006a, pp 157) according to joint NMFS and U.S. Fish and Wildlife Service (USFWS) recovery planning guidance (Section 5.1.10 Implementation Schedule in "interim Recovery Planning Guidance" available at www.nmfs.noaa.gov/pr/laws/esa/policies.htm). Priority 1 actions are, by definition, those actions "that must be taken to prevent extinction or to prevent the species from declining irreversibly in the foreseeable future." Priority 2 actions are defined as those "that must be taken to prevent a significant decline in species population/habitat quality or some other significant impact short of extinction." Priority 3 actions are defined as "all other actions necessary to provide for full recovery of the species."

Many of the research activities related to priorities listed in the Draft SSL Recovery Plan have been used by past and current research programs under the Status Quo permits. However, there are some research questions listed in the plan that have not received adequate attention in the past, either because they would require larger budgets than were available or because researchers elected not to attempt them because of the logistical challenges they presented. Some of these research questions may require use of techniques or protocols that have not previously been requested or permitted on SSLs and NFSs. As such, they may involve unique or uncertain risks to the animals. These new techniques or procedures would likely require addition NEPA Analysis.

Under Alternative 4, NMFS would consider proposals for research that posed a higher risk of injury to individual animals, including intentional mortality of animals or other specified individuals, if the permit applicant could demonstrate that the research has a reasonable chance of providing significant data relevant to conservation of the species. Permit issuance criteria under the MMPA and ESA would still prohibit research from putting the species at a disadvantage or in jeopardy. Under Alternative 4, the total amount of incidental mortality allowed under all permits and authorizations would not exceed 15 percent of PBR for each stock (western SSL is 35 animals, eastern SSL is 300, eastern Pacific NFS is 2,289, San Miguel Island NFS is 33).

Regarding the eastern DPS, the Draft SSL Recovery Plan recommended the initiation of a status review to consider removing the eastern DPS from the ESA's List of Threatened and Endangered Wildlife. If, following the status review, the eastern DPS is delisted, then pursuant to section 4(g) of the ESA the agency is required "in cooperation with the States to monitor effectively for not less than five years the status" of the eastern DPS. Given the long-term increasing population trend and lack of significant conservation threats, the Draft SSL Recovery Plan concludes that, if the eastern DPS is delisted, the primary recovery goal is to develop a post-delisting monitoring plan to ensure re-listing is not necessary after removal. Key components of this plan relative to research activities have not been prioritized in the SSL plan but would be likely to include population-trend monitoring, genetics research to refine population structure, monitoring terrestrial habitat threats, monitoring for unusual mortality events that may be related to contaminants or other human factors, and monitoring fishery management plans to ensure that they stay consistent with SSL requirements. These are activities that have been permitted under the Status Quo and would be considered under Alternative 4.

The Draft NFS Conservation Plan identified 58 tasks needed to achieve recovery of the depleted eastern Pacific stock, as prioritized in the implementation schedule (NMFS 2006b, pp 82). The actions that contain field research components are as follows:

- monitor and manage subsistence harvest;

- identify and evaluate illegal harvests;
- conduct basic studies on fur seal feeding ecology;
- determine impact of fisheries;
- monitor male and pup abundance at Pribilof Islands;
- estimate pup survival;
- evaluate marking and resighting program;
- study vital rates;
- conduct behavioral/physiological studies;
- conduct comparative studies between Pribilof Islands animals and other islands;
- conduct oceanographic and fishery surveys in relation to essential NFS habitat; and
- reevaluate carrying capacity.

Alternative 4 represents an extensive research program that would be able to simultaneously address multiple issues over a huge geographical space. To be fully implemented, such a program would require a much larger research budget than is currently allocated to these species. It would also require greater administrative support for the Grants, Permits, and Regional Offices of NMFS in order to efficiently process the large number of projects. For the purposes of this PEIS, it is assumed that the grants and permits processes will be essentially the same as under the Status Quo. However, if adequate funding were available to implement this expanded research program, it is likely that NMFS would adopt one or more of the measures, discussed in Chapter 5, to expedite the review process and to improve communication and coordination, not only between researchers, but between the various branches of NMFS involved in the research program, the Alaska Native communities affected by research, other federal and state agencies, and the public.

Table 2.6-2 Alternative Framework

					Alt. 4: Research Program with Full Implementation of Conservation Goals[3]
Activities that do not require permits	*Analysis of existing data and samples*	● Grants could be issued for administrative, educational, and research activities that do not require permits	● Grants could be issued for administrative, educational, and research activities that do not require permits and for those where permits would be issued	● Grants could be issued for administrative, educational, and research activities that do not require permits and for those where permits would be issued	● Grants could be issued for administrative, educational, and research activities that do not require permits and for those where permits would be issued
	Bio-sampling under Co-Management or other agreement with NMFS	● Grants could be issued for activities associated with this activity	● Grants could be issued for activities associated with this activity	● Grants could be issued for activities associated with this activity	● Grants could be issued for activities associated with this activity
Activities that do not involve capture, handling, or collection of tissues from live animals	*Aerial surveys*	● No new permits or authorizations ● Grants could be issued and surveys could occur at altitudes that would not result in disturbance or other take	● Surveys at trend sites as needed for stock assessment and population monitoring	● Frequency, location, and protocol (including sample size) determined according to specific research objectives	● Frequency, location, and protocol (including sample size) determined according to specific research objectives ● Level of effort higher than Status Quo
	Vessel-based surveys and observations	● No new permits or authorizations ● Grants could be issued and surveys or observations could occur at distances or under circumstances that would not result in disturbance or other take	● Timing and location as needed for stock assessment and population monitoring, to support other research activities (e.g. brand resight or behavioral studies), and monitoring effects of research	● Frequency, location, and protocol (including sample size) determined according to specific research objectives	● Frequency, location, and protocol (including sample size) determined according to specific research objectives ● Level of effort higher than Status Quo
	Land-based surveys and observations (includes scat collection, ground counts, operation and maintenance of remote cameras)	● No new permits or authorizations ● Grants could be issued and surveys, observations, or scat collections could occur at distances or under circumstances that would not result in disturbance or other take	●Timing and location as needed for stock assessment and population monitoring, to support other research activities (e.g. brand resight or behavioral studies), and monitoring effects of research ●No disturbance of rookeries during breeding season	● Frequency, location, and protocol (including sample size) determined according to specific research objectives	● Frequency, location, and protocol (including sample size) determined according to specific research objectives ● Level of effort higher than Status Quo

[1] Note that the specifics of research in the No Action column refer to what would or would not be funded or permitted by NMFS as the existing permits and grants expire. All research activities currently funded and permitted would continue unaltered (no amendments or modifications) through their expiration. See the Status Quo for a description of currently funded and permitted research.

[2] Note that the Status Quo of research for this document is defined as the level of research permitted at the time scoping was initiated December 28, 2005. Subsequent to scoping the majority of permits for research on Steller sea lions were vacated by court order. However, for the purpose of analysis and comparison with other alternatives, we will assume that research would be permitted at the pre-court order levels.

[3] This Alternative would include not only those specific activities currently or previously permitted but any additional research activity or method that is consistent with the Acts and Regulations, including new or experimental techniques. Thus, permits could authorize research range-wide, any time of year, by any method proposed, including things not previously permitted.

Table 2.6-2 (continued) Alternative Framework

					Alt. 4: Research Program with Full Implementation of Conservation Goals[6]
Activities that do not involve capture, handling, or collection of tissues from live animals	*Receipt and use of tissues from subsistence harvested and stranded animals*	● Permits could be issued to researchers for receipt and use of samples (no "take" authorized) ● Grants could be issued for activities associated with the use of samples	● Permits could be issued to researchers for receipt and use of samples (no "take" authorized) ● Grants could be issued for activities associated with the use of samples	● Permits could be issued to researchers for receipt and use of samples (no "take" authorized) ● Grants could be issued for activities associated with the use of samples	● Permits could be issued to researchers for receipt and use of samples (no "take" authorized) ● Grants could be issued for activities associated with the use of samples
	Collection and use of tissue samples from predation events and from carcasses found during other research activities	● Permits and grants could be issued to researchers for collection and use of samples only under circumstances that would not result in "takes" of live animals	● Permits and grants could be issued to researchers for collection and use of samples under circumstances that would result in disturbance of live animals (assume mitigation measures to minimize incidental disturbance)	● Permits and grants could be issued to researchers for collection and use of samples under circumstances that would result in disturbance of live animals (assume mitigation measures to minimize incidental disturbance)	● Permits and grants could be issued to researchers for collection and use of samples under circumstances that would result in disturbance of live animals (assume mitigation measures to minimize incidental disturbance)
	Disturbance incidental to research on other species or environmental components	● No new permits or authorizations ● Grants could be issued for activities that would not require permits	● Allowed and assumed will be kept to minimum by use of mitigation measures for other research activities	● Allowed and assumed will be kept to minimum by use of mitigation measures for other research activities ● Numbers likely higher than under Alternatives 1 & 2 due to increased scope of research program	● Allowed and assumed will be kept to minimum by use of mitigation measures for other research activities ● Numbers likely higher than under Status Quo due to increased level of effort

[4] Note that the specifics of research in the No Action column refer to what would or would not be funded or permitted by NMFS as the existing permits and grants expire. All research activities currently funded and permitted would continue unaltered (no amendments or modifications) through their expiration. See the Status Quo for a description of currently funded and permitted research.

[5] Note that the Status Quo of research for this document is defined as the level of research permitted at the time scoping was initiated December 28, 2005. Subsequent to scoping the majority of permits for research on Steller sea lions were vacated by court order. However, for the purpose of analysis and comparison with other alternatives, we will assume that research would be permitted at the pre-court order levels.

[6] This Alternative would include not only those specific activities currently or previously permitted but any additional research activity or method that is consistent with the Acts and Regulations, including new or experimental techniques. Thus, permits could authorize research range-wide, any time of year, by any method proposed, including things not previously permitted.

Table 2.6-2 (continued) Alternative Framework

					Alt. 4: Research Program with Full Implementation of Conservation Goals[9]
Activities that require capture, handling, and/or invasive procedures on wild animals *Note: All alternatives must be consistent with the MMPA and AWA requirements that all research activities must be "humane", defined as "that method of taking which involves the least possible degree of pain and suffering practicable to the mammal involved"*	*Capture and temporary restraint by various methods (including on land and in water, by physical or chemical means)*	● No new grants, permits or authorizations issued	● No new grants, permits or authorizations issued	● Number and method of permitted takes determined according to specific research objectives	● Number and method of permitted takes determined according to specific research objectives ● Level of effort higher than Status Quo
	Collect morphometric measurements (includes weigh; measure length/girth; blubber thickness via skin fold caliper or ultrasound)	● No new grants, permits or authorizations issued	● No new grants, permits or authorizations issued	● Number and method of permitted takes determined according to specific research objectives	● Number and method of permitted takes determined according to specific research objectives ● Level of effort higher than Status Quo
Activities that require capture, handling, and/or invasive procedures on wild animals	*Collect various tissue samples from restrained animals (includes blood, skin, blubber, muscle, teeth, stomach contents, etc.)*	● No new grants, permits or authorizations issued	● No new grants, permits or authorizations issued	● Number and method of permitted takes determined according to specific research objectives	● Number and method of permitted takes determined according to specific research objectives ● Level of effort higher than Status Quo
	Apply various marks (includes temporary and permanent)	● No new grants, permits or authorizations issued	● No new grants, permits or authorizations issued	● Number and method of permitted takes determined according to specific research objectives	● Number and method of permitted takes determined according to specific research objectives ● Level of effort higher than Status Quo

[7] Note that the specifics of research in the No Action column refer to what would or would not be funded or permitted by NMFS as the existing permits and grants expire. All research activities currently funded and permitted would continue unaltered (no amendments or modifications) through their expiration. See the Status Quo for a description of currently funded and permitted research.

[8] Note that the Status Quo of research for this document is defined as the level of research permitted at the time scoping was initiated December 28, 2005. Subsequent to scoping the majority of permits for research on Steller sea lions were vacated by court order. However, for the purpose of analysis and comparison with other alternatives, we will assume that research would be permitted at the pre-court order levels.

[9] This Alternative would include not only those specific activities currently or previously permitted but any additional research activity or method that is consistent with the Acts and Regulations, including new or experimental techniques. Thus, permits could authorize research range-wide, any time of year, by any method proposed, including things not previously permitted.

Table 2.6-2 (continued) Alternative Framework

					Alt. 4: Research Program with Full Implementation of Conservation Goals[12]
Activities that require capture, handling, and/or invasive procedures on wild animals	*Apply various scientific instruments (internal and external)*	● No new grants, permits or authorizations issued	● No new grants, permits or authorizations issued	● Number and method of permitted takes determined according to specific research objectives	● Number and method of permitted takes determined according to specific research objectives ● Level of effort higher than Status Quo
	Collect body composition measurements (includes BIA, labeled isotopes, metabolic chamber)	● No new grants, permits or authorizations issued	● No new grants, permits or authorizations issued	● Number and method of permitted takes determined according to specific research objectives	● Number and method of permitted takes determined according to specific research objectives ● Level of effort higher than Status Quo
	Injection of drugs or chemicals other than for sedation/anesthesia/analgesia (e.g. Evans blue dye, labeled isotopes, other bio-markers)	● No new grants, permits or authorizations issued	● No new grants, permits or authorizations issued	● Number and method of permitted takes determined according to specific research objectives	● Number and method of permitted takes determined according to specific research objectives ● Level of effort higher than Status Quo
Activities that require capture, handling, and/or invasive procedures on wild animals	*Remote collection of tissue samples*	● No new grants, permits or authorizations issued	● No new grants, permits or authorizations issued	● Number and method of permitted takes determined according to specific research objectives	● Number and method of permitted takes determined according to specific research objectives ● Level of effort higher than Status Quo
	Temporary removal from the wild and short-term captivity for research activities	● No new grants, permits or authorizations issued	● No new grants, permits or authorizations issued	● Number and method of permitted takes determined according to specific research objectives	● Number and method of permitted takes determined according to specific research objectives ● Level of effort higher than Status Quo

[10] Note that the specifics of research in the No Action column refer to what would or would not be funded or permitted by NMFS as the existing permits and grants expire. All research activities currently funded and permitted would continue unaltered (no amendments or modifications) through their expiration. See the Status Quo for a description of currently funded and permitted research.

[11] Note that the Status Quo of research for this document is defined as the level of research permitted at the time scoping was initiated December 28, 2005. Subsequent to scoping the majority of permits for research on Steller sea lions were vacated by court order. However, for the purpose of analysis and comparison with other alternatives, we will assume that research would be permitted at the pre-court order levels.

[12] This Alternative would include not only those specific activities currently or previously permitted but any additional research activity or method that is consistent with the Acts and Regulations, including new or experimental techniques. Thus, permits could authorize research range-wide, any time of year, by any method proposed, including things not previously permitted.

Table 2.6-2 (continued) Alternative Framework

					Alt. 4: Research Program with Full Implementation of Conservation Goals[15]
Activities that require capture, handling, and/or invasive procedures on wild animals	*Maintenance and husbandry of captive animals (temporary and permanent captivity, including propagation for purposes of studies on reproduction and growth – no release of progeny)*	● No new grants, permits or authorizations issued. Animals currently held under research or enhancement permits could continue to be maintained but no breeding could occur	● Grants and permits could be issued for captive propagation provided appropriate justification given relative to achieving information related to species recovery	● Grants and permits could be issued for captive propagation provided appropriate justification given relative to achieving information related to species recovery	● Grants and permits could be issued for captive propagation provided appropriate justification given relative to achieving information related to species recovery ● Level of effort higher than Status Quo
Potential direct and indirect mortality from research *Note: Under no alternative would NMFS permit levels of mortality that would likely disadvantage or jeopardize populations or adversely impact stocks*	*Mortality incidental to research activities (includes mortality due to disturbance effects plus mortality related to capture and handling of animals)*	● No new permits or authorizations ● Grants could be issued for activities that would not require permits	● Allowed and assumed will be kept to minimum by use of mitigation measures for other research activities	● Allowed and assumed will be kept to minimum by use of mitigation measures for other research activities ● Numbers likely higher than under Alternatives 1 & 2 due to increased scope of research program	● Allowed and assumed will be kept to minimum by use of mitigation measures for other research activities ● Numbers likely higher than under Status Quo due to increased level of effort
	Intentional lethal collection and permanent removal of animals from the wild for research or enhancement activities	● No new grants, permits or authorizations issued	● No new grants, permits or authorizations issued	● No new grants, permits or authorizations issued	● Number and method of permitted takes determined according to specific research objectives ● Level of effort higher than Status Quo
Potential direct and indirect mortality from research	*Threshold level of total potential mortality authorized (incidental and intentional mortality combined)*	● No incidental or intentional mortality permitted or authorized for any stock	● Permits and authorizations for incidental mortality not to exceed 5% of PBR[16] for each stock (WSSL=12 animals, ESSL=100, EPNFS=763, SMINFS=11)	● Permits and authorizations for incidental mortality not to exceed 10% of PBR for each stock (WSSL=23 animals, ESSL=200, EPNFS=1,526, SMINFS=22)	● Permits and authorizations for incidental and intentional mortality not to exceed 15% of PBR for each stock (WSSL=35 animals, ESSL=300, EPNFS=2,289, SMINFS=33)

[13] Note that the specifics of research in the No Action column refer to what would or would not be funded or permitted by NMFS as the existing permits and grants expire. All research activities currently funded and permitted would continue unaltered (no amendments or modifications) through their expiration. See the Status Quo for a description of currently funded and permitted research.

[14] Note that the Status Quo of research for this document is defined as the level of research permitted at the time scoping was initiated. Subsequent to scoping the majority of permits for research on Steller sea lions were vacated by court order. However, for the purpose of analysis and comparison with other alternatives, we will assume that research would be permitted at the pre-court order levels.

[15] This Alternative would include not only those specific activities currently or previously permitted but any additional research activity or method that is consistent with the Acts and Regulations, including new or experimental techniques. Thus, permits could authorize research range-wide, any time of year, by any method proposed, including things not previously permitted.

[16] Potential Biological Removal (PBR) is defined in the MMPA as the product of the minimum population estimate, one-half the maximum theoretical net productivity rate, and a recovery factor based on the status of the stock. Based on the most recent stock assessment data (Angliss and Outlaw 2007, Carretta *et al.* 2007), PBR for the endangered western DPS of SSL (WSSL) = 234 animals; PBR for the threatened eastern DPS of SSL (ESSL) = 2,000 animals; PBR for the depleted eastern Pacific stock of NFS (EPNFS) = 15,262 animals; and PBR for the San Miguel Island stock of NFS (SMINFS) = 219 animals.

2.7 Alternatives Not Carried Forward for Analysis

The alternatives considered in this PEIS range from allowing only research activities that do not require a permit (Alternative 1) to allowing an expanded research policy associated with full implementation of recovery and conservation plan objectives (Alternative 4). All of these alternatives would be consistent with NMFS current statutory and regulatory authority. A number of additional potential alternatives were considered but not carried forward for analysis, due to reasons described below.

2.7.1 Fisheries Modifications

Comments were submitted during scoping and for the Draft PEIS requesting alternatives that prohibited fishing or encourage adaptive experimental approaches to fishing in order to reduce fishing related effects on SSLs and NFSs. This PEIS is related to research directed at SSL and NFS, pursuant to Sections 104 of the MMPA and 10(a)(1)(A) of the ESA. Other types of studies, such as experimental fishing or oceanographic research, are not within the scope of the directed research program that is being evaluated in this PEIS.

2.7.2 Research Moratorium

As described in Chapter 1, NMFS is responsible for management, conservation, and protection of SSLs under the ESA (16 U.S.C. 1531 *et seq*.) and the MMPA (16 U.S.C. 1361 *et seq*.), and NFSs under the MMPA. NFSs in the Pribilof Islands are also managed under the Fur Seal Act of 1966 (16 U.S.C. 1151 *et seq*.). A research moratorium, which would involve not allowing any research and revoking all active research permits, was not carried forward because it would not be consistent with NMFS legal mandates to monitor the status of marine mammals and recover threatened and endangered species. A permanent "no research permit" policy would end most research activities directed at SSLs and NFSs and compromise NMFS ability to monitor distribution and abundance of the species, as mandated under section 117 of the MMPA. Without some level of research surveys, NMFS would not be able to monitor the status of the endangered population, nor assess whether or not protective measures, such as regulations prohibiting fishing in critical habitat, were achieving the desired effect of recovery of the species.

2.7.3 Structuring Alternatives on Conservation and Recovery Plan Priorities

Currently, all researchers must identify how their permit applications address the objectives of the Conservation and Recovery Plans. This information is reviewed by NMFS and by the public during the permit comment period. This requirement would remain common to all alternatives. The new Conservation and Recovery Plans are currently in a draft stage, and are being revised based on public comments. NMFS does not support formally tying alternatives to Plan priorities that may change or become outdated by changes in stock status. However, NMFS agrees with suggestions that a research implementation plan for SSLs and NFSs should be developed, and that part of its framework should be prioritizing goals and guiding research in accordance with the Recovery and Conservation Plans.

2.7.4 Structuring Alternatives on Spatial and Temporal Considerations

Suggestions were made to structure alternatives to vary the temporal and spatial intensity of research effort, partly over concerns about duplicative research efforts and concentrating research effects in specific areas. Some research is purposefully concentrated in specific areas, with multiple visits in order to maximize useful data collection and establish trend information. In other cases, specific locations for research activities are picked based on cost, logistical, and safety considerations. Researchers currently coordinate field activities on a voluntary basis prior to initiation of field work, and NMFS is recommending steps for formal coordination requirements in Chapter 5. For these reasons, NMFS eliminated this potential alternative structure for research.

2.7.5 Research Not Consistent with Governing Laws and Regulations

Alternatives that would allow research not consistent with the requirements of the MMPA and ESA, or with NMFS implementing regulations, were also not carried forward because they would not meet the minimum environmental standards established by these laws, or would require revision of the statutes by Congress. For example, an alternative that would allow researchers to conduct research using methods that would not meet the humane standard under the MMPA or would not be likely to contribute to conservation of the endangered species that was the subject of the permit, as required by the ESA, was not considered further because it would not meet these minimum requirements of the statutes governing research on protected species. Similarly, an alternative that would allow research permits to be issued for an indefinite time period, or for longer than five years, was not carried forward because it would not meet the minimum requirements for permits as currently stipulated in NMFS implementing regulations. It is not within the scope of this EIS to address the substantial impediments to changing the governing laws (i.e., ESA, MMPA, and NEPA) and regulations concerning research on marine mammals.

2.8 Environmentally Preferred Alternative

The environmentally preferred alternative (40 CFR 1505.2[b]) will promote the national environmental policy as expressed in Section 101 of NEPA. This is often characterized as the alternative that causes the least damage to the physical and biological environment and is the alternative that best protects, preserves, and enhances historic, cultural, and natural resources. In this case, Alternative 2 - Research Program without Capture or Handling is considered the environmentally preferred alternative because intrusive research on SSLs and NFSs would not be authorized, but some level of non-intrusive research would continue to allow for collection of information on the distribution and abundance of SSL and NFS stocks. Thus, SSLs and NFSs would be subject to a minimum of research activities that could potentially harass, injure, or kill them. However, it should be recognized that data collected from research under other alternatives could provide important information on the status of these species allowing NMFS to better meet its obligations to promote recovery of SSLs under the ESA (16 U.S.C. 1531 *et seq.*) and MMPA (16 U.S.C. 1361 *et seq.*), and NFSs under the MMPA. The types of information that could be collected under Alternative 2 would be limited compared to alternatives where permits could be issued for capture and sampling. For example, without collection of tissue samples, NMFS would not have information on the incidence or types of disease present in these populations, nor could NMFS determine or monitor variations in population genetics that might be relevant to delineating stocks for management purposes. Thus, while Alternative 2 may initially benefit SSLs and NFSs by eliminating some harassment, injury, or potential mortality due to research activities, the Research Program without Capture or Handling Alternative could hinder NMFS' ability to conserve or recover these marine mammal populations by limiting collection of information needed for management.

2.9 The Preferred Alternative

NMFS has chosen Alternative 4 as the Preferred Alternative in this Final PEIS. The approach outlined in Alternative 4 allows the agency to fully implement the recommendations in the species' conservation and recovery plans. Full implementation of the plans would lead to a better understanding of these species, more informed management decisions and, hence, a move promising prospect of recovery.

3.0 AFFECTED ENVIRONMENT

3.1 Introduction

This Chapter describes the biological, physical, and socioeconomic resources that are affected by research on Steller sea lions (SSLs) (*Eumetopias jubatus*) and Northern fur seals (NFSs) (*Callorhinus ursinus*) or that may be involved in their respective population declines. The objective of this section is to describe the past and present effects on relevant resources, thereby defining their baseline conditions, as a basis for the analysis of direct and indirect effects of the alternatives and the cumulative effects analysis presented in Chapter 4 of this document. This Chapter also includes summaries of research programs that have been funded and permitted through the National Marine Fisheries Service (NMFS) in the past and how that research has been and is likely to be used to develop management actions for species conservation.

An important goal of this Programmatic Environmental Impact Statement (PEIS) is to provide an overview of the combined effects of research activities on SSLs and NFSs in the context of potential factors that have led to their reduced populations. The cumulative effects analysis in Chapter 4 provides the means to accomplish this goal. The concept behind cumulative effects analysis is to capture the total effects of many actions over time that would be missed by evaluating each action individually. Cumulative effects are defined by federal regulation as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (Center for Environmental Quality [CEQ] 1997, 40 Code of Federal Regulations [CFR] 1508.7). This chapter will focus on issues that are relevant to research and conservation of SSLs and NFSs, but will also address other past and present actions that are important for understanding the cumulative effects on the species that will be discussed in Chapter 4.

The overall spatial scope of the analysis is the geographic range of SSL and NFS, including the Bering Sea and the North Pacific Ocean south to California. When the overall spatial scope is not applicable to a given resource, a relevant geographic sub-area within the overall area is defined in the analysis. The overall time frame for the past/present effects analysis is defined as the period over which the populations of SSL and NFS began to decline to the present. Although there are earlier data from specific locations (i.e., NFS numbers on the Pribilof Islands rookeries), overall population trend surveys for these species were not conducted until the 1960s. For other resources, relevant data may be available from an earlier time period or may not be available until more recently. In these cases, a relevant time period is defined in the resource description.

The following descriptions of the affected environment have been compiled from several other sources, primarily other NMFS documents. In many cases the original documents are referenced and the pertinent information has been summarized. In other cases, pertinent sections of other NMFS documents have been reproduced from the original. All source documents are cited in the text with full references in Chapter 8 of this document.

3.2 Biological Environment

3.2.1 Steller Sea Lion

SSLs (*Eumetopias jubatus*), also found in the literature as Steller's sea lion and northern sea lion, are members of the order *Pinnipedia*, family *Otariidae* (composed of fur seals and sea lions), subfamily *Otariinae* (the sea lions).

The following sections on SSLs summarize information pertinent to this PEIS and draw heavily from several NMFS documents. The interested reader is directed to these documents (and others cited in the text) for more detail about the scientific results of specific research projects and their application to management issues: 1) Draft Revised 2006 Draft Recovery Plan for the Steller Sea Lions (*Eumetopias jubatus*) (NMFS 2006a); 2) Steller Sea Lion Research and Coordination: A Brief History and Summary of Recent Progress (Ferrero and Fritz 2002); 3) Northern Fur Seal Subsistence Harvest Environmental Impact Statement 2005 (NMFS 2005a); 4) Alaska Groundfish Programmatic Supplemental Environmental Impact Statement (PSEIS) 2004 (NMFS 2004a); and 5) Steller Sea Lion Protection Measures Environmental Impact Statement (NMFS 2001a).

3.2.1.1 Distribution

The SSL ranges along the North Pacific Ocean rim from northern Japan, the Kuril Islands and Okhotsk Sea, through the Aleutian Islands (AI) and Bering Sea, Alaska's southern coast, and south to California (Figure 3.2-1), (Loughlin *et al.* 1984). Prior to the decline in the west, the largest rookeries were in the Gulf of Alaska (GOA) and AI. However, because the rookeries in the GOA and AI have declined, the largest rookeries are now in southeast Alaska and British Columbia.

SSL habitat includes a variety of both marine waters and terrestrial rookeries (breeding sites) and haulouts (resting sites). Terrestrial sites used by SSLs are generally on exposed rock shorelines associated with fairly shallow and well mixed waters with average tidal speeds and gradual bottom slopes (Call and Loughlin 2005; Ban 2005). Some rookeries and haulouts are also located on gravel/cobbles beaches. Peak pupping and breeding occur during June and July on rookeries located on relatively remote islands, rocks, and reefs. Although most often found within the continental shelf region, SSLs may also be found in pelagic waters (Bonnell *et al.* 1983, Fiscus *et al.* 1976; Kajimura and Loughlin 1988; Merrick and Loughlin 1997).

In general, SSLs seem to have a high degree of site fidelity; they return to breed at or near their natal rookeries (Calkins and Pitcher 1982; Alaska Sea Grant 1993; Loughlin *et al.* 1984; Raum-Suryan *et al.* 2002). Tagged and branded individuals have been seen at distances up to 1,784 kilometers (km) from their natal rookeries, but once they approach adulthood they generally remain within 500 km of their natal rookery (Raum-Suryan *et al.* 2002).

3.2.1.2 Population Status and Trends

In 1990, the SSL was listed as threatened under the Endangered Species Act (ESA) as a result of a major decline in its population (55 Federal Register [FR] 12645, 55 FR 13488, 55 FR 49204, 55 FR 50005). A recovery plan was completed in 1992. In 1997, based largely on differences in genetics, morphology, and population trends, NMFS recognized two distinct population segments (DPSs) of SSLs under the ESA (62 FR 24345). The regulatory division between DPSs is Cape Suckling (144º west [W] longitude) in the northeast GOA. The eastern DPS includes SSLs born on rookeries from California north through southeast Alaska; the western DPS includes those animals born on rookeries from Prince William Sound westward (Bickham *et al.* 1996; Loughlin 1997). However, frequent movement is seen across this boundary by animals from both populations, particularly juvenile animals (Raum-Suryan *et al.* 2002). At the time the stocks were split, the western DPS was reclassified as endangered under the ESA while the eastern DPS remained listed as threatened.

<u>Critical Habitat</u>

NMFS designated critical habitat areas for SSLs in 1993 (50 CFR 226.202). Critical habitat includes marine waters, terrestrial rookeries (breeding sites), and haulouts (resting sites). The critical habitat for SSLs includes three separate zones: terrestrial, air, and aquatic. For both the western and eastern DPSs, the terrestrial zone extends 3,000 feet (ft) (0.9 km) landward from the baseline or base point of each major rookery and haulout in Alaska and the air zone extends 3,000 ft (0.9 km) above the terrestrial zone, measured vertically from sea level. In areas used by the western DPS, the aquatic zone extends 20 nautical miles (nm) (37 km) seaward in state and federally managed waters from the baseline and basepoint of each major rookery and haulout that is west of 144º W longitude. In areas used by the eastern DPS, the aquatic zone extends 3,000 ft (0.9 km) seaward from the baseline or basepoint of each major rookery and haulout in Alaska that is east of 144º W longitude. In California and Oregon, critical habitat is the same as what is designated for the eastern DPS in Alaska, except that there is no terrestrial zone that extends landward.

Designated critical habitat for the western DPS also includes three aquatic foraging areas that are based on at-sea observations of presumed foraging behavior. These foraging areas are in the vicinity of Seguam Pass in the AI, Bogoslof in the southeastern Bering Sea, and Shelikof Strait in the GOA. Designated critical habitats are shown in Figures 3.2-2 and 3.2-2A.

Western Distinct Population Segment

Population assessment for SSLs has been achieved primarily by conducting aerial surveys and on-land pup counts. Historically, this included surveys of limited geographical scope in various portions of the species' range, in many cases conducted using different techniques, and occasionally during different times of year. Consequently, reconstructing population trends for SSLs from the 1970s and earlier involves a mix of regional surveys conducted over many years.

For the western DPS of SSL in Alaska, count data have generally been combined and analyzed in six sub-areas (Table 3.2-1 and Figures 3.2-3 and 3.2-4), which are geographically convenient but do not necessarily reflect biologically important units. Because earlier efforts to count sea lions were concentrated in the center of their Alaskan range, evaluations of long-term trends have often been calculated for the "Kenai to Kiska" index area, which includes the central and western GOA and the eastern and central AI.

The first reported counts of SSLs in Alaska were made in 1956-1960 (Kenyon and Rice 1961; Mathisen and Lopp 1963), totaling approximately 140,000 animals in the GOA and AI regions (Merrick *et al.* 1987). Loughlin (1997) estimated that the Alaska portion of the western DPS (non-pups) totaled approximately 177,000 animals in the 1960s. Population declines were first observed with the advent of more systematic aerial surveys with high resolution photography (35 millimeter [mm] slides). The decline in numbers was first detected in the eastern AI in the mid-1970s (Braham *et al.* 1980) and spread eastward to the central GOA during the late 1970s and early 1980s and westward to the central and western AI during the early and mid 1980s (Merrick *et al.* 1987; Byrd and Nysewander 1988). Approximately 110,000 adult and juvenile SSLs were counted in the Kenai-Kiska region in 1976-1979, but by 1985 counts in this area had dropped to about 68,000 (Merrick *et al.* 1987). By 1989 counts in this area had dropped to 25,000 (Loughlin *et al.* 1990).

Population trend analyses during recent years have focused on 82 "trend sites," which are selected rookeries and haulout sites that have been surveyed consistently from the mid 1980s to the present (NMFS 1998b and 1995) (Table 3.2-1 and Figures 3.2-3 and 3.2-4). Trend sites include roughly 75 percent of animals observed in recent surveys (Sease *et al.* 1999; Sease and Loughlin 1999; Sease *et al.* 2001; Sease and Taylor 2001; Sease and Gudmundon 2002). Following a rapid rate of decline in the 1980s, the intensity of which varied in different sub-regions, the population continued to decline throughout the 1990s but at a slower rate (Sease *et al.* 1999; Sease *et al.* 2001; Strick *et al.* 1997). The most recent surveys indicated a reversal of this trend, with an increase of about 5 percent per year from 2000-2004, although increases were not distributed evenly across the range in Alaska (Fritz and Stinchcomb 2005).

Pup surveys had been used to provide information on reproductive rates, but counting pups from aerial photography was unreliable because of poor resolution and obstruction of pups by adults. Pup surveys were therefore conducted by landing a team of biologists on the rookery during June or July and driving the non-pups into the sea. This allowed researchers to count the pups on land, but various numbers of pups also fled into the water with the adults. This resulted in some uncertainty about numbers and exposed those pups to risks of serious injury or death through aspiration of seawater, drowning, exposure to predators, and separation from their mothers (see Appendix F from the 2005 Environmental Assessment [EA] for a description of the risks involved in various research techniques). In the years prior to the 1992 SSL Recovery Plan, pups within the western DPS were counted only at selected rookeries on an alternating schedule. Extensive pup surveys were conducted at virtually all western DPS rookeries in Alaska in 1998, and at all, except the Near Islands in the western AI, in 1994 (Strick *et al.* 1997). The results of these surveys were generally similar to the patterns of decline and increase noted from aerial surveys of non-pups (Table 3.2-2).

In 2002, researchers began using a new aerial survey photographic technique, medium-format color photogrammetry, which allowed counts of pups as well as improved counts of non-pups (Fritz and Stinchcomb 2005). This technique provided accurate results compared to traditional drive-counts and resulted in almost no disturbance on the rookery (Snyder *et al.* 2001).

Eastern Distinct Population Segment

The eastern DPS consists of SSLs born in southeast Alaska, British Columbia, Washington, Oregon, and California. Similar to the western DPS, population surveys prior to the 1970s were of limited geographical scope, used various techniques, and occurred during different times of year. Survey techniques since the 1980s have been the same as those used in the western DPS, including the use of trend sites.

In contrast to the population declines recorded in the western DPS, the SSL population in southeast Alaska increased by almost 4 percent per year between 1985-1989 (Loughlin *et al.* 1992). From 1990 to 2000, counts of non-pup SSLs at trend sites showed an overall increase of 29 percent, or an average increase of almost 2 percent per year (Sease *et al.* 2001) (Table 3.2-3). Trends in British Columbia, Washington, and Oregon have shown similar increases (Tables 3.2-4 and 3.2-5). While numbers in central and southern California have been decreasing, the eastern stock as a whole is stable or increasing slowly (Figure 3.2-5) (Angliss and Outlaw 2007).

SSLs in southeast Alaska are not an isolated population, as demonstrated by the movement of branded and tagged animals from southeast Alaska to British Columbia and Washington (Raum-Suryan *et al.* 2002). In addition, recent mitochondrial deoxyribonucleic acid (DNA) studies with large samples of pups from newly established rookeries in the eastern DPS have shown that some females born in the western DPS are pupping in the eastern DPS (NMFS unpublished data).

Overall, the eastern DPS has increased over 3 percent per year since the 1970s, more than doubling in southeast Alaska, British Columbia, and Oregon. The eastern DPS contained only about 10 percent of the total number of SSLs in the United States (U.S.) in the 1970s. However, large declines in the western DPS coupled with notable increases in the east resulted in a shift such that over half of the SSLs in the U.S. now belong to the eastern DPS (NMFS 2006a).

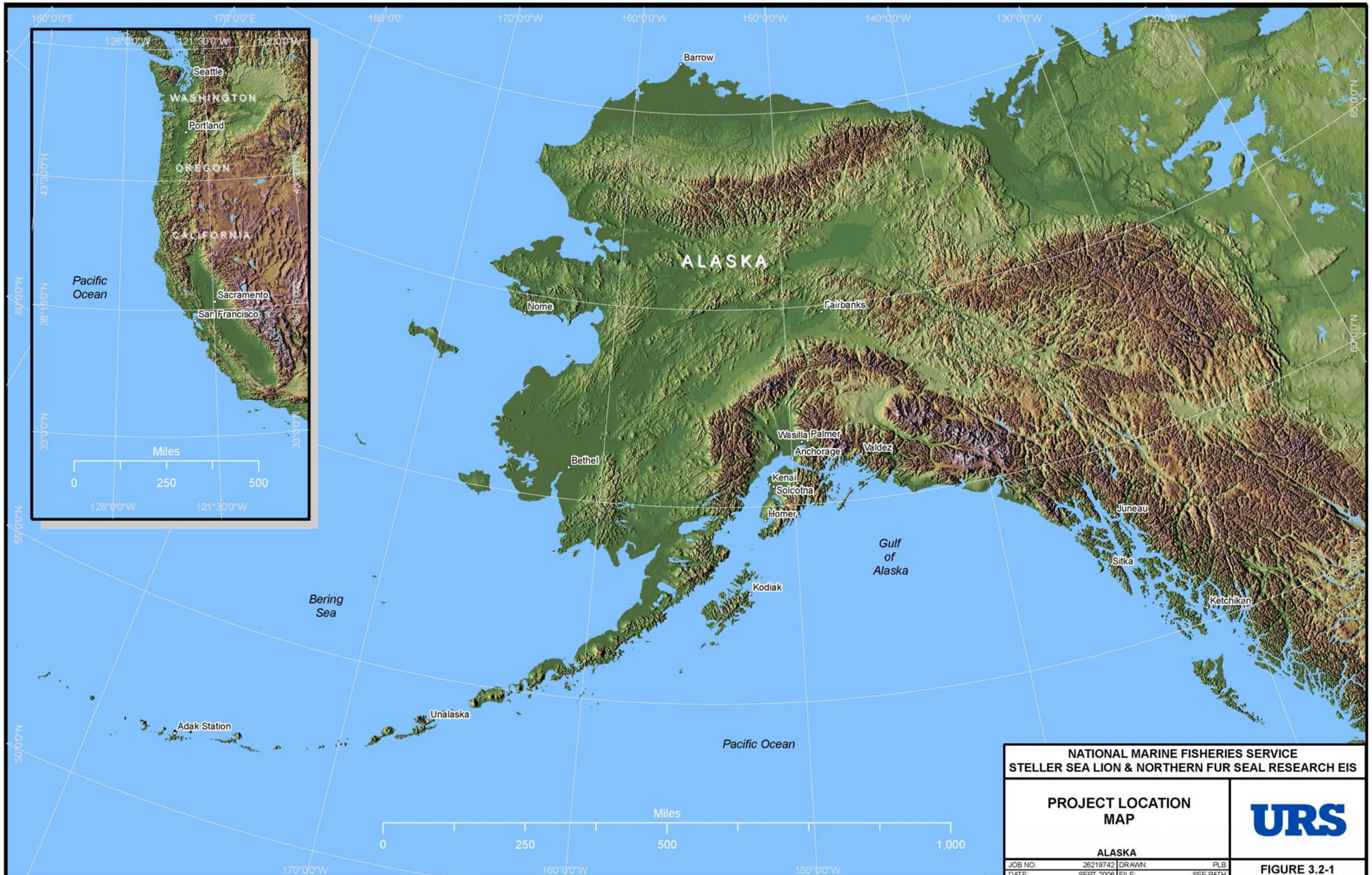

Figure 3.2-1 Project Location Map

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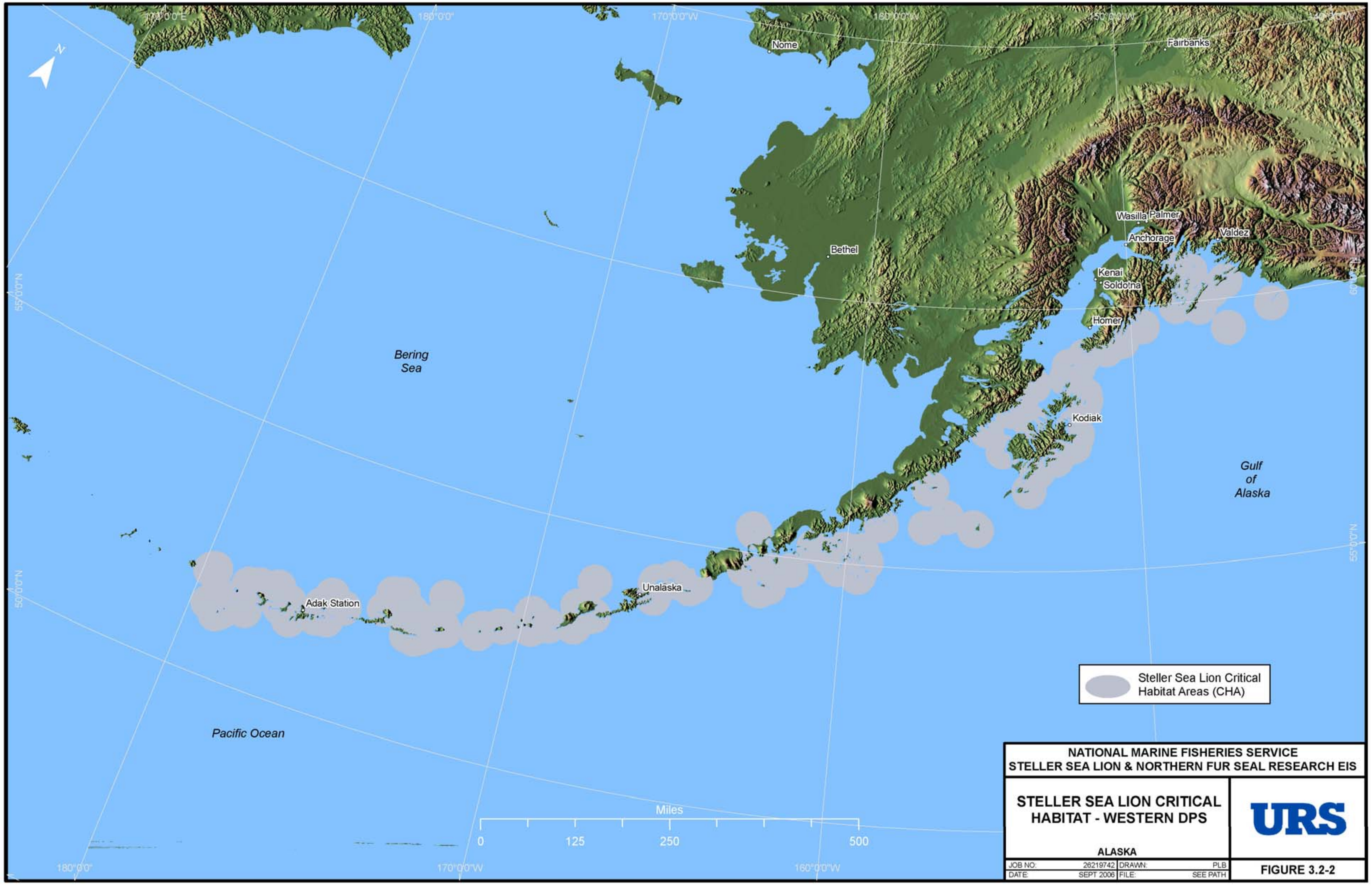

Figure 3.2-2 Steller Sea Lion Critical Habitat – Western DPS

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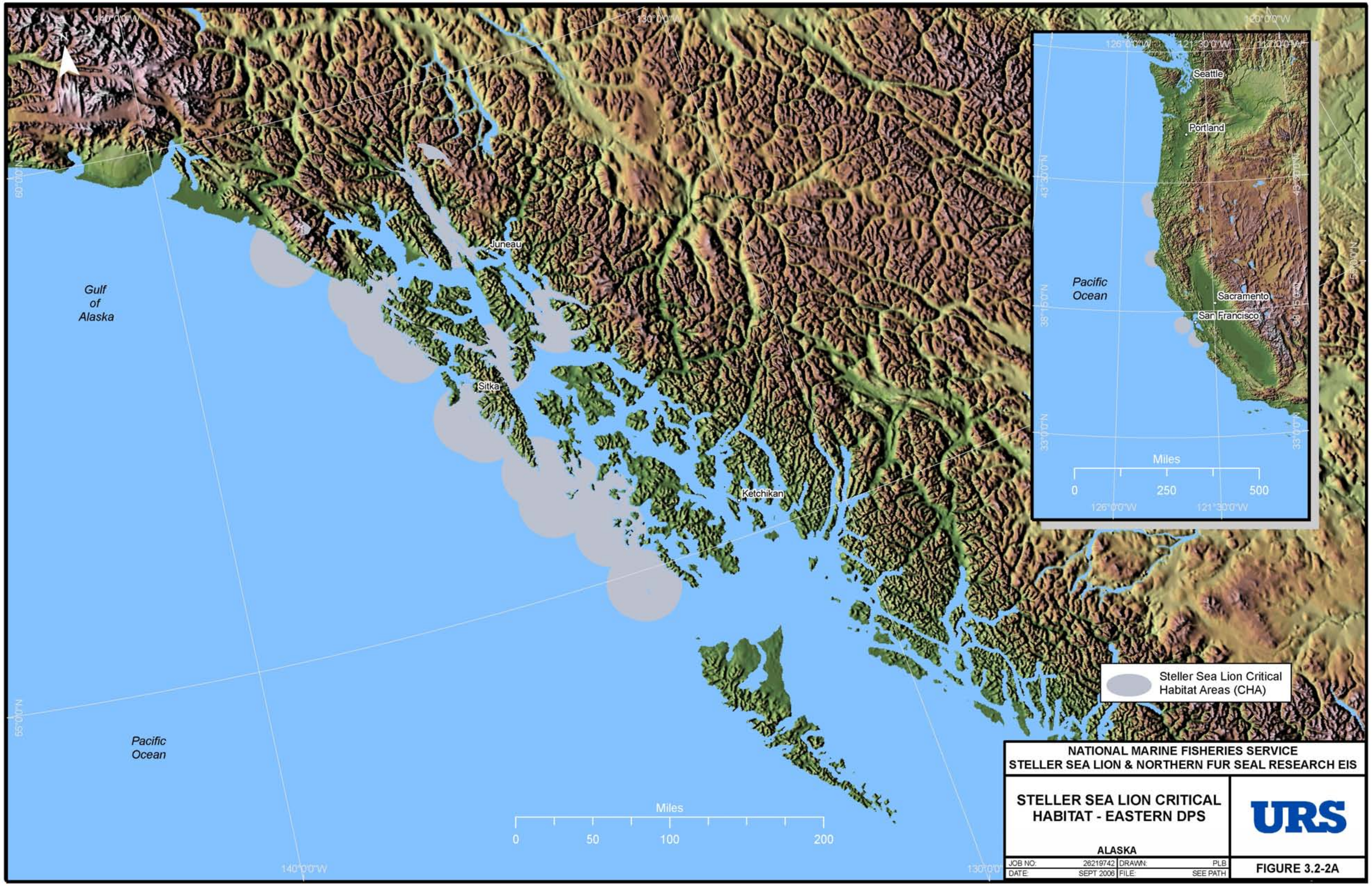

Figure 3.2-2a Steller Sea Lion Critical Habitat – Eastern DPS

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Table 3.2-1
Counts of Adult and Juvenile (non-pup) Steller Sea Lions at Western DPS Rookery and Haul-out Trend Sites in Alaska During June-July Surveys From 1956 to 2004

Year(s)	Gulf of Alaska			Aleutian Islands			Kenai-Kiska (69)	Western DPS in Alaska (82)
	Eastern (9)	Central (15)	Western (9)	Eastern (11)	Central (34)	Western (4)		
1956-60[1]		34,792	15,772	44,020	17,120		111,704	
1962					23,175			
1976-79[2]	7,053	24,678	8,311	19,743	36,632	14,011	89,364	110,428
1985		19,002	6,275	7,505	23,042		55,824	
1989	7,241	8,552	3,908	3,032	7,572		23,064	
1990	5,444	7,050	3,915	3,801	7,988	2,327[3]	22,754	30,525
1991	4,596	6,270	3,732	4,228	7,496	3,083	21,726	29,405
1992	3,738	5,739	3,716	4,839	6,398	2,869	20,692	27,299
1994	3,365	4,516	3,981	4,419	5,820	2,035	18,736	24,136
1996	2,132	3,913	3,739	4,715	5,524	2,187	17,891	22,210
1998	2,110[4]	3,467	3,360	3,841	5,749	1,911	16,417	20,438
2000	1,975	3,180	2,840	3,840	5,419	1,071	15,279	18,325
2002	2,500	3,366	3,221	3,956	5,480	817	16,023	19,340
2004[5]	2,536	2,944	3,512	4,707	5,936	898	17,099	20,533
1950s to 2000		**-91%**	**-82%**	**-91%**	**-68%**		**-86%**	
1970s to 2000	**-72%**	**-87%**	**-66%**	**-81%**	**-85%**	**-92%**	**-83%**	**-83%**
1970s to 1990	**-23%**	**-71%**	**-53%**	**-81%**	**-78%**	**-83%**	**-75%**	**-72%**
1990 to 2000	**-64%**	**-55%**	**-27%**	**+1%**	**-32%**	**-54%**	**-33%**	**-40%**
2000 to 2004	**+28%**	**-7%**	**+24%**	**+23%**	**+10%**	**-16%**	**+12%**	**+12%**

Notes: 1 1956 counts for the western GOA, 1957 counts for the central eastern Aleutians.
2 1976 counts for the eastern, central, and western GOA and the eastern Aleutians, and 1979 counts for the central and western Aleutians.
3 Gillon Point rookery, Agattu Island not surveyed in 1990.
4 1999 counts substituted for sites in the eastern Gulf of Alaska not surveyed in 1998.
5 2004 counts were from medium format photographs, while all others were from 35 mm photographs, aerial counts or beach counts. 2004 data reflect a -3.64% adjustment to account for film format resolution and count differences.

Source: Adapted from Fritz and Stinchcomb 2005, National Marine Mammal Laboratory (NMML) unpublished data.

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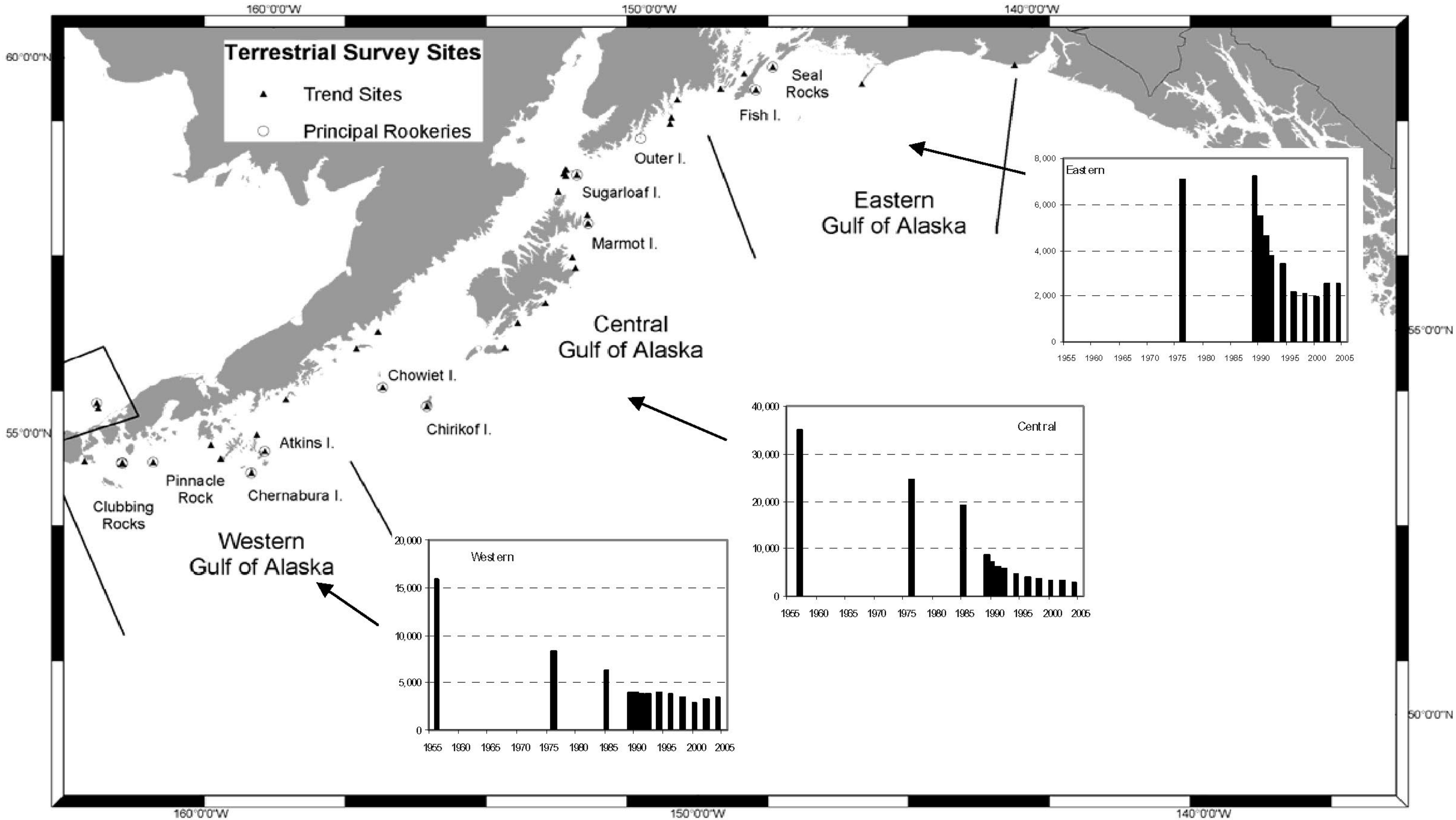

Figure 3.2-3 Counts of Adult and Juvenile Steller Sea Lions on Western DPS Trend Sites in Three Sub-areas of the Gulf of Alaska, 1950s through 2004. Principal rookeries (named) and major terrestrial haul-out trend sites are shown (NMFS 1992; Fritz and Stinchcomb 2005).

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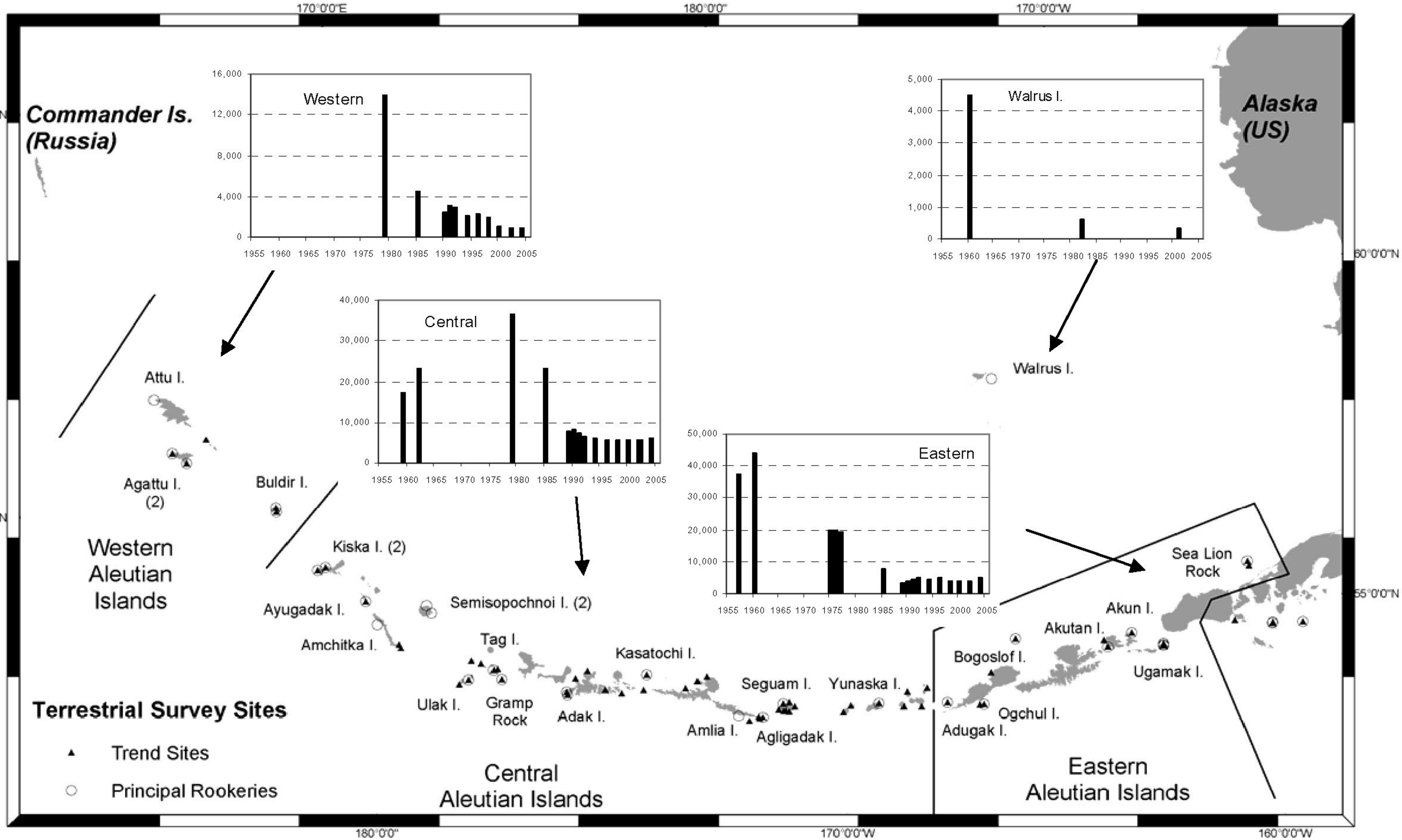

Figure 3.2-4 Counts of Adult and Juvenile Steller Sea Lions on Western DPS Trend Sites in Three Sub-areas of the Aleutian Islands, 1950s through 2004.
Counts on Walrus Island in the eastern Bering Sea are also shown, as are the location of principal rookeries (named) and major terrestrial haulout trend sites (NMFS 1992; Fritz and Stinchcomb 2005).

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Table 3.2-2
Counts of Steller Sea Lion Pups at Western DPS Rookeries in Alaska During 1979 to 2005

Year(s)	Gulf of Alaska			Aleutian Islands			Eastern Bering Sea	Kenai-Kiska [7]	Western DPS in Alaska
	Eastern [1]	Central [2]	Western [3]	Eastern [4]	Central [5]	Western [6]	Walrus Island		
1979			8,616						
1982							334		
1984			6,435						
1985-89		10,254		4,778	9,428		250	30.8957	
1990-92		4,904	1,923	2,115	3,568		63	12,510	
1994	903	2,831	1,662	1,756	3,109		61	9,358	
1996	584								
1997	611					979	35		
1998	689	1,876	1,493	1,474	2,834	803		7,677	9,169
2001-02	586	1,721	1,671	1,561	2,612	488	39	7,565	8,678
2003-04	716	1,609	1,577	1,731					
2005	715	1,651	1,707	1,921	2,551	343	29	7,830	8,917
Earliest count to 1994		**-72%**	**-81%**	**-63%**	**-67%**			**-70%**	
Earliest count to 2001-02	**-35%**	**-83%**	**-81%**	**-67%**	**-72%**	**-50%**	**-88%**	**-76%**	**-5%**
1994 to 2001-02	**-35%**	**-39%**	**+1%**	**-11%**	**-16%**		**-36%**	**-19%**	
2001-02 to 2005	**+22%**	**-4%**	**+2%**	**+23%**	**-2%**	**-30%**	**-25%**	**+4%**	**+3%**
1979			8,616						
1982							334		
1984			6,435						

Notes:
1 Seal Rocks and Fish (Wooded) Island.
2 Outer, Sugarloaf, Marmot, Chowiet and Chirikof islands.
3 Atkins and Chernabura Islands, and Pinnacle Rock and Clubbing Rocks.
4 Ugamak, Akun, Akutan, Bogoslof and Adugak islands.
5 Yunaska, Seguam, Kasatochi, Adak, Tag, Ulak, Ayugadak and Kiska (2) islands, and Gramp and Column Rocks.
6 Buldir, Agattu (2), and Attu islands.
7 Rookeries in the central and western Gulf of Alaska, and eastern and central AI.

Source: Adapted from Fritz and Stinchcomb 2005, NMML unpublished data.

3.2.1.3 Reproduction and Growth

SSLs are highly sexually dimorphic, with males being much larger than females. They have a polygynous mating system where males fight each other for territories that attract many females. Mating and pupping occur in rookeries on relatively remote islands, rocks, and reefs. The largest males (>9 years old) establish territories in early May in anticipation of the females' arrival in late May and early June (Pitcher and Calkins 1981). Pregnant females give birth to a single pup soon after arriving at the rookeries and mating occurs about one to two weeks after giving birth (Gentry 1970). Mating occurs primarily on land but may also occur in the water (Pitcher *et al.* 1998; Gentry 1970; Gisiner 1985). The gestation period is probably about 50 to 51 weeks, but implantation of the blastocyst is delayed until about three and a half months after breeding (i.e., late September or early October) (Pitcher and Calkins 1981). Females first breed between the ages of 3 and 8 years old and may produce young into their early 20s (Mathisen *et al.* 1962; Pitcher and Calkins 1981). Pupping is highly synchronous throughout the SSL range, with a median pupping date of 12-13 of June (Merrick 1987; Bigg 1985; Pitcher *et al.* 2001).

Much of the research on whether or not nutritional stress was a major factor in the decline of the western DPS compared animals from the declining western DPS with animals from the increasing eastern DPS. Many studies focused on mother and pup body conditions and maternal attendance patterns (Merrick *et al.* 1995; Davis *et al.* 1996 and 2004; Adams 2000; Brandon 2000; Rea *et al.* 2003). Contrary to what would be expected for animals experiencing acute nutritional stress, these studies found western DPS pups were either heavier or the same size as eastern DPS pups; there was no indication of poor body condition in pups or mothers; and higher pup growth rates were in declining western DPS areas. These observations indicate that at least this phase of reproduction may not be affected by nutritional stress: that is, if females are able to complete their pregnancy and give birth, then the size of those pups does not appear to be compromised.

Table 3.2-3
Counts of Adult and Juvenile (non-pup) Steller Sea Lions Observed at Individual Rookeries as well as Rookery and Haul-out Trend Sites Combined in Southeast Alaska During June-July Aerial Surveys from 1979 to 2005

Year	Forrester Island	Hazy Island	White Sisters	Graves Rocks	Biali Rocks
1979	3,121	893	761	-	810
1982	3,777	1,268	934	-	722
1989	4,648	1,462	734	475	794
1990	3,324	1,187	980	937	596
1991	3,970	1,496	975	470	494
1992	3,508	1,576	860	366	398
1994	4,010	1,615	868	733	410
1996	3,551	1,759	894	475	342
1998	3,788	1,962	858	445	476
2000	3,674	1,824	1,398	558	690
2002	3,699	2,050	1,156	1,001	624
2005	5,557	2,293	1,078	–	598
Source: Adapted from Fritz and Stinchcomb 2005; NMML unpublished data					

Table 3.2-4
Counts of Steller Sea Lions on Rookeries and Haulouts in British Columbia, 1971-2002

Year	Non-pups	Pups	Total
1971	4,617	941	5,475
1977	5,219	963	6,274
1982	4,713	1,245	5,956
1987	6,109	1,084	7,193
1992	7,376	1,468	8,844
1994	8,091	1,186	9,277
1998	9,818	2,073	11,891
2002	12,121	3,281	15,402
Source: Carretta *et al.* 2005			

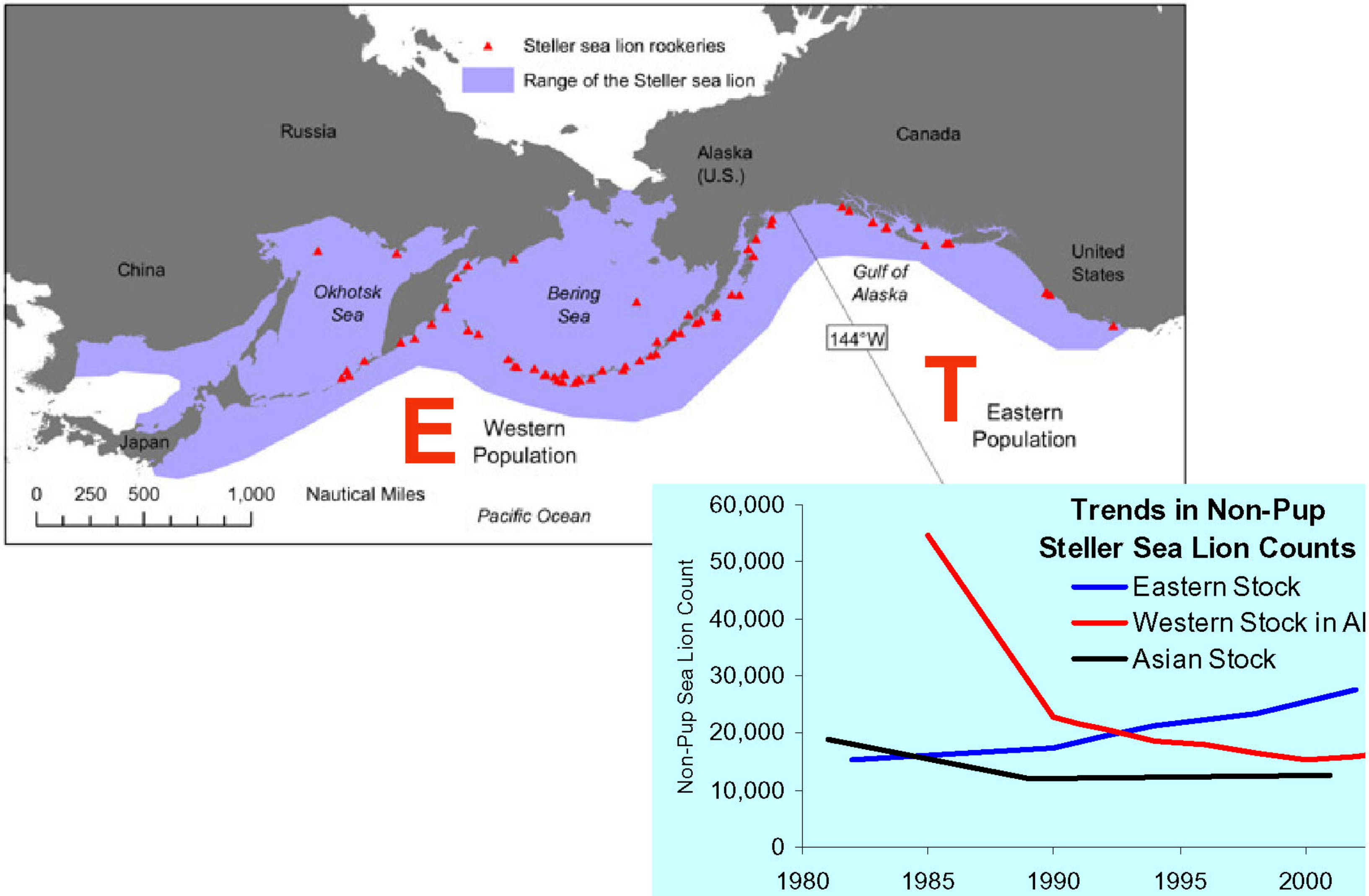

Figure 3.2-5 Breeding Ranges of the Western and Eastern DPSs of Steller Sea Lions (triangles = terrestrial locations of major rookeries) in Northern Pacific. Trends in index counts of adult and juvenile (non-pup) sea lions on rookery and haulout sites within the breeding ranges of the eastern and western (Alaska only) DPSs are also shown.

Table 3.2-5
Counts of Non-pup Steller Sea Lions on Rookeries and Haulouts in Oregon and of Pups Counted During Ground Counts or From Medium-Format Photographs on the Rogue Reef and Oxford Reef Rookeries 1977-2002

Year	Oregon Total Non-Pups	Rogue Reef Pups	Oxford Reef Pups	Washington Total Non-Pups
1977	1,461	--	--	--
1979	1,542	--	--	--
1980	1,632	--	--	--
1981	2,105	--	--	--
1982	2,604	--	--	--
1983	2,106	--	--	--
1984	1,867	--	--	--
1985	2,210	--	--	--
1986	2,289	--	--	--
1987	2,709	--	--	--
1988	2,825	--	--	--
1989	2,183	--	--	89
1990	2,414	492	298	--
1991	--	--	--	274
1992	3,581	--	--	278
1993	2,838	--	--	--
1994	3,293	--	--	384
1995	3,837	--	--	409
1996	3,205	685	335	594
1997	3,897	--	--	352
1998	3,971	--	--	470
1999	3,275	--	--	806
2000	2,927	--	--	778
2001	3,648	600	--	516
2002	4,169	746	382	--

Source: (Carretta *et al.* 2005)

Mothers nurse pups and stay with them for about the first week, then go to sea on foraging trips which vary in average duration in different locations (Hood and Ono 1997; Higgins *et al.* 1988; Brandon and Davis 1999). Pups generally are weaned before the next breeding season, but it is not unusual for a female to nurse her offspring for a year or more (Pitcher and Calkins 1981). The length of the nursing period may be an important indicator of the female's condition and ability to support her pup, and the pup's condition at weaning (and hence, the likelihood that the pup will survive the post weaning period). Relatively little is known about the life history of SSLs during their juvenile years between weaning and maturity, although recent telemetry data indicate that yearlings that have reached nutritional independence greatly increase their foraging area and begin deeper diving (Loughlin *et al.* 2003).

For mature females, the reproductive cycle includes mating, gestation, parturition (birth), and nursing or post-natal care. The reproductive success of an adult female is determined by a number of factors within a cycle and over time through multiple cycles. Although much of the effort to explain the decline of the western DPS has focused on juvenile survival rates, some evidence suggests that decreased reproductive success may also have contributed to the original decline (Pitcher *et al.* 1998; Calkins *et al.* 1998; Holmes and York 2003). In the 1970s and 1980s, birth rates were estimated from the examination of reproductive tracts from collected animals. Intentional lethal take has not been requested or authorized for research purposes since the species was listed under the ESA. Current estimates of birth rates are derived from alternative techniques such as mark-resight estimation, analysis of reproductive hormone levels in feces or tissue samples, or population modeling.

Female growth is asymptotic, which means the growth rate is very high in early years, and tapers off thereafter. Females reach 87 percent of the asymptote during their third year (Winship *et al.* 2001). Male growth is also asymptotic, but constant until about year six and thus males grow at a greater rate for a longer period than do females (Winship *et al.* 2001). While males reach sexual and physiological maturity before seven years of age, they do not have the physical size or skill to obtain and defend a breeding territory until they are nine years of age or older (Pitcher and Calkins 1981). Males may return to the same territory for up to seven years, but most return for no more than three years (Gisiner 1985). During the breeding season, males may not eat for one to two months. The rigors of fighting to obtain and hold a territory and the physiological stress of the mating season reduce their life expectancy to the point that males rarely live beyond their mid-teens, whereas females may live as long as 30 years.

3.2.1.4 Survival

Causes of pup mortality vary widely and include drowning, starvation caused by separation from mother, disease, parasitism, predation, crushing by larger animals, biting by other SSLs, and complications during parturition (Orr and Poulter 1967; Edie 1977; Maniscalo *et al.* 2002; Maniscalo *et al.* 2006; Merrick *et al.* 1987). Older animals may die as a result of injuries, starvation, disease, predation, subsistence harvests, intentional shooting by humans, fishery interactions, and entanglement in marine debris (Loughlin and York 2001).

Modeling by York (1994) suggested that the observed decline in SSL abundance in the GOA may have been due to an increase in juvenile mortality. The estimated annual mortality from the table York created was as follows: 0.22 for ages 0-2, dropping to 0.07 at age three, increasing progressively to 0.15 by age 10, and finally 0.20 by age 20. Population modeling was indicative of the notion that the major decline of SSLs that occurred in the central GOA during the 1975-1985 period was primarily a function of juvenile survival (York 1994; Chumbley *et al.* 1997). This idea is reinforced by evidence from low resighting rates of 800 pups tagged and branded at Marmot Island in 1987 and 1988 and observations of relatively few juveniles at Ugamak Island (Merrick *et al.* 1988). The low resighting rates do not confirm a corresponding drop in juvenile survival because some animals may have migrated to other sites where they were not observed. However, given the observations of relatively high site fidelity of animals returning to breed at their natal site, the "loss" of these animals is viewed as a significant increase in juvenile mortality consistent with the overall population decline in the central GOA (York 1994; Chumbley *et al.* 1997; Holmes and York 2003). In addition, changes in adult survival may also have contributed to the decline. At present, survival rates for adults cannot be determined with sufficient resolution to determine if those rates have changed over time or are somehow compromised to the extent that population growth and recovery are threatened.

3.2.1.5 Prey and Foraging Behavior

Prey

Historically, studies of marine mammals' diets were based on analysis of the remains of prey in the stomach, which usually involved killing the animal. Currently, the most common method of identifying prey species consumed by pinnipeds is through analysis of bony remains in fecal (scat) collections. The interpretation of predator diet through the use of scat was first developed for terrestrial studies and has been adapted for use in marine mammal trophic studies over the past two decades. Scat analysis is a useful tool for monitoring seasonal and temporal trends in diets without the need to euthanize the animal. Other methods for evaluating pinniped diets include collection of stomach contents from live animals by lavage, collection of regurgitated stomach contents and intestinal contents by enema, and analysis of fatty acid and stable isotope composition of tissues samples collected from live animals (Tollit *et al.* 2007).

Typically, the importance of any given prey species in marine mammal diet studies is based on some combination of the following two factors: the number of individuals of a particular species represented across all samples (prey number) and the number of samples containing that species across all samples containing prey remains (frequency of occurrence). All of the different methods of diet evaluation in marine mammals have their own set of biases that variably affect estimates of prey volume, weight, number, rank and frequency of occurrence (Sinclair *In prep.*). For example, stomach contents from an individual animal may represent an accumulation of a number of meals over an extended period of time. Certain prey parts such as squid beaks or large fish bones get trapped in stomach folds where they digest very slowly, or accumulate until regurgitated. Therefore, an accumulation of prey parts predictably overestimates the importance of some prey types over others. Regurgitations (spewings) represent a very small portion of the overall diet and primarily that of the largest prey items consumed. By comparison, scat typically represents meals eaten 12-72 hours prior and tend to underestimate the size of prey consumed because small items pass through the digestive tract more readily (and with less erosion) than large items (Sinclair and Zeppelin 2002). Accordingly, diet studies should be interpreted with consideration of the method used to collect prey samples. Fatty acid and stable isotope analyses are being tested to determine whether these techniques may be used to determine weaning status of pups and juveniles. This research gave an indication as to whether or not the animals had converted completely to a diet of fish and helped identify the types of fish consumed by individual sea lions.

Prey Species and Size

SSLs are generalist predators that eat various fish and cephalopods (Pitcher and Fay 1982) and occasionally birds and marine mammals (Daniel and Schneeweiss 1992; Sinclair and Zeppelin 2002). A recent analysis of the SSL diet compares trends in prey species consumption between summer and winter, when juveniles are first learning to forage on their own (Jones 1981; Brown *et al.* 2002; Sinclair and Zeppelin 2002). SSL scats were collected (1990-1998) from 31 rookeries (May-September) and 31 haul out sites (December-April) across the U.S. range of the western population resulting in a sample of 3,762 scats with identifiable prey remains. Frequency of occurrence (FO) data values combined across years, seasons, and sites indicated walleye pollock (*Theragra chalcogramma*) and Atka mackerel (*Pleurogrammus monopterygius*) as the two dominant prey species, followed by Pacific salmon and Pacific cod. Other primary prey species consistently occurring at frequencies of 5 percent or greater included arrowtooth flounder (*Atheresthes stomias*), Pacific herring, Pacific sand lance, Irish lord (*Hemilepidotus hemilepidotus*), and cephalopods (squid and octopus).

Prior to the early 1990s, the diet of SSLs in the eastern part of their range was not well studied. Rockfish, hake, flatfish, salmon, herring, skates, cusk eel, lamprey, squid, and octopus are known to have been eaten by SSLs in California and Oregon (Olesiuk *et al.* 1990). In British Columbia, principal prey has included hake, Pacific herring, octopus, Pacific cod, rockfish, and salmon (Trites *et al.* 2006a). In southeast Alaska, the most commonly identified prey items were pollock, Pacific cod, flatfishes, rockfishes, Pacific herring, salmon, sand lance, skates, squid, and octopus (Calkins and Goodwin 1988; NMFS 2000).

All the available data on prey occurrence in stomach contents samples for the eastern and western SSL populations for the 1950s-1970s and the 1980s have been compiled (Zeppelin *et al.* 2004; Tollit *et al.* 2004). For both eastern and western populations, the occurrence of pollock, Pacific cod, and Pacific herring were higher in the 1980s than in the 1950s-1970s, suggesting that the dominance of pollock in the SSL diet might have changed over time across much of its range, although the data from the 1950s-1970s had both small sample sizes and limited geographic scope.

Size of prey consumed varies, ranging from several centimeters (cm) in length (i.e., sand lance and capelin) to over 60 cm in length (salmon, skates, pollock, and cod). Remains of pollock exceeding 70 cm in length have been recovered in SSL scats (Schauflerer *et al.* 2004; Kitts *et al.* 2004; Ingles *et al.* 2005; Stansby 1976; Anthony *et al.* 2000; Payne *et al.* 1999; Van Pelt *et al.* 1997).

Prey Quality

An important consideration in evaluating effects of changing diets or prey abundance on SSLs is the quality of the prey. Lipid content, and therefore energy density, varies greatly among SSL prey species, and within prey species depending upon life history stage, location, and time of year (Schauflerer *et al.* 2004; Anthony *et al.* 2000). Atka mackerel and gadids are generally low energy density prey (ranging from about 3 kilojoules/gram [kJ/g] to 6 kJ/g, though few data exist for Atka mackerel), while forage fish such as eulachon, herring, or capelin have generally higher energy contents (up to about 11 kJ/g). Because energy densities are seasonally variable, this is not an absolute relationship. For example, capelin and sand lance declined in lipid content, and therefore energy density, throughout the summer (Hu *et al.* 2005; Mazzaro *et al.* 2003). In addition to considerations of prey energy content, vitamins and other metabolites are essential for adequate nutrition (Didier 1999).

To estimate the amount of food required by SSLs in the wild, detailed measurements of metabolic rates and food intake requirements have been made in captivity. An SSL Recovery Team review of the earliest captive feeding studies suggested that they may not be generally representative of field situations (Fadely *et al.* 1994; Rosen and Trites 2000b), a point that has also been highlighted by researchers conducting the studies (Castellini *et al.* 2005). They cited the short duration, often less than two weeks, which may have been inadequate to trigger cues used by SSLs to adjust intake in response to dietary changes. Likewise, these studies fed SSLs single-species diets that were unrealistic for wild animals and did not directly measure changes in activity or body condition, which also affect food intake rates.

A set of captive feeding studies was conducted to address many of these concerns by performing feeding trials throughout the year, and by using mixed diets based on known diet compositions of free-ranging SSLs in different parts of their range (Castellini 2001; Tollit *et al. 2007).* Preliminary results indicate that SSLs have a tremendous ability to compensate for dietary shifts through physiological adaptations and behavior. Mellish *et al.* (2006) summarized the results of studies of juvenile SSLs (one and two years old) that were captured in the wild and held for several months. Some animals were fed an exclusive pollock diet for an average of 54 days and others were fed a mixed diet of several fish species and cephalopods. All animals increased in mass on both diets, indicating that consumption of an exclusive pollock diet was not necessarily a deterrent to growth.

Studies of prey remnants from captive SSL scats indicate that there are significant differences in digestibility between and within prey species (NMML 1997). Castellini *et al.* (2005) examined the energetic requirements of captive SSLs in relation to metabolism, nutritional differences among fish prey species, and hydrodynamics. The results indicate that adding herring to the diet and decreasing the amount of pollock increased the metabolic turnover of protein by 30-50 percent. They also found seasonal differences between the nutritional value of prey samples, with the greatest variability found in herring, and a difference between age classes of pollock.

Although captive feeding studies can describe the metabolism of prey once ingested, they do not include components of foraging efficiency, or the cost to the SSL of acquiring a certain prey type. The net energy gain to an animal from ingesting a particular prey item depends not only upon the energy content of the prey but also on the energetic costs of finding, capturing, handling, and digesting the prey. The energy balance of foraging on any particular prey thus depends on the prey item's individual size, total biomass, availability, behavior, degree of aggregation, temporal and spatial distribution, and other factors.

Foraging Behavior

The *Platforms of Opportunity* database provides an overall view of the foraging range or distribution of SSLs in the Bering Sea and the western/central GOA (Perez and Loughlin 1991). This database and the locations of SSLs taken incidentally in groundfish fisheries indicate that SSLs disperse widely to forage throughout much of the Bering Sea and the GOA, at least as far out as the continental shelf break (Merrick *et al.* 1997; Brandon 2000). Such broad dispersal may be essential to SSL populations to take advantage of distant food resources and, as a consequence, limit intra-specific competition near rookeries and haulout sites. However, this database does not represent a systematic survey effort so it cannot be used to make conclusions about changes in SSL distribution or foraging patterns over time.

Prior to the mid 1990s, telemetry work was conducted on adult female (occasionally adult male) SSLs rather than juveniles because of problems with immobilizing younger animals. At least three types of telemetry have been used to study SSL foraging: very high frequency (VHF), satellite-linked, and stomach telemetry. VHF telemetry can be used to determine presence or absence of an animal and, to some extent, animal location and if it is on land or in the water. The use of VHF telemetry to determine the presence or absence of an animal can be used to infer the occurrence and length of foraging trips (Merrick *et al.* 1994), and movement patterns between sites that can be monitored manually, remotely, or automatically by VHF receivers.

Satellite-linked telemetry is used to determine animal location and, when coupled with time-depth recorders, diving patterns (Pitcher *et al.* 2005; Loughlin *et al.* 2003). Satellite-linked telemetry provides an opportunity to collect information on animal location without having to recapture the animal to collect stored data. Underwater capture techniques developed by the Alaska Department of Fish and Game (ADF&G) and on-land net captures devised by NMFS in the late 1990s afforded access to younger animals, which was crucial because most data suggested that high mortality rates in sub-adult animals could be responsible for the decline. Before 2000, the physical size of satellite transmitters precluded their attachment to smaller animals without negatively affecting dive performance. Advancements helped to reduce the size of the instruments while increasing the quality of transmitted data (Andrews 1998).

Stomach telemetry offers an opportunity to determine when an animal has consumed prey, rather than requiring the investigator to infer feeding from diving behavior. Stomach telemetry, in combination with satellite-linked telemetry, may provide greater understanding of foraging behavior and discrimination of at-sea activities that may or may not be related to foraging (Loughlin *et al.* 2003).

Satellite telemetry studies from 1994-2000 helped establish the range of movement patterns and dive characteristics for animals of different age classes and in different parts of the SSL range, from the GOA and AI to Washington (Fadely *et al.* 2005; Briggs *et al.* 2005; Pitcher *et al.* 2005; Raum-Suryan *et al.* 2002; Loughlin *et al.* 2003). Improved satellite instruments have helped researchers link SSL dive performance to bathymetry and remote environmental data to better define foraging behavior and habitat characteristics (Fadely *et al.* 2003). Also, there were successful efforts to show relationships between SSL movements, dive behavior, and prey fields in both the Kodiak area (Gende and Sigler *In press*; Gende and Sigler 2006; Bredesen *et al.*2004; Bredesen *et al.* 2006) and in southeast Alaska (Sterling *et al.* 2004). Remote sensing data from satellites were also used to monitor SSL movements and foraging behavior in and around surface eddies in the Bering Sea and North Pacific.

In general, otariids have adopted an "energy maximizer" type foraging strategy, which is characterized by high energy turnover. That is, SSLs *expend* comparatively high levels (relative to phocids) of energy in order to *acquire* relatively high levels of energy. This strategy is advantageous in highly productive ecosystems with concentrated and predictable prey (Boyd 1996; Boyd 1999; Andrews 2001). Otariids can make adjustments to foraging strategies on many behavioral and metabolic scales. Changes in foraging trip duration and time at a prey patch have been observed in response to prey availability (Boyd 1997; Costa 1993).

The time a SSL is able to spend underwater, and therefore its ability to forage, depends upon physiological adaptations for diving. The maximum time submerged will be largely determined by the speed at which oxygen stores are used (i.e., metabolic rate), how much oxygen is stored in the body, and the demands of movement (Hastie *et al.* 2004, 2005, 2006, *In press*). In a study incorporating captive SSLs in the open ocean, researchers used a general linear model to predict oxygen consumption of SSLs in the wild (Richmond *et al.* 2006; Horning and Trillmich 1997). Due to increases in blood volume, muscle myoglobin and body mass, there is considerable development of the oxygen storage ability of an otariid as they mature (Lavigne *et al.* 1986; Richmond *et al.* 2006; Costa 1993). However, the estimated aerobic dive limit of juveniles is less than that of adults, likely due to smaller size and higher metabolic rates, which limits how long and how deeply they can dive, and thus their choice of foraging strategies during their transition to nutritional independence (Winship *et al.* 2002).

Overall, the available data suggest two main types of foraging patterns: 1) foraging around rookeries and haulout sites that is crucial for lactating females, pups, and juveniles, and 2) foraging that may occur over much larger areas where these and other animals may search to find the optimal foraging conditions once they are no longer tied to rookeries and haulout sites for reproductive purposes.

With estimates of food intake requirements, population size, and age structure, it is possible to generate estimates of food intake requirements for the entire population of SSLs. The mean predicted food requirement of an average SSL consuming an average Alaskan diet was 17 kilograms (kg) per day (Winship 2000). Based on a bioenergetic model (Winship 2000), SSLs in the GOA consumed 76,400 metric tons (mt) of pollock and cod annually while SSLs in southeast Alaska consumed 72,900 mt. The second largest single species consumption was of Atka mackerel by the central AI population (48,700 mt). Winship (2000) estimated that the total annual consumption of pollock by all SSLs was 6 percent of the total estimated pollock biomass attributed to natural mortality, and 19 percent of the total biomass removed by commercial fisheries. SSL predation accounted for a greater proportion (83 percent) of the estimated biomass of Atka mackerel annual natural mortality. However, this type of analysis does not consider spatial, temporal or local availability of prey to SSLs, particularly on scales relevant to foraging SSLs (Angliss and Outlaw 2007).

3.2.1.6 Anthropogenic Sources of Mortality

Anthropogenic, or human-caused, sources of mortality can occur incidental to other actions, or through directed taking. Examples include mortalities that occur incidental to commercial fishing, through entanglement in derelict fishing gear or other debris, directly through subsistence harvests, or directly by illegal shooting or other action.

The primary source of data for mortalities that occur incidental to commercial groundfish fishing is from the North Pacific Groundfish Observer Program database. Based on recent data (1990-2004), minimum estimate of average mortality for the western DPS from commercial fisheries is 24.6 SSLs per year (24.2 based on observer data and 0.4 based on stranding data) (Angliss and Outlaw 2007). Based on recent data (1992-2004), the minimum estimate of average mortality for the eastern DPS from commercial fisheries is 2.57 SSLs per year (2.17 based on observer data and 0.4 based on stranding data) (Angliss and Outlaw 2007). Entanglement of SSLs in fishing-related gear is included in the stranding portion of these estimates. These estimates include incidental takes from nearshore salmon fisheries and halibut longlines as well as groundfish fisheries. There are no apparent "hot spots" of incidental catch nor an apparent relationship between mortality and magnitude of catch. Due to the size class requirements for observer coverage, if vessels with limited or no coverage operate in ways different than the larger vessels, either in technique or area, then these mortality estimates could be biased. Moreover, no observers have been assigned to several fisheries that are known to interact with this DPS, making the estimated mortality a minimum.

Entanglement of SSLs in derelict fishing gear or other materials does not appear to affect a significant portion of the population. From a sample of rookeries and haulout sites in the AI of 15,957 adults observed only 11 (0.07 percent) were found entangled in marine debris, some of which was derelict fishing gear (Angliss and Outlaw 2005). Observations of sea lions at Marmot Island for several months during the same year observed 2 of 2,200 adults (0.09 percent) entangled in marine debris. During 1999-2003, only one fishery-related stranding was reported from the range of the western DPS (Angliss and Outlaw 2005). There were no fishery-related entanglement incidents involving SSLs in Washington, Oregon, or California.

SSLs are primarily used for subsistence purposes in communities within the range of the western DPS. Most (79 percent) are harvested in the AI and Pribilof Islands by Aleut hunters (Zavadil *et al.* 2003 and 2004). The mean annual subsistence take from this stock over the four-year period from 2000-04 was 191 SSLs per year (Wade and Outlaw 2007). Harvest levels typically have been lowest during June-August, peaking during September-November, and declining through May, but this seasonality has been less pronounced since 1996 with declining harvest rates (Wolfe *et al.* 2004). Sixteen Alaskan communities in the area of the eastern DPS took an average of two per year during 2000-2003 (Takahashi and Wada 1998). Subsistence hunters in Canada harvest a small number of animals but the harvest has not been quantified.

A modified Leslie matrix model was used to assess the possible effect of the Japanese government's sanctioned hunting of SSLs in Japanese waters and concluded that hunting near Hokkaido to reduce damage to local commercial fisheries likely depleted the sea lion population in the Kuril Islands (Angliss and Outlaw 2005). Calkins (2000) corroborated the large kill levels in Japanese waters, but limited them to years prior to 1994 and reported that the anthropogenic mortality level is likely <100 animals per year and is probably not having any population-level effects.

Illegal shooting occurs, but the frequency of occurrence is difficult to estimate. NMFS successfully prosecuted two cases of illegal shooting of SSLs in the Kodiak area in 1998 and two cases in southeast Alaska between 1995 and 1999, but there have been no cases of successfully prosecuted illegal shootings between 1999 and 2003 (Olesiuk 2004). Over the period of 1999-2003, there was a mean annual mortality of 45.75 SSLs taken from the eastern DPS by British Columbia commercial salmon farms (Barrett-Lennard *et al.* 1995), but this practice has stopped since 2004 (P. Olesiuk personal communication).

Intentional lethal sampling of western and eastern SSLs was a primary means of collecting reproductive, morphometric, dietary, and histologic samples for scientific research in the 1960s and 1970s. However, this sampling method was strictly regulated after passage of the Marine Mammal Protection Act (MMPA) and was completely ended once the species was listed under the ESA.

Scientific research on SSLs is also a potential source of mortality in SSLs and may occur as a result of disturbance, capture, handling, or anesthesia procedures. Mortality can occur at the time of these activities, or at some time after disturbance has occurred or the animal released. Mortality occurring while present on a rookery or haulout, or during capture and handling activities, is directly observable and recorded. Mortalities occurring later may or may not be observed. Estimates of directly observed mortalities attributable to research have ranged from 1-3 per year (NMFS 2006a) to 3-5 per year in the western stock (Loughlin and York 2000), but no accurate compilation of reported research mortalities has previously been widely available. During the period 2000-2005, a total of 20 research-related mortalities from the eastern stock (an average of 3.3 per year) and a total of 5 research-related mortalities from the western stock (an average of 0.8 per year) were reported. Of these totals, mortalities to pups in the eastern stock, by year, were 5 in 2001, 4 in 2002, 7 in 2003, 3 in 2004, and 1 in 2005; and of juveniles there were 0 in all years 2000-2005. In the western stock, pup mortalities were 0 in 2000, 2 in 2001, 0 in 2002, 0 in 2003, 1 in 2004, and 0 in 2005; mortalities of juveniles were 0 during 2000-2003, 1 in 2004 and 1 in 2005. All mortalities were associated with capture, handling or anesthesia activities (see Section 4.8.1, "Basis for Estimates of Animals Affected, Injury Rates, and Mortality Rates" for additional details).

3.2.1.7 Natural Predators and Competitors

Natural Predators

The primary natural predators of SSL are believed to be transient killer whales and, to a much lesser extent, sharks. Based on surveys of researchers, fishers, tour boat operators and others, more lethal interactions of SSL with transient killer whales may occur in the AI compared to other parts of Alaska (Heise *et al.* 2003; Saulitas *et al.* 2000). In a study dedicated to tracking killer whales in Prince William Sound during 1984-1996, none of the 31 documented marine mammal kills by transient killer whales were of SSLs, although there were observations of SSLs being harassed (Matkin *et al.* 2007). Even though direct observations of feeding by GOA/AI/Bering Sea transient killer whales have been limited to date, they have included NFS, gray whales, minke whales, and SSLs (Matkin *et al.* 2001). Based in part on these observations, and on stomach contents of six stranded killer whales, sea lions were estimated to comprise 5-20 percent of killer whale diet (Matkin *et al.* 2001). Expanding this to account for daily killer whale metabolic needs, average size and caloric content of SSLs consumed, and a population estimate of killer whales, a range of the percent of SSL mortalities attributable to killer whales was estimated to be 6-77 percent, with a best estimate of 27 percent (Matkin *et al.* 2001; Estes *et al.* 1998). Williams *et al.* (2004) reported that an average adult killer whale would require two to three SSL pups or the equivalent of 1/3 to 1/2 of an adult female per day when feeding exclusively on SSLs. Maniscalco *et al.* (2007) studied the behavioral and predatory patterns of GOA transient killer whales near the Chiswell Island SSL rookery. Based on estimates from field observations, approximately 59 SSLs were consumed between 2002 and 2005; while estimates based on published caloric requirements of GOAs suggest a loss of 103 SSLs during the same period. This study suggests that GOA transients have a minor effect on the recovery of SSLs in the GOA. The results of these exercises highlight the need for improved data on killer whale population size and the proportion of SSLs in their diet, and suggest that killer whale predation may be a factor in the current decline and lack of recovery of SSLs (Springer *et al.* 2003).

One study postulates that killer whale predation alone is sufficient to explain the observed decline of the western DPS, as well as declines in other marine mammal populations (Springer *et al.* 2003). This is known as the "Sequential Megafaunal Collapse" hypothesis and is based on the assumption that killer whales were forced to eat more pinnipeds after their preferred prey, the great whales, were decimated by post-World War II industrial whaling. Based on estimates of the number of transient killer whales (higher than estimates used by other authors), the annual dietary needs of a killer whale, and the nutritional value of SSLs, the authors calculated that killer whale predation could be more than ten times the level necessary to cause the historic SSL population decline (Springer *et al.* 2003). Other researchers have challenged this hypothesis and claim that it is not consistent with existing data regarding killer whale predation on great whales, the timing of population declines in SSLs and other pinnipeds, killer whale numbers, and ecosystem changes that followed the end of whaling (DeMaster *et al.* 2006; Trites *et al.* in press). These authors conclude that killer whale predation could affect the recovery of SSLs now that the western DPS is depleted but that other factors have played a larger role in its original decline.

Attacks by great white sharks (*Carcharodon carcharias*) have been documented on SSLs at the southern end of their range in California (Bright 1959; Yang and Page 1999; Hulbert *et al.* 2001). Sleeper sharks (*Somniosus pacificus*) range throughout the GOA and Bering Sea and eat primarily fish and invertebrates, but consumption of small marine mammals has also been documented (Yang and Page 1999). No remains of SSLs were found in 13 sleeper shark stomachs collected in the GOA between June and August 1996 in areas near active SSL rookeries and haulout sites (Hulbert *et al.* 2006; Sigler *et al.* 2006).

Natural Competitors

SSLs forage on a variety of marine prey that are also consumed by other marine mammals (e.g., NFSs, harbor seals, humpback whales), marine birds (e.g., murres and kittiwakes), and marine fishes (e.g., pollock, arrowtooth flounder). To some extent, these potential competitors may partition the prey resource so that little direct competition occurs. For example, harbor seals and NFSs might consume smaller pollock than SSLs (NMFS 1995). Competition may still occur if the consumption of smaller pollock limits the eventual biomass of larger pollock for SSLs, but the connection would be difficult to demonstrate. Such competition may occur only seasonally if, for example, NFSs migrate out of the area of competition in the winter and spring months. Similarly, competition may occur only locally if prey availability or prey selection varies geographically for either potential competitor. Finally, competition between SSLs and other predators may be restricted to certain age classes because diet may change with age or size.

3.2.1.8 Disease and Contaminants

As with any wild mammal population, a multitude of infectious diseases (e.g., viral, bacterial, parasitic, or mycotic) or toxicological diseases (e.g., heavy metal, organochlorine) may afflict SSLs. Many anatomical and clinical studies have been performed to determine disease prevalence, with an ultimate goal of determining incidence, interactions with the environment, and what role disease may play in the population decline or as an impediment to recovery.

Infectious Diseases

Many diseases common to otariids in general and SSLs specifically can cause reproductive failure or death, and have thus been considered relative to their role in the population decline (Barlough *et al.* 1987). Among those potentially pathogenic that have tested positive for exposure in some SSLs are calicivirus (San Miguel SSL virus) (Spraker 1996), *Listeria* sp. (Spraker and Bradley 1996), canine distemper virus, phocine distemper virus, phocid herpesvirus, *Salmonella* sp. (Sheffield and Zarnke 1997), *Toxoplasma gondii*, chlamidia (Sheffield and Zarnke 1997), and poxvirus (Burek *et al.* 2005). Prevalence or isolation of pathogens occurs throughout the range, with no immediate temporal/spatial pattern detectable due largely to small or infrequent sampling (NMFS 1995; Sheffield and Zarnke 1997). No exposure to influenza A or *Brucella* spp. was detected (NMFS 1995).

Disease has not been considered to have played a significant role in the overall decline of the western stock of SSLs (Calkins *et al.* 1994), but it is inconclusive to what extent it played a contributory factor, and to what extent disease may be operating as a limitation to recovery.

Parasites

Numerous lesions were found in adult and juvenile SSLs necropsied during the *Exxon Valdez* oil spill. Gross lesions caused by parasites were found in the nasal cavity, stomach, and intestine, and were unrelated to hydrocarbon exposure (Fay and Furman 1982). Gross lesions on SSLs have also been found to be the result of a novel poxvirus (Burek *et al.* 2005).

Nasal mites infect SSLs in Alaska (Konishi 1998) and Russia (Konishi 1998) by at least two years of age, though nasal mites and SSLs have apparently evolved into a relatively neutral, or benign, relationship (Beckmen *et al.* 2005). Hookworms (*Uncinaria lucasi*), the same worm that infects California sea lions, were recovered from the ventral abdominal bladder of pups, but population effects are not known (AMAP 1997).

Contaminants

Organic and inorganic chemicals from pesticides and industrial applications that accumulate in food webs and are hazardous to wildlife include persistent organic pollutants (e.g., dichloro-diphenyl-trichloroethane [DDT], polychlorinated biphenols [PCBs], chlordane, hexachlorocyclohexane, dioxin), heavy metals (lead, cadmium, mercury), radioactive elements or compounds, and petroleum hydrocarbons. Contaminants can be transported to Alaska via atmospheric or oceanic currents, or can be found in localized point sources such as abandoned military installations, industrial complexes, mining sites, land or sea dumps, and from discharges or spills (MMC 1999). Contamination of wildlife can result from inhalation, absorption through skin, direct ingestion, or by consumption of contaminated prey (MMC 1999). Changes in diets or ecosystem trophic webs can thus affect the contaminant burden of top predators (Helle *et al.* 1976; Reijnders 1986). Toxic effects of contaminants in wildlife and marine mammals have been associated with reproductive failures (Martineau *et al.* 1987), population declines (Gulland *et al.* 1997), carcinomas (Ross 1996 *et al.*; DeSwart *et al.* 1995), and immune suppression (Castellini and Cherian 1999).

A study of transitory metals accumulation in SSLs found that levels of zinc, copper, and metallothionein (a chelating compound) were comparable between pups sampled from the western DPS and eastern DPS, and lower than captive sea lions (Noda *et al.* 1995). Hepatic metal concentrations in SSLs have generally been much lower than found in NFSs (Saeki *et al.* 1999). Vanadium concentrations in SSL livers correlated positively with levels of selenium, silver, and mercury (Wise *et al.* 2005). A recent study investigated the toxicity of metals in the major organ systems of SSLs by establishing cell lines from organ systems and determining the effects of metals in these lines (Lee *et al.* 1996). This study found that toxicity level varied as a function of metal type, tissue, and amount of exposure. The most significant result was that exposure to chromium and arsenic posed a substantial risk factor for the health of SSLs. However, it was not known whether or not these levels of toxicity occur in free ranging SSLs.

Blubber samples from GOA and Bering Sea SSLs revealed that PCB levels ranged from 5,700-41,000 nanograms/gram (ng/g) lipid in males, and 570-16,000 ng/g lipid in females (Varanasi *et al.* 1992). PCB concentrations in male SSLs was orders of magnitude higher than in other arctic and Alaskan pinnipeds. Female SSLs were found to decrease the contaminant burden throughout life, relative to adult males, by dumping contaminants through lactation. Blubber samples from the Barren Islands, Prince William Sound, and St. George Island (Pribilof Islands) revealed organochlorine levels in the blubber of SSLs at 23,000 +/- 37,000 ng/g (Barron *et al.* 2003). The NMFS Northwest Fisheries Science Center examined blubber samples from 24 SSLs from southeast Alaska and found PCB levels of 630-9,900 ng/g and DDT levels of 400-8,200 ng/g (NMFS unpublished). The NMFS Auke Bay Laboratory studied fish that are documented as part of the SSL diet and found arrowtooth flounder posed the greatest risk of exposure to PCBs, followed by Pacific cod, Atka mackerel, and finally, pollock (Krahn *et al.* 2001).

ADF&G monitored organochlorines in scat and in tissues from free-ranging SSL pups and juveniles (also some adults) that are handled during capture operations and found significant correlations between organochlorine exposure and impaired immune function at several levels (Hoshino *et al.* 2004). The study also showed high levels of organochlorines in western Pacific SSLs. These studies suggest that adverse effects of organochlorines should be considered as both health burdens and contributing factors in the decline of the western DPS in Alaska, and should be monitored accordingly.

3.2.1.9 Disturbance from Marine Vessel Traffic

Marine vessels have the potential to disturb marine mammals due to their large numbers and production of underwater noise (Richardson *et al.* 1995). Disturbance reactions are thought to be short-term behavioral reactions usually involving a change in feeding, resting, or social behavior. These reactions also include movement from haulout sites or rookeries to water, where SSLs may be initiating avoidance behavior (BBNA 2004).

Fishing vessels are numerous and prominent within marine mammal habitat. However, fishery management measures implemented by NMFS limit the presence of fishing boats and other vessels within SSL critical habitat, offering protection against disturbance. Large vessels such as cruise ships, container vessels and oil tankers contribute to underwater noise, but generally do not travel near the shoreline and are not likely to disturb rookeries and haulouts. Research vessels and wildlife viewing cruises, on the other hand, can visually disturb SSLs because of their proximity to the animals. Some wildlife viewing cruises are known to travel close to the following rookeries for unaided viewing of the animals: Chiswell Island, on the outer Kenai Peninsula approximately 35 miles south of Seward, Alaska, and Farallon Islands off the coast of San Francisco, California. Other marine vessels include recreational boaters and sport fishing charters, which are more likely to disturb SSLs present in high traffic areas or transportation corridors (e.g., Lynn Canal, southeast Alaska).

3.2.1.10 Traditional Knowledge about SSLs and Their Decline

According to the Director General of United Nations (U.N.) Educational, Scientific and Cultural Organization, traditional knowledge can be defined as follows:

> The indigenous people of the world possess an immense knowledge of their environments, based on centuries of living close to nature. Living in and from the richness and variety of complex ecosystems, they have an understanding of the properties of plants and animals, the functioning of ecosystems and the techniques for using and managing them that is particular and often detailed. In rural communities in developing countries, locally occurring species are relied on for many - sometimes all - foods, medicines,

> fuel, building materials and other products. Equally, people's knowledge and perceptions of the environment, and their relationships with it, are often important elements of cultural identity.
>
> *--Frederico Mayor Zaragova, (Director-General United Nations Educational, Scientific and Cultural Organization 1987-1999) from a speech to the Plenary Session on Global Knowledge and Local Culture of the International Global Knowledge Conference, Toronto in 1997*

With funding through the NMFS Steller Sea Lion Research Initiative (SSLRI), a number of community-based and collaborative research projects were undertaken to interview hunters about their observations of changes in sea lion abundance, distribution, and health. One project incorporating such traditional knowledge is entitled "Traditional Knowledge of Steller Sea Lions and Community-Based Monitoring of Local Seasonal Haul-outs" and is being conducted by The Alaska Sea Otter and Steller Sea Lion Commission (TASSC). TASSC partnered with six Alaskan coastal communities to develop and implement a survey of traditional knowledge of SSL health and abundance. The surveyors interviewed subsistence hunters, those who use SSL for food or art, as well as boaters, pilots, and others who spend time on the water. From the survey data, local seasonal haulouts were identified, protocols were developed for community-based monitoring of local seasonal haulouts, and testing protocols were implemented to ensure reporting of survey results. TASSC is also producing an Alaska Native Hunter's Photographic Guide to SSL Biosampling. This guide will include the following topics: health assessment, nutritional and contaminant sampling, estimating SSL weight, whisker analysis, and SSL stomach rocks. Also, the dynamics for "seal finger" in man, an arthritic-like, painful, contagious disease affecting the hands and acquired from seals and SSLs, would be addressed. The project was scheduled to be completed in July of 2006, with a final report available soon after.

Another important project along similar lines was conducted by the Bristol Bay Native Association in cooperation with the community of Perryville. The study documented the traditional knowledge important to effective hunting and identified active haulouts and rookeries. The project report was submitted in 2004 (ADF&G 1999a).

A major research effort to interview SSL hunters regarding subsistence harvests and traditional knowledge was undertaken by the ADF&G Division of Subsistence over an 11-year period starting in 1992. These studies involved cooperation with tribal governments, local governments, and Alaska Native tribal associations in as many as 65 communities in 7 regions, stretching from southeast Alaska to Bristol Bay. Additional hunter surveys were conducted in three Yukon Kuskokwim Delta communities for two years and six Bering Strait communities for one year in the late 1990s. In addition to the detailed harvest information, these studies asked hunters for their observations on SSL ecology, including seasonal cycles, population trends, and behavioral habits. The traditional ecological knowledge information was compiled in a technical paper in 1999 and compiled into an electronic database (National Research Council [NRC] 1996). The interviews reveal the hunters' longstanding and intricate familiarity with SSLs in the vicinity of each village; however, these detailed observations have not been synthesized into regional histories of SSL population trends.

3.2.1.11 SSL Past Research, Levels of Effort, Funding, and Program Histories

SSL Research Overview

Research on SSLs dates back to the 1960s and 70s, but the SSL has been the subject of intensive scientific research only since a steep population decline was identified in the late 1980s. Research efforts during most of the 1990s were guided by recommendations contained in the SSL Recovery Plan of 1992. Research funding for federal agencies during this period was less than $1 million annually, of which over half was required for population monitoring surveys. During the late 1990s, SSL research activities were intensified as new scientific findings, litigation, and legislation focused increasing attention on the ongoing decline and concern over possible impacts by commercial fisheries in Alaskan waters. This renewed attention was manifested in a seven-fold increase in funding between 2000 and 2001 (Section 3.6). A wide spectrum of research entities were engaged in these studies, including federal and state agencies, universities, and non-governmental research organizations. In cooperation with the entities that received federal funding, NMFS developed a research coordination framework to clarify the context of individual research projects, to show their relationships to each other, and to link them to underlying hypotheses that might explain the continued decline of SSLs.

Several of the largest U.S. fisheries operate within the range of the SSL; the fisheries' role, if any, in the decline of the western DPS remains both a topic of debate (NMFS 1998a, 1999 and 2000) and a significant issue for ongoing litigation (*Greenpeace et al. v. NMFS and At-Sea Processors et al., Civ. No. C98-0492-C*). On the one hand, if fisheries play a significant part in the decline and lack of recovery, then actions should be taken to avoid those effects. On the other hand, if fisheries do not impede recovery, then the economic viability of those fisheries should not be unnecessarily compromised by regulations or other legal requirements related to protection of SSLs. In either case, SSL scientific information is critical to the future of both the SSL population and commercial fisheries in Alaska.

The development and implementation of broad-scale, comprehensive scientific investigations needed to address issues of this magnitude and complexity are enormous and costly undertakings. Therefore, it should not be unreasonable to expect scientific progress to be tempered by both the availability of research funds and the intricacy of the studied ecosystem and research questions. However, unlike most of the period since the 1980s, the current level of research funding offers renewed opportunities to understand the SSL decline and to promote the recovery of SSL populations.

SSL Research in the 1970s, 1980s, and early 1990s

Despite being the most abundant sea lion in North America at the time, research on SSLs prior to the 1970s principally involved studies of its population status and distribution (Imler and Sarber 1947; Mathisen *et al.* 1962; Thorstein and Lensink 1962), or brief descriptions of its diet (Pitcher and Calkins 1981). In the 1970s and early 1980s, potential exploration of Alaska's continental shelf for oil and gas prompted baseline research on growth, reproduction, and other aspects of SSL life history, along with continued monitoring of the SSL population (Calkins and Pitcher 1982; Calkins and Goodwin 1988; Loughlin *et al.* 1984; Fritz 1995 and 2002; NMFS 1998b and 1999; Pitcher and Calkins 1981). The decline in the SSL population in Alaska was first noted after surveys conducted in 1975-77 in the eastern AI (Section 3.1.1.2). These significant and steep decreases in the size of the SSL population resulted in NMFS being petitioned to list the species under the ESA, which prompted the agency to list it as threatened in 1990.

SSL Research, Fisheries and Litigation in the Late 1990s and 2000s

NMFS released a SSL Recovery Plan in 1992 (NMFS 1992). This plan was initially drafted by the SSL Recovery Team (SSLRT) following the listing of the species as threatened across its range in 1990. The SSL Recovery Plan focused primarily on recommendations for research essential to determine population (and recovery) status and immediate, tangible actions such as reducing direct mortality from shooting and incidental takes in fisheries that could help arrest the steep decline experienced by the population in the 1980s. The plan also identified other research needs relating to both natural and human-related factors that could be affecting the population. That discussion of research needs provided the initial guidance for the development of subsequent plans and projects conducted from 1993-1998.

Population modeling and observation studies conducted in the late 1980s and early 1990s indicated that a decline in the survival rates of juvenile SSLs was largely responsible for the steep decrease in SSL abundance in the 1980s (Pasqual and Adkison 1994; York 1994). Along with baseline aerial and ground surveys to monitor the status and trend of the SSL population, and genetic studies to investigate stock structure, the SSLRT recommended tagging/branding studies to estimate age-specific survival and dispersal rates. Branding and brand sighting efforts were re-initiated in the mid-1990s by ADF&G and in 2000 by National Marine Mammal

Laboratory (NMML). Aerial survey protocols were also standardized between these two agencies, which both conducted baseline studies. Neonate and juvenile sea lions remain the focus of physiological and foraging ecology research throughout the 1990s because of the information associating the population decline with declines in their survivorship (York 1994). It was for this reason that ADF&G, NMML, and the Alaska SeaLife Center (ASLC) developed methods to capture, instrument and sample juvenile SSLs. In addition, considerable research on the condition, physiology, incidence of disease and contaminant loads of neonate pups was conducted in the 1990s.

By the late 1990s, interest in SSL research was renewed due to a combination of several factors, including recent scientific findings, litigation, and legislation. NMFS reinitiated formal ESA consultations on specific groundfish fisheries, Atka mackerel and pollock, based on information and analyses that showed the potential for competitive overlap between them and SSLs. This new information consisted primarily of:

- SSL food habits;
- depths, locations, and size ranges of fish targeted by groundfish fisheries;
- disproportionate rates of harvest in SSL foraging habitats; and
- potential localized depletions of prey.

The food habits information revealed strong prevalence of Atka mackerel, pollock, and Pacific cod, all of which are targeted by groundfish fisheries, in the diet of SSLs. The size ranges of fish consumed by sea lions and those targeted by fisheries overlapped considerably, as did the geographic locations and water depths used by both fisheries and SSLs. These data suggested the potential for competitive overlap, and further analyses of the distribution of the Atka mackerel and pollock fisheries indicated that there was likelihood that competition for prey could affect survival and recovery of SSLs. Survey and fishery data suggested that harvest rates in some of the areas used by the Atka mackerel and pollock fisheries were greater than the target rate on the stock as a whole (NMFS 1998a). This could have reduced the availability of prey in areas used by the fishery, many of which were within areas designated as SSL critical habitat (Section 3.2.1.2).

Due to these concerns, NMFS and the North Pacific Fishery Management Council (NPFMC) took actions in 1998 which spatially and temporally dispersed the Atka mackerel fishery and reduced effort in SSL critical habitat in the AI. Efforts to restructure the pollock fisheries in the North Pacific to address SSL concerns were more protracted. The NMFS biological opinion on the effects of the proposed 1999 pollock fishery on SSLs (NMFS 2000) concluded that it was likely to jeopardize their continued existence and adversely modify SSL critical habitat. This was based on an analysis of the information described previously which suggested that fisheries could reduce the prey availability for SSLs in important foraging habitats. Consequently, NMFS and the NPFMC modified the fishery to spatially and temporally disperse effort as well as to reduce catches within critical habitat. These measures were termed the reasonable and prudent alternatives (RPAs). However, considerable scientific uncertainty existed regarding the effects of fisheries on SSLs as well as the efficacy of the management measures proposed to mitigate them. While NMFS gave the "benefit of the doubt" to the SSL in its conclusions regarding the effects of the pollock fishery, NMFS could not convince the U.S. District Court for the Western District of Washington and the Honorable Thomas S. Zilly that the RPA avoided jeopardy to the continued existence of SSLs and avoided adversely modifying their critical habitat. As a result, the RPA was remanded back to NMFS, which produced a revised final RPA under which the pollock fishery operated through 2000.

The U.S. District Court also required NMFS to write a biological opinion (BiOp) analyzing the combined and cumulative effects of all the groundfish fisheries as managed under the fishery management plans (FMPs). This document (the FMP BiOp) finalized in November 2000, concluded that the Bering Sea/AI and GOA groundfish fisheries were likely to jeopardize SSLs and adversely modify their critical habitat because effects would likely occur at three scales: local, regional, and global. Much of the evidence for the local and regional fishery effects came from analyses of SSL food habits and fishery data as described previously. However, new information on the potential impacts at the global, or ecosystem, scale of the overall target fishing rates supported, according to NMFS, the conclusion of jeopardy and adverse modification. The RPA developed in the November 2000 BiOp

(NMFS 2001c), however, was controversial because of the magnitude of perceived impacts to the fishing industry and was challenged with lawsuits. Again, this stemmed largely from the lack of firm evidence and considerable scientific uncertainty on the magnitude of fishery effects on SSLs and the efficacy of the proposed measures in mitigating these effects.

The concern over SSLs and the possibility that their decline might be at least partially induced by interactions with Alaskan groundfish fishery activities rose to the Congressional level in the summer of 2000. The possibility that Alaskan groundfish fisheries might face costly restrictions as a result of scientific uncertainty about the decline of SSLs led to increased funding for research. It was hoped that with this funding the fisheries could remain open and, simultaneously, more research and protection of SSLs could occur.

Ultimately, Congressional actions in 2000 resulted in a total of $43.15 million in the fiscal year (FY) 2001 to the National Oceanic and Atmospheric Administration (NOAA) budget for the implementation of SSL research and protective measures (NRC 2003). This $43.15 million sum was for NOAA and its cooperating partners, including the ADF&G, NPFMC, and others (Table 3.5-5c and Figure 3.2-5a). Representatives from each of the entities funded through the 2001 appropriation reviewed and finalized a SSL research framework based on a NMFS-Alaska Fisheries Science Center concept. The framework reflected the Congressional mandate to "develop and implement a coordinated, comprehensive research and recovery program for the Steller sea lion … designed to study:

- available prey species;
- predator/prey relationships;
- predation by other marine mammals;
- interactions between fisheries and Steller sea lions, including the localized depletion theory;
- regime shift, climate change, and other impacts associated with changing environmental conditions in the North Pacific and Bering Sea;
- disease;
- juvenile and pup survival rates;
- population counts;
- nutritional stress;
- foreign commercial harvest of sealions outside the exclusive economic zone;
- the residual impacts of former government-authorized Steller sea lion eradication bounty programs; and
- the residual impacts of intentional lethal takes of Steller sea lions."

This framework was developed to facilitate the exchange of information, ideas, and support among individual investigators doing similar or related research in the same geographic area (identify linkages); to assist in the research planning process to identify major research areas that are lacking in effort (identify gaps) or are saturated; and to ensure that each project is addressing one or more of the hypotheses related to one or more factors causing or contributing to the decline or lack of recovery of SSLs. These criteria led to a research framework focused on factors and mechanisms causing or contributing to the decline. This framework led to the development of the following six testable hypotheses for the decline and lack of recovery of SSLs in 2000:

Table 3.2-5a
Steller Sea Lion Decline and Lack of Recovery Hypotheses 2000

Hypothesis		What We Knew in 2000	
		Contributor to decline?	**Threat to recovery?**
Environmental Change		Possible	Possible
Indirect Fisheries Effects		Possible	Possible
Direct Human-Related*		Likely	Possible
Predation	Sharks	Possible	Possible
	KillerWhales	Possible	Possible
Disease		Possible	Possible
Contaminants		Possible	Possible

* Incidental take in fisheries, illegal shooting, subsistence hunting

The development of these hypotheses led to considerable expenditures of research funds (Table 3.2-5c and Figure 3.2-5a), beginning in 2001, in fields directly and indirectly related to SSLs (Table 3.2-5d). Some of the direct SSL research enhancements included:

- larger collections of food habits from throughout the range (more disturbance of animals on terrestrial haulouts and rookeries);
- development of capture techniques and novel methodologies to study the condition, physiology, diving ontogeny and foraging ecology of juvenile sea lions (capture and handling of more individual sea lions);
- diet, physiological and metabolic studies of captive sea lions (no additional takes of wild animals);
- branding and tagging studies to estimate vital rates and dispersal (more disturbance of animals on terrestrial haulouts and rookeries and additional handling of individual sea lions); and
- activities to observe branded animals subsequent to marking (more disturbance of animals on terrestrial haulouts and rookeries).

Collectively, this level of research represented the maximum level of field-based research on SSLs to date. The primary focus of field research during the peak years from 2001 – 2004 was the capture of juvenile sea lions for investigations of foraging and condition, and the demographic work involving the re-initiation of a vital rates program by NMML and ADF&G. Those two groups were the primary field research groups during that time with additional work contributed by the ASLC, collaborators from various universities, and the North Pacific University Marine Mammal Research Consortium (NPUMMRC) (Table 3.2-5c).

Other work continued or was enhanced that involved little or no additional disturbance or handling than occurred prior to 2001. These research activities included aerial surveys, pup counts and condition work on rookeries, and observations from field camp settings. However, the addition of new research entities within the SSL research umbrella beginning with the funding increase in 2001 increased the overall level of research on SSLs.

Other research funded with Congressionally allocated SSL research funds was related to the SSL decline, but did not include any direct contact or involvement with SSLs themselves. This involved $8 million allocated specifically to NOAA-Office of Oceanic and Atmospheric Research (OAR) and NOAA-National Ocean Service (NOS) to investigate the environmental change and predation hypotheses (Figure 3.2-5a and Table 3.2-5c). In addition, NOAA-NMFS allocated a considerable portion of its SSL resources to investigate forage fish populations and how they may be affected by climate change, and the indirect effects of fisheries on prey availability for sea lions. Competition for prey between commercial fisheries and pinniped populations is of particular interest. Baraff and Loughlin (2000) report that "concerns over pinnipeds impacting fisheries are more prevalent than concerns over fisheries' impacts on pinnipeds." However, potential for significant pinniped-fishery interaction exists, and as Trites *et al.* (2006b) observe, "the effects of fisheries go well beyond those of other apex predators, due in large part to their capacity to remove large amounts of biomass from the world's oceans and the lack of biological controls or feedback to limit what and how much they take." Congress allocated SSL research funds to the NPFMC specifically to commission the National Academies of Sciences to conduct an independent scientific review on the causes of the SSL decline. The results of the review were published in *The Decline of the Steller Sea Lion in Alaskan Waters: Untangling Food Webs and Fishing Nets* (Soboleff 2006). Based on limited existing data, the NRC concluded that the "bottom-up" (loss of prey species) hypothesis invoking nutritional stress is unlikely to be the primary threat to the recovery of SSLs, whereas "top-down" processes (predation by killer whales and other sources of mortality) appear to pose the greatest threat to the recovery of the western DPS.

As a result of this increase in funding for direct and indirect SSL research, considerable progress has been made toward answering questions regarding the magnitude of the 6 factors identified as possibly having been responsible for the decline and lack of recovery of the SSL population. NMFS (and the reconstituted SSLRT) summarized this progress in a draft updated SSL Recovery Plan released for public review in 2006 (NMFS 2006) and a revised draft scheduled for release in summer 2007. This progress can be summarized by updating the original hypothesis table (Table 3.2-5a) to reflect what we know now (Table 3.2-5b):

Table 3.2-5b
Steller Sea Lion Decline and Lack of Recovery Hypotheses 2007

Hypothesis		What We Knew in 2007	
		Contributor to decline?	**Threat to recovery?**
Environmental Change		Possible	Potentially High
Indirect Fisheries Effects		Possible	Potentially High
Direct Human-Related*		Likely	Unlikely
Predation	Sharks	Unlikely	Unlikely
	KillerWhales	Unlikely	Possible
Disease		Unlikely	Unlikely
Contaminants		Unlikely	Possible

* Incidental take in fisheries, illegal shooting, subsistence hunting

NMFS and the SSLRT ranked both environmental change and indirect fisheries effects as potentially high threats to recovery largely because of uncertainties involving their absolute and relative impacts, and because many of the other threats had been largely removed from consideration, including direct human-related mortality, sharks, and diseases. Other threats that remain as potential, though lesser threats to recovery, are killer whales (because they are a large source of mortality) and contaminants (because of their potential negative impacts on reproduction).

Table 3.2-5c
Steller Sea Lion Research Funding History, 1992-2005 ($1000s).

Year	NOAA			SSLRI*	ADF&G	NPUM MRC	NFWF	ASLC	UAF	NPFMC	AFDF	PWSSC	Total
	NMFS	OAR	NOS										
1992	750	0	0	0	690	0	0	0	0	0	0	0	1,440
1993	728	0	0	0	712	0	0	0	0	0	0	0	1,440
1994	708	0	0	0	732	0	0	0	0	0	0	0	1,440
1995	708	0	0	0	733	0	0	0	0	0	0	0	1,441
1996	701	0	0	0	740	305	0	0	0	0	0	0	1,746
1997	701	0	0	0	740	322	0	0	0	0	0	0	1,763
1998	720	0	0	0	720	323	1,000	0	0	0	0	0	2,763
1999	590	0	0	0	790	323	750	0	0	0	0	0	2,453
2000	1,950	0	0	0	1,100	800	0	1,000	0	0	0	0	4,850
2001	7,850	6,000	2,000	15,000	2,500	800	0	6,000	1,000	2,000	0	0	43,150
2002	17,650	6,000	2,000	0	2,500	3,500	0	5,000	1,000	2,000	500	0	40,150
2003	5,850	0	0	0	2,000	2,500	0	5,000	1,000	2,000	1,000	0	19,350
2004	4,611	0	0	0	2,000	2,500	0	6,000	1,000	2,000	1,000	1,000	20,111
2005**	5,466	0	0	0	1,908	2,431	0	5,836	1,500	2,000	0	1,000	20,141

NMFS=National Marine Fisheries Service; OAR =Office of Oceanic and Atmospheric Research; NOS=National Ocean Service; SSLRI=Steller Sea Lion Research Initiative; ADF&G=Alaska Department of Fish and Game; NPUMMRC=North Pacific Universities Marine Mammal Research Consortium; ASLC=Alaska SeaLife Center; UAF=University of Alaska – Fairbanks; NPFMC=North Pacific Fisheries Management Council; PWSSC=Prince William Sound Science Center; NFWF=National Fish and Wildlife Foundation; AFDF=Alaska Fisheries Development Foundation.

* Appropriated funds for the Steller Sea Lion Research Initiative (SSLRI) were provided to NMFS but allocated to a variety of state agencies, universities, and non-governmental organizations.

** Prior to 2005, separate line items were provided to NMFS, ADF&G, NPUMMRC, and the ASLC for SSL, harbor seal, and fur seal research. Funding in 2005 for these organizations covers all Alaska pinnipeds; only a portion of the total for each organization would be allocated to SSL.

Table 3.2-5d
Congressionally-Funded Steller Sea Lion Research Institutions and the Decline Hypotheses They Address.

Hypothesis	Research Institution					
	NOAA	ADFG	ASLC	NPUMMRC	UAF	PWSSC
Environmental Change	●			●	●	
Indirect Fisheries Effects	●				●	●
Direct Human-Related	●	●				
Predation	●		●	●	●	
Disease	●	●	●	●		
Contaminants	●	●	●			
SSL Vital Rates	●	●				
SSL Life History	●	●	●	●	●	
SSL Foraging	●	●	●	●	●	

NOAA = NOAA Fisheries Alaska Fisheries Science Center, NOAA OAR Pacific Marine Environ. Lab, NOAA NOS Coastal Ocean Processes; ADF&G = Alaska Department of Fish and Game; ASLC = Alaska Sea Life Center; NPUMMRC = North Pacific Univ. Marine Mammal Res. Consortium (Univ. of WA, AK, and British Columbia; OR State Univ.); UAF = University of Alaska Fairbanks; PWSSC = Prince William Sound Science Center

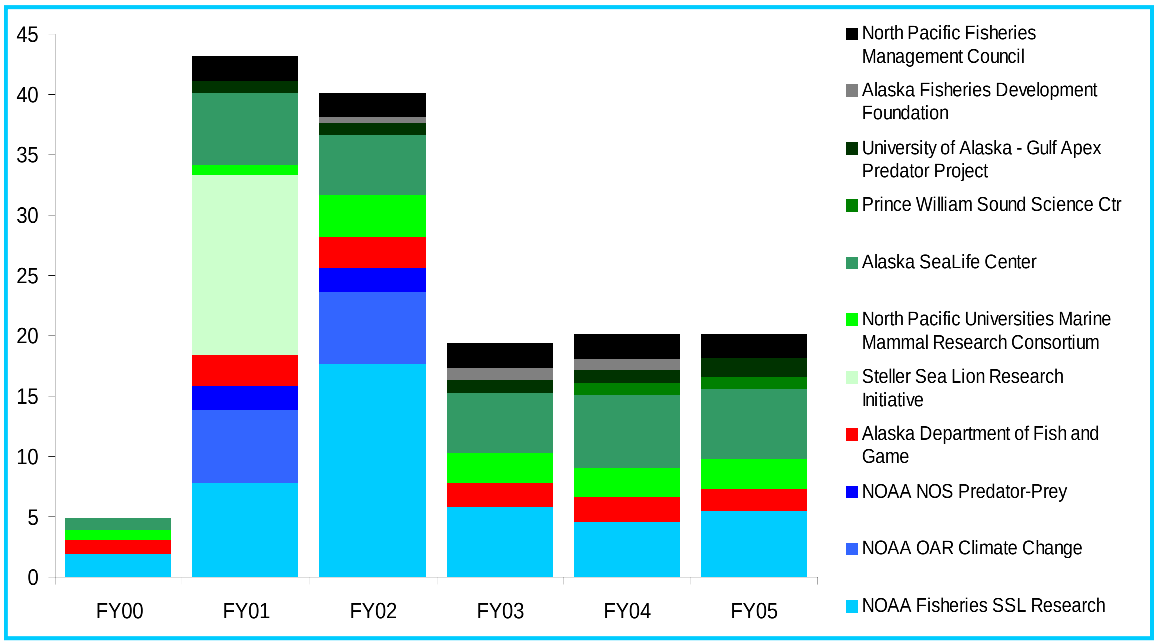

Figure 3.2-5a. Congressional Allocation of Steller Sea Lion Research Funds to Research Entities In 2000-2005.

3.2.1.12 Coordination of Research

As described in Section 3.2.1.11, SSLs have been the subject of intensive scientific research, particularly since the late 1980s. The SSL Recovery Plan of 1992 guided much of this research, during a time during which <$1 million annually was required for population monitoring surveys. During the late 1990s, SSL research activities were intensified as scientific findings, litigation, and new legislation focused increasing attention on the ongoing decline and concern over possible impacts by commercial fisheries in Alaskan waters. Between 2000 and 2001, there was a seven-fold increase in funding, as discussed in Section 3.6, with over 125 individual projects planned or implemented. The appropriation for FY 2002 continued the increased funding trend with federal and non-federal research monies totaling $40.14 million. To put these increased amounts in perspective, the 2001 research funds, $43.15 million, were near ten times what was appropriated for preceding FY 2000 ($4.7 million). Moreover, FY 1992 was the first time that research funding was greater than $1 million.

Admittedly, the amount of funding allocated to NMFS in such a short timeframe brought challenges for the agency in terms of developing a strategy to coordinate the large number of research projects that were quickly underway. Recently raised criticisms regarding coordination of research include duplication of effort and unnecessary disturbance of animals, as well as incompatibility of data collected. In order to come up with a mechanism to promote cooperation among research entities that received federal funding, NMFS developed a research coordination framework, as outlined in Ferrero and Fritz (2002), to clarify the context of individual research projects, to show their relationships to each other, and to link them to the underlying hypotheses that might explain the continued decline of SSLs. All SSL research activities have been catalogued using the research coordination framework and can be searched from the SSL Coordinated Research Program website, located at www.afsc.noaa.gov/stellers/coordinatedresearch.htm. Since 2000, all permittees are required to notify the Regional Administrator of NMFS of intended field sites/dates, coordinate with other researchers, and to work with the SSL Research Initiative Research Coordinator to develop a research coordination and monitoring plan. Information listed for each project includes the specific questions that relate factors to the decline of SSLs, funding source, principal investigator information, institution where research is being conducted, geographic location of the research, project type, expected date of completion, keywords to describe the project, list of related projects, project description, and project reports.

To manage a population it is important to understand the population's basic ecology as well as external pressures that may be affecting population dynamics. For example, threatened or endangered species often have the added pressure from potentially harmful research activities. In order to minimize and mitigate potential research-related impacts, considering the increased interest and funding of SSL research as described previously, NMFS and SSL researchers have conducted meetings, workshops, and symposia since 2000 that focus on research coordination, collaboration, and communication (Table 3.2.6). More recently, these conferences have been held specifically for, or have included, NFS research, despite there being fewer researchers involved. These SSL and NFS research conferences provide a forum to exchange information and facilitate discussions necessary to improve management techniques and/or species recovery plans and to help avoid duplication of data collection on similar research projects that may have adverse impacts to SSL and NFS populations. In general, the information and discussions presented at these conferences include project collaboration and distribution of research priorities, data collection and analysis methods, research results and potential areas of difficulties, and long-term management and future research needs.

Until 2002, these meetings were principally between NMML and ADF&G, with other investigators working as permit co-investigators. As other institutions increased their study efforts and obtained independent permits, the coordination group grew to include the ASLC, the University of British Columbia/NPUMMRC, UAF, the Aleutians East Borough (AEB), and OSU. At the most recent coordination meeting in January 2007, a coordination matrix was developed to aid in coordination of timing and location of research activities. The coordination matrix included fields for region, site, longitude/latitude, start/end date, activity, and contact information. The matrix was then sorted to identify potential areas of overlap/overuse to alert researchers where further coordination is warranted. Investigators plan to continue to utilize this matrix for future research, as well as eventually link field activities to the Draft Recovery Plan research recommendations.

3.2.1.13 Co-Management Agreements

There are SSL co-management agreements in place for the Aleut communities of St. Paul and St. George. These agreements are between each community and NMFS.

St. Paul Island Co-Management Agreement

Since 2000, NMFS and The Aleut (Unangan) Community of St. Paul Island, Alaska, have worked together under the terms of a co-management agreement addressing both SSLs and NFSs. The agreement area encompasses St. Paul Island and associated interaction areas, which include Walrus and Otter islands and Sea Lion Rock.

The agreement has the following purposes:

- Promoting the conservation and preservation of NFSs and SSLs;
- Utilizing traditional knowledge, wisdom and values, and conventional science in research, observation, and monitoring efforts to establish the best possible management actions for the protection and conservation of NFSs and SSLs;
- Establishing a process of shared local responsibilities regarding the management and research of fur seals and sea lions on behalf of the citizens of the U.S.;
- Identifying and resolving through a consultative process any management conflicts that may arise in association with NFSs and SSLs; and
- Providing information to hunters and the affected community, as a means of increasing the understanding of the sustainable use, management, and conservation of NFSs and SSLs.

In order to achieve these purposes, the co-management agreement provides for:

- Cooperation between members of the Tribal Government of St. Paul (TGSNP) and NMFS in the conservation and management of NFSs and SSLs for the year 2000 and thereafter; and
- The establishment of a St. Paul Island Co-Management Council.

Table 3.2-6
Summary of Research Workshops

1	5-7 December 1997	**Steller Sea Lion Research Peer Review: Behavior/Rookery Studies**: This two-day workshop consisted of members of the Recovery Team plus other scientists familiar with behavioral, conservation, and/or ecology research on other marine mammal species. Scientists currently or recently involved in SSL investigations presented their data and research results.
2	8-10 December 1997	**Steller Sea Lion Research Peer Review: Telemetry Workshop:** This two-day workshop consisted of three members of the Recovery Team plus four other scientists familiar with telemetry research on other marine mammal species. Scientists currently or recently involved in SSL investigations presented their data and research results.
3	8-10 February 1999	**Steller Sea Lion Research Peer Review: Physiology Workshop:** This two-day workshop consisted of one member of the Recovery Team plus six other scientists familiar with physiological research on other marine mammal species. Scientists currently or recently involved in SSL investigations presented their data and research results.
4	11-12 February 1999	**Steller Sea Lion Research Peer Review: Feeding Ecology Workshop:** This two-day workshop was attended by representatives of several agencies and research entities. The focus of this workshop was the feeding ecology of SSLs. Scientists involved with SSL investigations presented their research and recommended directions their programs should take in the future.
5	26-30 April 1999	**Steller Sea Lion Research Peer Review: Implantable Telemetry Devices Workshop:** This five-day workshop consisted of SSL researchers and other scientists familiar with implantable telemetry devices. Three separate workgroups also met after the plenary session: 1) Workgroup on Biological Research Needs, 2) Veterinary Workgroup on Implantation Procedures, and 3) Workgroup on Electronics and Instrumentation Engineering.
6	8 December 2000	**NMML and ADF&G Coordination Meeting:** NMML and ADF&G discussed research techniques, coordination, and collaboration for the 2001 field season. Topics discussed included captures, diet/food habits, branding, and health/physiology.
7	24-25 January 2001	**Steller Sea Lion Research Planning Meeting:** This two-day meeting was attended by several government agencies and non-governmental organizations (NGOs) with the stated purpose “to communicate, cooperate and coordinate efforts to spend the sea lion funds in the most productive ways possible.” Participants included NMFS, NOAA’s OAR, NOS, ADF&G, ASLC, UAF, NPFMC and NPUMMRC.
8	24-25 January 2001	**Overview of Funding History, FY00 Activities, and FY01 Funding Allocations:** This document reports the different SSL research funding allocations up to FY01.
9*	May 2001	**Steller Sea Lion Decline: Is it the Food II:** Attended by 24 SSL scientists. This two-day workshop provided an opportunity for researchers to present data and discuss factors that might be related to the decline of SSL populations.
10	24-25 July 2001	**Steller Sea Lion Research Coordination Workshop:** Two-day meeting focused on “assembly of a draft framework to organize the various research projects by topic as a tool for identifying associations and lines of communications.” Participants included NMFS, ADF&G, OAR, NPFMC and NPUMMRC.
11	4-5 December 2001	**NMML and ADF&G Coordination Meeting:** ADF&G and NMML met to coordinate their research programs for the 2002 field season and discuss partitioning research efforts. Field trips for each program were described and an agreement was made that NMML would take the lead on further satellite telemetry work while the ADF&G program would focus on physiological work.
12	December 2001	**Steller Sea Lion Branding Review, 2001:** The purpose of this meeting was to present and discuss the results of SSL branding from summer 2001. The meeting was attended by NMML, ADF&G, Oregon Fish and Game, and U.S. Fish and Wildlife Service (USFWS).
13	19-21 March 2002	**Steller Sea Lion Principal Investigators Orientation and Coordination Meeting:** This meeting was sponsored by NMFS and FASC and featured research presentations by virtually all of the NMFS-funded SSL researchers as well as researchers funded by SSLRI and the Cooperative Institute for Arctic Research.

Table 3.2-6
Summary of Research Workshops

14	June 2002	**Steller Sea Lion Research and Coordination: A Brief History and Summary of Recent Progress:** This NOAA Technical Memo summarizes 20 years of SSL research from 1982 through 2002 and describes the development of a comprehensive and coordinated research program. This research plan was developed by NMFS in cooperation with other entities that receive SSL research funding. The purpose of the research plan is to "clarify the context of individual research projects, to show their relationships to each other and to link them to the underlying hypotheses which might explain the continued decline of SSLs."
15	24-25 September 2002	**Steller Sea Lion Bioenergetic Modeling Workshop:** This workshop was for investigators modeling SSL foraging, bioenergetics and population dynamics. The goals of the workshop were to (1) review the range of bioenergetics and foraging behavior models that could be applied to SSLs, (2) examine the extent to which these models are being researched to address important management issues for SSLs, (3) discuss current research, particularly research sponsored by NMFS, and report progress and potential areas of difficulties, and (4) encourage the development of synergistic links between different research groups researching bioenergetics and foraging behavior models in SSLs.
16	12 December 2002	**NMML and ADF&G Coordination Meeting:** ADF&G and NMML met to coordinate their research programs for the 2003 field season and to discuss ongoing research and data needs. Field trips for the ADF&G program were described and discussed.
17	January 2003	**Marine Science in the Northeast Pacific:** This symposium provided an opportunity for SSL researches to collaborate, coordinate, and discuss SSL research projects.
18	5-7 March 2003	**Brand Resight Workshop:** This three-day workshop was attended by 20 SSL researchers representing eight agencies and institutions: ADF&G, NMFS/NMML, OSU, UAF, ASLC, USFWS-MMM, The Alaska Sea Otter and Steller Sea Lion Commission, Natural Resources Consultants, Inc./Kamachatka Branch of the Pacific Institute of Geography and Russian Academy of Sciences. The purpose of this meeting was to bring together all of the scientists conducting brand resight work on SSLs in order to design a common data collection method, ensure consistency in collection methods, and share data and research resources.
19	7 April 2003	**FY2003 AFSC SSL Research Project Descriptions – Version 2:** This document provides descriptions and budgets for SSL-related research activities undertaken FY2003.
20	14-16 February 2004	**NMML/AKRPRD Coordination Meeting:** The purpose of this three-day meeting between NMML and AKRPRD was to initiate regular and ongoing dialogue between the AKRPRD and NMML and to serve as a venue to discuss management, research, and coordination needs for SSLs and NFSs.
21	9 November 2004	**Northern Fur Seal Research Meeting:** Nine scientists representing ASLC, NMFS and UBC held a meeting to coordinate research activities related to the Pribilof and Bogoslof NFS populations and to ensure that management needs were addressed as best as possible by the groups with the most appropriate skills and resources.
22	7 February 2005	**Steller Seal Lion Field Work Coordination Meeting:** The Alaska Ecosystems Program at NMML invited scientists from the ASLC, NPMMRC and ADF&G to participate in a joint meeting to share plans for the upcoming field season, and to coordinate work and data or sample collection. Field trips for the upcoming field season were described and discussed.
23	14-16 February 2005	**NMML/AKRPR Coordination Meeting:** This three-day meeting between NMML and AKRPRD focused on management questions, research activities, and coordination needs. Specific coordination topics that were discussed included improving coordination between groups, identifying topics that will require special attention or coordination and improving efficiency and reducing duplication of efforts by identifying research activities that could be coordinated between groups.
24	6-9 September 2005	**Northern Fur Seal Population Assessment and Vital Rates Workshop:** This workshop, held at NMML, was attended by scientists from North America, Australia, and Scotland. The objective of the workshop was to gather the best available information from the scientific community on temporary and permanent marking of fur seals. The participants also discussed study designs and statistical methods for collecting demographic data.
25	4 December 2005	**Steller Sea Lion Field Work Coordination Meeting:** This joint meeting was attended by representatives from NMFS, ADF&G, ASLC and NPMMRC. The objective of this meeting was for participants to describe SSL research activities for the upcoming SSL field season, to coordinate projects, and to organize sample and data collection.

Table 3.2-6 (continued)
Summary of Research Workshops

26	6-7 February 2006	**AKRPRD/AFSC Protected Resources Coordination Meeting:** This two-day meeting between NMML and AKRPRD included discussions on SSL and NFS long-term management, co-management issues, population monitoring, recovery plan updates, research needs, and research coordination.
27	8-10 February 2006	**Steller Sea Lion Branding Methods/Results Workshop:** This three-day workshop included SSL researches permitted to conduct branding or brand resighting of SSLs. The workshop focused on the current methods of brand resighting being employed by different programs to examine the results of the previous five-six years of branding and brand resighting. The workshop also included discussions, plans and intentions for future branding and brand resighting projects, and an opportunity for researches to present and discuss the results from their research. Scientists from NMML, ADF&G, ASLC, Oregon Department of Fish and Wildlife (ODF&W) and private contractors participated.
28	January 2007	**Steller Sea Lion Coordination Meeting:** SSL researchers met to coordinate their research programs for the 2007 field season and to discuss ongoing research and data needs. New for this meeting was a request for investigators to submit field plan details to NMML in advance of meeting to better show coordination and mitigate areas of potential increased disturbance, as well as development of a coordination matrix.
Source: Complied by NMML 2007		

The TGSNP and NMFS will plan and develop together to conserve and provide for stewardship of SSLs and NFSs. TGSNP and NMFS will cooperatively implement the following:

- Management Plans;
- Monitoring Programs;
- Research Programs;
- Disentanglement Program;
- Local Opportunities for Scientific Research Projects;
- Maintenance of Fur Seal Rookeries;
- Co-Managing the Harvest; and
- Providing Education and Information.

The end result of the co-management agreement is an equitable working relationship that fosters broad-based support while maintaining stewardship of SSLs and NFSs. On St. Paul Island, the co-management agreement is administered by the Tribal Government's Ecosystem Conservation Office, which has implemented a real-time harvest monitoring method to increase accuracy of reporting. For further details, please see the Co-Management Agreement between NMFS and The Aleut Community of St. Paul Island (NMFS 2001d) and Appendix F.

St. George Island Co-Management Agreement

In 2001 the Community of St. George Island, Alaska and NMFS established an agreement that is essentially the same as the St. Paul agreement. However, there is an additional purpose that reads as follows:

> Establishing a process of shared responsibility for the use, management, operation, and upkeep of the structure locally known as the old sealing plant.

St. George Island has also implemented a real-time harvest monitoring method to increase accuracy of reporting. For further details, please see Co-Management Agreement between NMFS and The Aleut Community of St. George Island (NMFS 2006a) and Appendix F.

3.2.1.14 1992 Recovery Plan

Generally, recovery plans delineate reasonable actions that are believed to be required to recover and/or protect the species. The 1992 SSL Recovery Plan was prepared by an interagency SSL Recovery Team and approved by NMFS. The Recovery Plan establishes the overall goal of SSL population recovery as well as objectives for identifying and mitigating factors that are limiting the population. Pursuant to satisfying these goals and objectives, research and management priorities revolved around several issues following issues: reducing human-caused mortality to the lowest level practicable, protection of important habitats through buffer zones, and enhancement of population productivity by ensuring sufficient food supply. Please see the executive summary of the 1992 SSL Recovery Plan, as well as the document itself, for further details.

3.2.1.15 Draft 2006 Recovery Plan

The 1992 Recovery Plan became outdated in 1997 after the population was split into two distinct population segments that had different population trends. NMFS assembled a new recovery team in 2001 to revise the 1992 Recovery Plan. The 17 team members represented state and federal agencies, the fishing industry, Alaska Natives, fishery and marine mammal scientists, and environmental organizations. The 2006 draft revised Recovery Plan (NMFS 2006a) was released in 2006 for public review and comments. NMFS is currently incorporating those comments and expects to release a final revised Recovery Plan in the fall of 2007. Although there may be substantial differences between the draft and final revised Recovery Plans, this PEIS along with current research permits and research permit applications currently under consideration are all based on the conservation objectives and research priorities as described in the 1992 Recovery Plan and the draft revised Recovery Plan. The draft revised Recovery Plan contains 1) a comprehensive review of SSL status and ecology, 2) a review of previous conservation actions, 3) a threats assessment, 4) biological and recovery criteria for downlisting and delisting, 4) actions necessary for the recovery of the species, and 5) estimates of time and cost to recovery.

The SSL Plan identifies 78 substantive actions needed to achieve recovery of the western DPS but highlights three actions that are especially important:

- Maintain current fishery conservation measures;
- Design and implement an adaptive management program to evaluate fishery conservation measures; and
- Continue population monitoring and research on the key threats potentially impeding sea lion recovery.

Priorities are assigned to each action in the implementation schedule. In compliance with NMFS' Endangered and Threatened Species Listing and Recovery Priority Guidelines (55 FR 24296), all recovery actions will have assigned priorities based on three categories. All recovery actions were prioritized into these three categories in the SSL Plan Implementation Schedule (NMFS 2006a), pp 157) according to joint NMFS and USFWS Interim Recovery Planning Guidance Section 5.1.10. Priority 1 actions are, by definition those actions "that must be taken to prevent extinction or to prevent the species from declining irreversibly in the foreseeable future." Priority 2 actions are defined as "an action that must be taken to prevent a significant decline in species population/habitat quality or some other significant impact short of extinction." Priority 3 actions are defined as "all other actions necessary to provide for full recovery of the species." Only the following two recovery actions received the Priority 1 designation in the SSL Plan:

> 1) Estimate abundance trends for pups and non-pups via aerial surveys. Conduct surveys biennially at trend sites, and at least every four years at all rookeries and haulouts in the western DPS using aerial survey techniques with medium-format photogrammetry, which allows for counting pups as well as non-pups. Information from trend sites forms the basis of the stock assessment reports.
>
> 2) Design and implement an adaptive management program for fisheries, climate change, and predation. The mechanisms by which different threats affect SSLs can be similar, as are the responses that SSLs exhibit to these different threats. This represents a fundamental difficulty in identifying which threats are impeding recovery and which mitigation measures would be effective. Due to the uncertainty in how fisheries affect SSLs and their habitat, and the difficulty in extrapolating from individual scientific experiments, a properly designed adaptive management program should be implemented. This type of program has the potential to assess the relative impact of commercial fisheries and to better distinguish the impacts of other threats (including killer whale predation). This program will require a robust experimental design with replication at the proper temporal and spatial scales with the appropriate levels of commercial fishing as experimental treatments. It will be a challenge to construct an adaptive management plan that meets the requirements of the ESA, is statistically sufficient, and can be implemented by the commercial fisheries. Acknowledging these hurdles, we must make a significant effort to determine the feasibility of such a program.

Regarding the eastern DPS, the 2006 Draft Recovery Plan cites the long-term increasing population trend and lack of significant threats in recommending the initiation of a status review to consider removing the eastern DPS from the ESA List of Threatened and Endangered Wildlife. If a status review determines that delisting the eastern DPS is warranted, the 2006 Draft Recovery Plan recommends that the primary recovery imperative is to develop a post-delisting monitoring plan to ensure re-listing is not necessary after removal. Key components of this plan relative to research activities have not been prioritized in the 2006 Draft Recovery Plan but would likely include population-trend monitoring, genetics research to refine population structure, monitoring terrestrial habitat threats, monitoring for unusual mortality events that may be related to contaminants or other human factors, and monitoring fishery management plans to ensure that they stay consistent with SSL requirements.

3.2.1.16 Current Research Priorities

The 2006 SSL Draft Recovery Plan is the primary document that establishes current research priorities concerning both DPSs of SSL. It arrives at these priorities by assessing the relative importance of the various factors or threats that have contributed to the decline and lack of recovery for the western DPS and the growth of the eastern DPS despite potentially adverse anthropogenic and natural effects. However, there was disagreement among the Recovery Team members about this assessment based on competing hypotheses regarding the western DPS population decline. The threat assessment therefore ranked three factors as having “potentially high” impacts: predation by killer whales, environmental variability, and competition with fisheries. Two threats were ranked as having “medium” impacts: toxic substances and incidental take by fisheries. Other factors were ranked as having “low” impacts: Alaska Native subsistence harvest, illegal shooting, entanglement in marine debris, disease and parasitism, disturbance from vessel traffic and tourism, and disturbance from research.

Individual researchers and institutions will likely continue to disagree about the relative importance of various threats and will pursue research opportunities accordingly. However, funding for research support is often highly competitive and, as required by NMFS permit issuance criteria, is based on the potential contribution of the research to conservation goals as defined by the 2006 Draft Recovery Plan. Research on SSL will therefore focus on the mechanisms by which various factors affect SSL population growth and how the negative impacts can be mitigated in order to facilitate recovery. Besides studies on individual threats, the dynamic interactions between threats need to be studied in order to assess potential cumulative effects. High expectations for meaningful progress toward identification of key factors for the recovery of SSLs should be tempered by two realities.

First, most efforts involve multi-year studies, ranging from two to ten years, that are not likely to yield conclusive results regarding the underlying constraints on SSL recovery in the short-term. A realistic expectation is for new information to coalesce over time and to provide the basis for more refined or targeted questions centered on those aspects that have shown particular promise. Likewise, progress will be evident as the new information points out the factors less likely to play important roles, and therefore are de-emphasized in future work. The underlying assumption for the entire research effort; however, is that sufficient funding levels persist long enough for the ongoing suite of studies to produce meaningful results, and to allow those results to form the basis for more refined investigations.

Second, our understanding of ecosystem processes is limited and marine science is more likely to produce glimpses of the underlying mechanics rather than an overall picture of its dynamics for many years to come. As such, while the SSL research efforts are very likely to greatly enhance our knowledge base, they should not be expected to either prove causal relationships or produce tools for predicting ecosystem function. Rather, the real value of the new information is to improve the scientific foundations for management decisions, which in turn, must still rely on the application of conservation principles in the face of uncertainty.

3.2.2 Northern Fur Seal

NFSs (*Callhorinus ursinus)* belong to the order of *Carnivora*, suborder *Pinnipedia*, family *Otariidae*, and subfamily *Otariinae*. The family contains seven genera, and the genus *Callhorinus* contains one species, the NFS.

NFSs are sexually dimorphic, meaning that mature males and females look very different. Females weigh about 135 pounds (61 kg) and reach 4.5 feet (1.4 meters [m]) in length while males average about 600 pounds (270 kg) and reach 6 ft (1.8 m) in length (NMML, 2006a). The bodies of NFSs are covered in dense fur consisting of approximately 46,500 hairs per square centimeter. The fur is made up of permanent dense underfur and long guard hairs that are molted each year. This dense fur provides highly efficient insulation from the cold water. The flippers are bare and assist in regulating the animal's body temperature (NMML 2006a).

3.2.2.1 Distribution

NFSs range throughout the North Pacific Ocean from southern California north to the Bering Sea and west to the Okhotsk Sea and Honshu Island, Japan. NFS habitat includes a variety of marine waters and haulouts (resting sites), and a small number of terrestrial rookeries (breeding sites). Rookeries can be found at St. Paul and St. George islands (i.e., collectively the Pribilof Islands), Bogoslof Island in the southern Bering Sea, San Miguel Island in southern California (Reeves *et al.* 1992). Rookeries outside of U.S. waters exist on the Commander Islands in the western Bering Sea, Robben Island in the Sea of Okhotsk, and the Kuril Islands north of Japan (Fiscus 1983). Figure 3.2-6 shows the locations of NFS rookeries and the extent of their winter range. Southeast Farallon Island and San Nicolas Island, California, are known haulout sites; however, NFSs may temporarily haul out on land at other sites in Alaska, British Columbia, and on islets along the coast of the continental U.S. (Angliss and Outlaw 2005; Reeves *et al.* 1992).

Adult males inhabit the rookeries between the months of May and August, and some may stay until November after giving up their territories. Adult females occupy the rookeries from June through November. The following 7 to 8 months will then be spent at sea migrating south. Females and pups originating from the Pribilof Islands tend to migrate to the North Pacific Ocean offshore of Oregon and California. Pups may stay at sea for 22 months before returning to the rookery of their birth. Males commonly migrate only as far as the GOA (NMFS 2005a).

No "critical habitat" has been designated for NFS because they are not listed under the ESA. However, there are several management measures that protect NFS on their rookeries (Section 3.2.2.11). In addition, past and current fishery management measures have affected NFS foraging habitat, including a trawling prohibition around the Pribilof Islands designed to protect crab stocks and the spatial/temporal restructuring of groundfish fisheries to protect SSLs. These fishery management measures are discussed in Section 3.4.

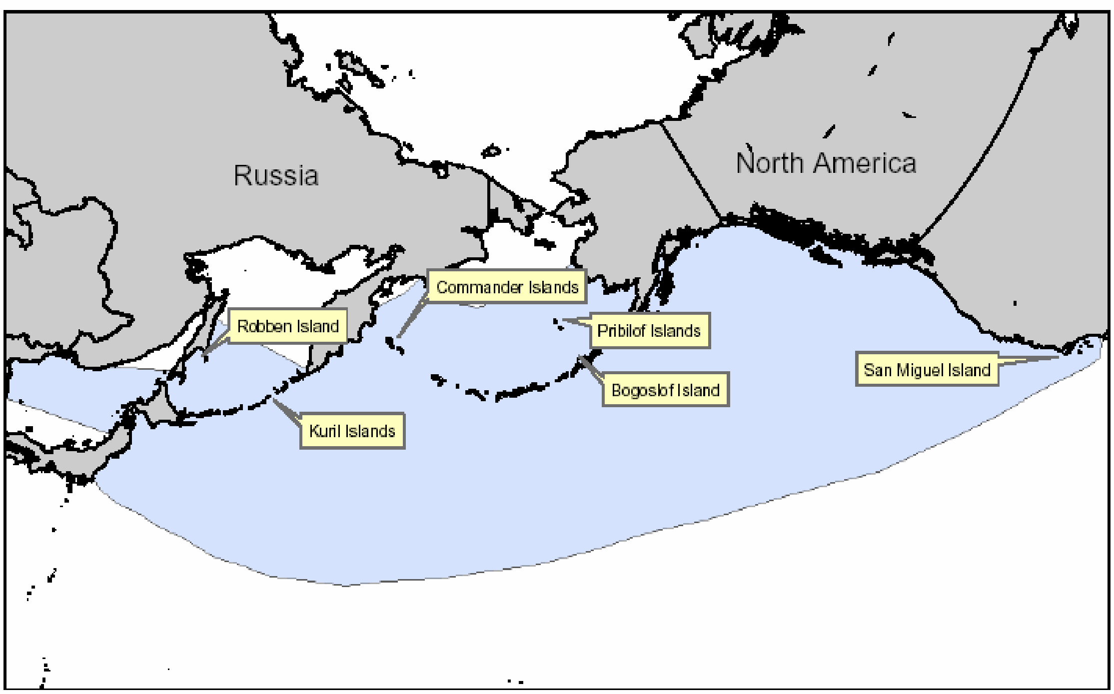

Figure 3.2-6. Northern Fur Seal Breeding Colonies and Extent of Their Winter Range
Source: NMFS 2006 Draft conservation plan for the eastern Pacific stock of northern fur seal

3.2.2.2 Population Status and Trends

Two separate stocks of NFS are recognized and managed within U.S. waters by NMFS: an eastern Pacific stock, which includes all the animals in the Bering Sea and AI, and the GOA; and a San Miguel Island stock off the coast of southern California. No genetic differences are evident between stocks, and they are differentiated solely by geography during the breeding season (NMFS 2006a).

On June 17, 1988, NMFS designated the Pribilof Islands stock (known since 1994 as the eastern Pacific stock) as "depleted" under the MMPA because it declined to less than 50 percent of the levels observed in the late 1950s and, at that time, there was no compelling evidence that carrying capacity had changed substantially since the late 1950s (50 CFR 216.15).

The Pribilof Islands harbor the world's largest breeding grounds for NFSs. Approximately 74 percent of the worldwide population of NFSs can be found on the Pribilof Islands during breeding season. The remainder is spread throughout the North Pacific Ocean. Of the seals in U.S. waters outside of the Pribilof Islands, approximately 3 percent of the population is found on Bogoslof Island in the southern Bering Sea and San Miguel Island in southern California (Angliss and Outlaw 2005).

Eastern Pacific Stock

Until the mid 1970s, NFS population trends could be explained largely by commercial harvest patterns in the North Pacific Ocean. Large population declines coincided with large harvests of female and juvenile NFSs. The NFS population has shown a resiliency to sustained harvests of adult males when females and juveniles were not harvested. The history of pelagic sealing (1875 through 1909), impact on the NFS population, and a subsequent treaty banning pelagic sealing is found in Gentry (1998). At the peak of pelagic sealing (1891 through 1900), more than 42,000 NFSs (mostly lactating females) were taken annually in the Bering Sea (Scheffer *et al.* 1984). Because the takes were greatly reducing the NFS stock, Great Britain (for Canada), Japan, Russia, and the U.S. ratified the Treaty for the Preservation and Protection of Fur Seals and Sea Otters in 1911. With the signing of the treaty, commercial pelagic harvests ended.

The population grew rapidly after the cessation of pelagic sealing until the mid 1940s. There was no commercial harvest from 1912 to 1917. From 1918 to about 1941, the Pribilof Islands NFS stock grew at 8 percent per year under a land-based harvest of males that ranged from 15,862 in 1923 to 95,016 in 1941 (NMML unpublished data). The Alaska population of NFS peaked at approximately two million individuals during the 1950s. In 1957, the signatories of the 1911 Treaty ratified a new agreement. During those negotiations, calculations presented by the U.S. suggested that maximum sustained productivity would occur at lower female population levels than those of the early 1950s. Consistent with that analysis, from 1956 to 1968, approximately 300,000 female fur seals were killed on the Pribilof Islands (York and Hartley 1981). Concurrently, 30,000 to 96,000 juvenile males were harvested each year, and the U.S. and Canada took a pelagic collection of about 16,000 females for research purposes. This harvest of females and juveniles caused a large population decline in the late 1960s.

With the cessation of female and juvenile harvests, the population increased only briefly in the mid 1970s, reaching approximately 1.25 million in 1974 (NMFS 2005a). The population then began a steady decline of 6 to 8 percent per year into the 1980s; the cause for this decline has not been determined. By 1983 the population was estimated to be 877,000 seals (Angliss *et al.* 2001). Annual pup production on St. Paul Island remained relatively stable between 1981 and 1996 and then began to decline. Between 1998 and 2002, pup counts on St. Paul declined 5 percent per year while those on St. George declined 5.3 percent annually. In 2004 pup production on St. Paul fell 22.6 percent from 2000 levels while those on St. George were 6.4 percent less than 2000 levels. St. Paul Island and St. George Island pup counts are now below the 1921 and 1916 population levels, respectively (Angliss and Outlaw 2007).

Figures 3.2-7 and 3.2-8 illustrate population levels on St. Paul and St. George islands between 1974 and 2004. The current population estimate for the eastern Pacific stock, based on the 2004 and 2005 pup counts, is 721,935 animals (Angliss and Outlaw 2007). This estimate includes the first pup counts on Bogoslof Island in more than five years.

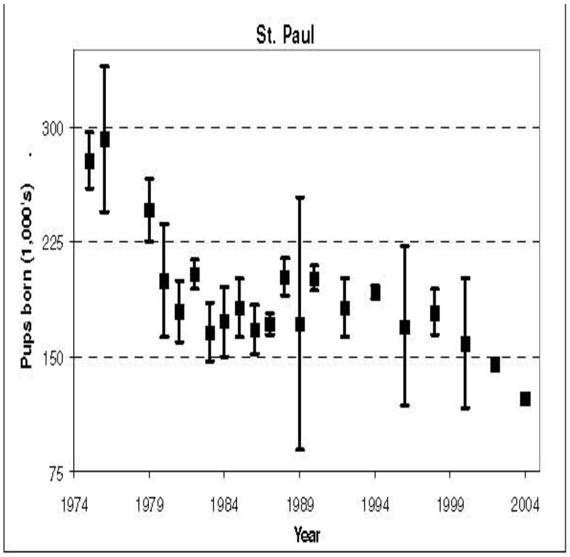

Figure 3.2-7 Estimated Number of Northern Fur Seal Born on St. Paul Island, 1975-2004.

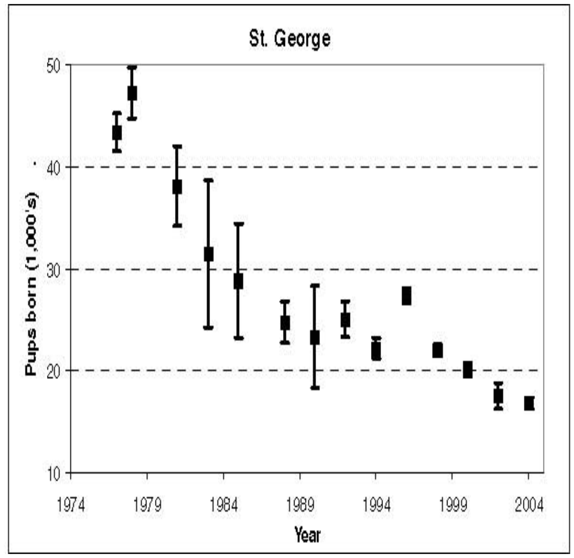

Figure 3.2-8 Estimated Number of Northern Fur Seal Pups Born on St. George Island, 1977-2004.

Source: Angliss and Outlaw 2007

San Miguel Stock

The San Miguel Island stock was discovered in 1968 and likely originated from the Pribilof Islands and Russian populations during the late 1950s or early 1960s (Melin *et al.* unpublished; Carretta *et al.* 2007). The population of this stock has experienced steady population increases, with the exception of severe declines associated with El Niño Southern Oscillation events in 1982-1983 and 1997-1998. Between 1972 and 1982 live pup births increased 24 percent annually. Female NFS immigration from the Bering Sea and the western North Pacific Ocean is believed to account for much of the population increase during these years. The 1982-1983 El Niño event resulted in a 60.3 percent decline in the NFS population. Recovery from this decline took seven years because adult female mortality occurred in addition to pup mortality.

The most severe El Niño event in recorded history affected California coastal waters during the 1997-1998 season. A record high population count was recorded in 1997 totaling 3,068 pups. Researchers estimated that approximately 87 percent of the pups born in 1997 died before weaning. The following year only 627 live pups were counted, demonstrating a 79.6 percent decline between 1997 and 1998. The population began to recover by 1999 and by 2005 that pup count was 2,356 (Carretta *et al.* 2007). The most recent population estimate for the San Miguel stock is 9,424 animals. Recovery has been slow from the 1998 decline because of high female NFS mortality that year as well (Carretta *et al.* 2007). Figure 3.2-9 illustrates the San Miguel stock population trends between 1972 and 2005.

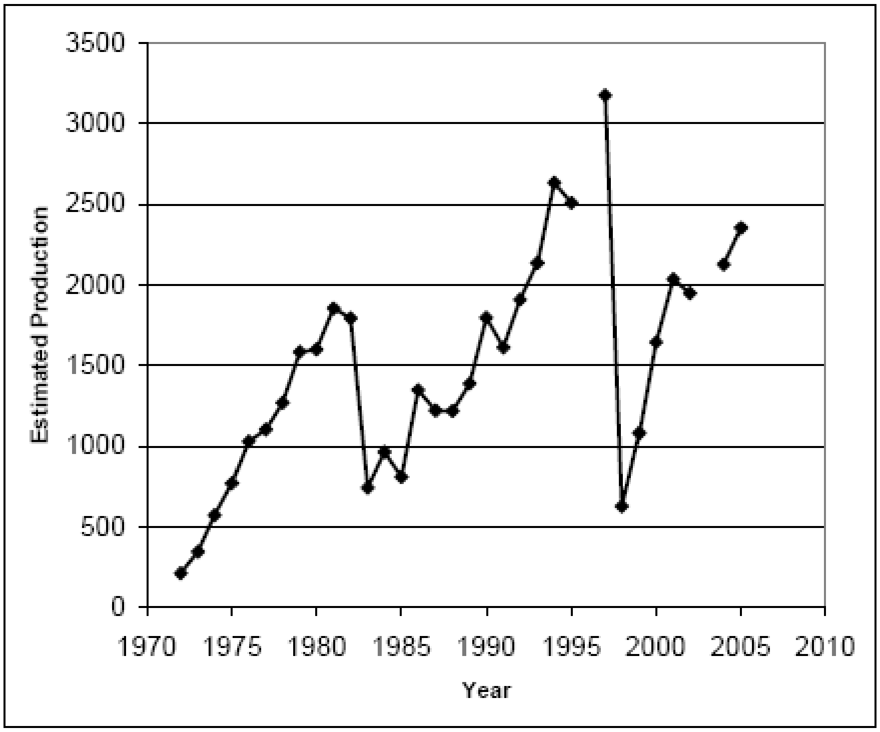

Figure 3.2-9 NFS Live Pup Counts on San Miguel Island, California, Between 1972 and 2005.
Source: Carretta *et al.* 2007

3.2.2.3 Reproduction and Growth

NFSs have a highly polygynous mating system, breeding in dense colonies on islands located near highly productive marine areas (Gentry 1998). Adult male fur seals arrive at rookeries in May and June to establish territories within the rookery. Females and juvenile males arrive on the rookeries in late June through August, with arrival times occurring progressively earlier as seals increase in age (Bigg 1986). NFSs exhibit strong site fidelity, returning to the rookeries where they were born (Baker *et al.* 1995; Gentry 1998). NFS females give birth within a few days of their arrival, begin nursing their single pup, and mate within four to seven days after parturition (Bartholomew and Hoel 1953). NFS females undergo a period of delayed implantation characteristic of all pinnipeds (Boyd 1993); the embryo does not implant in the uterus and begin to develop until late November (York and Scheffer 1997).

Starting approximately seven to eight days after giving birth and lasting through October, lactating females begin a series of foraging trips to sea alternating with one to two days on land to nurse their pups (Gentry *et al.* 1986). Pups are weaned in October and November, at about 125 days of age, and go to sea soon afterward (Gentry and Kooyman 1986). The natural mortality rate for NFSs in the first year of life is almost 50 percent. For ages two to three years, the mortality rate decreases to 10 to 20 percent; for mature females mortality is 10 to 11 percent; and for adult males mortality is 32 to 38 percent (Reeves *et al.* 1992).

Most females, pups, and juveniles leave the Bering Sea by late November and are pelagic in the North Pacific Ocean during the late fall and winter, migrating south as far as southern California in the eastern North Pacific and Japan in the western North Pacific, until they begin returning to the rookeries in March (Bartholomew and Hoel 1953). In 1989 and 1990, radio-tagged pups departed St. Paul Island in mid-November and entered the North Pacific Ocean through the AI from Samalga Pass to Unimak Pass an average of 10 to 11 days later (Ragen *et al.* 1995). Of four NFS pups tracked by satellite during 1996, two pups left the Bering Sea after 10 and 13 days, while two other pups traveled northwest of St. Paul Island and remained in the Bering Sea for 50 and 68 days until late January (NMFS 2004a). Adult males appear to migrate only as far south as the GOA and Kuril Islands (Kajimura and Fowler 1984; Loughlin *et al.* 1999). Adult females and pups from the Pribilof Islands migrate through the Aleutians into the North Pacific Ocean (Ream *et al.* 2005).

3.2.2.4 Prey and Foraging Behavior

NFSs feed primarily on schooling fish and gonatid squid. The specific type of prey consumed varies with location and season. Kajimura and Fowler (1984) suggested that NFSs in the eastern Pacific are opportunistic feeders, preying on the most abundant species throughout their range. However, Sinclair *et al.* (1994) concluded that fur seals in the eastern Bering Sea (EBS) were size-selective, mid-water feeders. Information concerning their diet has been gathered from stomach content analyses of females and juveniles; fecal analyses; stable isotope analyses; and fatty signature analyses. Studies suggest there are limits on the results from fecal/scat analyses when estimating the species and size of pinniped prey (NMFS 2005a).

<u>Prey</u>

Eastern Pacific Stock, Bering Sea

During the first half of the 20th century, walleye pollock (*Theragra chalcogramma*), squid (Gonidae and Onychoteuthidae), and bathylagid fish (possibly northern smooth-tongue *Leuroglossus schmidti*, or “seal-fish”) were the predominant prey of NFSs in the Bering Sea. Between 1958 and 1974, juvenile pollock (35 percent), squid (30 percent), capelin (*Mallotus villosus*; 16 percent), and Pacific herring (*Clupea pallasi*; 11 percent) were found in female NFS stomachs. Between July and September pollock is a particularly important prey species occurring around the Pribilof Islands and other inshore areas, and between June and October near Unimak Pass, capelin is the main prey consumed by NFSs. Pelagic studies in the EBS revealed that NFSs consumed mostly juvenile pollock from the age-zero group (65 percent) or from the age-one group (31 percent), while only 4 percent were from the age-two group and older (NMFS 2005a).

Adult pollock were most frequently found in the stomachs of NFSs from along the outer domain of the continental shelf, while juvenile pollock were found in the stomachs of NFSs collected both over the midshelf and outer domain. Atka mackerel (*Pleurogrannus monopterygius*) was found only in seals collected over the outer shelf domain north of Unimak Island. Northern smooth-tongue and gonatid squid were the dominant species found in stomach samples collected over continental slope and oceanic waters.

Scat analysis on the Pribilof Islands disclosed that juvenile pollock was the predominant prey of NFSs from 1987 to 1990. Squid occurred more frequently in the diet of NFSs from St. George Island than from St. Paul Island. In a fatty acid signature analysis on milk from lactating females in 1995 through 1996, pollock was the principal prey consumed by NFSs. Recent research of mesopelagic nekton in the slope and oceanic waters of the southeastern Bering Sea revealed that bathylagids were the dominant group throughout the water column and that nearly half of the total catch weight values were comprised of northern smooth-tongue (NMFS 2005a).

Eastern Pacific Stock, Gulf of Alaska

The dominant prey for NFSs in the GOA are Pacific herring, Pacific sand lance (*Ammodytes hexapterus*), and capelin. From 1958 to 1968 the principal prey in the GOA included Pacific herring, capelin, salmon (*Oncorhynchus spp.*), pollock, Pacific sand lance (*Ammodytes hexapterus*), rockfish (*Sebastes spp.*), Atka mackerel, and squid. Historical evidence collected during the first half of the 20th century identified squid and rockfishes as NFS prey in the GOA although sample sizes were small (NMFS 2005a).

Pacific Ocean

Northern anchovy (*Engraulis mordax*) and Pacific whiting (*Merluccius productus*) were the primary prey in the diets of NFSs in Californian waters. Pacific herring, rockfishes, northern anchovy, and squid were prominent in NFS stomachs off Washington. Off British Columbia, Pacific herring, market squid (*Loligo opalescens*), onychoteuthid squids, and salmonids were important (Angliss and Outlaw 2005; Carretta *et al.* 2005).

Between 1958 and 1972, NFSs collected in continental shelf waters off the California and Washington coast fed primarily on fishes and those collected beyond the shelf fed primarily on squids. Adult female NFSs breeding on San Miguel Island fed on Pacific whiting, northern anchovy, juvenile rockfish, and several squid species in the oceanic zone northwest of the island.

Foraging Behavior

Fourteen adult male NFSs captured on St. Paul and St. George islands in 1991 and 1992 were fitted with satellite-linked time-depth recorders (Loughlin *et al.* 1999). The NFSs remained in the Bering Sea for an average of approximately 30 days after tag attachment. While in the Bering Sea, the male NFSs foraged in areas associated with the outer domain of the continental slope and northwest of the Pribilof Islands on the continental shelf in water ranging from 100 to 250 m in depth. Relatively little time was spent foraging in deep water (greater than 1,000 m) or shallow water (less than 100 m). Eventually the male NFSs left the Bering Sea and entered the North Pacific Ocean through AI passes and fed either in the eastern Pacific Ocean and GOA or to the west off the Kuril Islands and the coast of Japan. Most dives were shallow; 68 percent were between 4 and 50 m; 14 percent were between 51 and 100 m, and 17 percent were between 101 and 350 m (Loughlin *et al.* 1999). Only 2.5 percent of all dives were greater than 250 m and no dives were deeper than 350 m. Duration of dives was usually less than six minutes (90 percent), 43 percent were one minute or less, and less than 1 percent of the dives were over 11 minutes.

Thirty-one juvenile male NFSs tagged on the Pribilof Islands had trip durations ranging from 8.7 to 28.8 days, with trip distances from 171 to 681 km (Sterling and Ream 2004). Diving tended to reflect patterns associated with different bathymetric domains: shallow nighttime diving was common in water approximately 3,000 m deep, whereas deeper diving was generally observed in waters less than 200 m deep. The important results of this study were that juvenile males can extend their foraging area further than nursing females (NMFS 2006b).

Two diving patterns were described for female NFSs from St. Paul during the breeding season: (1) deep-diving that occurred at all hours of the day over the continental shelf in water less than 200 m deep, and (2) shallow-diving that occurred primarily at night over deep water (Goebel *et al.* 1991). Gentry (1998) described 13 diving patterns based on the timing and number of depth reversals within a given dive, but questioned whether or not this number was an artifact of scoring dive reversals. Shallow divers foraged more frequently at night and made more dives per foraging trip than deep divers. The primary prey of fur seals in deep water beyond the continental shelf (gonatid squid, deep-sea smelt) migrate up to the top of the water column at night and to deeper waters during the day, which would allow NFSs to efficiently capture prey with shallow, nighttime dives. Costa and Gentry (1986) reported that shallow-diving female NFSs had higher food and energy consumption than deep-diving seals. Deep-diving seals obtained a smaller mass of food but gained similar body mass during a feeding trip, suggesting that their prey is of higher energy content than that of shallow divers. Goebel *et al.* (1991) further reported that deep divers expended less energy than shallow divers and apparently obtained greater energy per dive. The female NFSs tracked by Goebel *et al.* (1991) fed as far as 160 km to the northwest, southwest, and south of St. Paul Island. At San Miguel Island, postpartum NFSs foraged approximately 70 km northwest of the island in oceanic waters with a mean depth of 933 m (Antonelis *et al.* 1990).

Loughlin *et al.* (1987) followed adult female NFSs equipped with radio transmitters and found that some had round-trip foraging trips of over 400 km and one had a round trip of 740 km. Robson (2001) and Robson *et al.* (2004) used satellite telemetry to compare feeding locations of 97 lactating female NFSs on St. Paul and St.

George islands and reported a strong tendency for segregation of foraging areas by breeding location on the islands. Females from St. Paul Island dispersed in all directions except to the southeast, where St. George Island females foraged. Foraging locations were also segregated for female NFSs departing from different groups of rookeries on St. Paul Island. Females from Tolstoi and Reef rookeries on the southwest side of the island foraged in areas from the southwest to northwest sides of the island, whereas those seals from Vostochni and Polovina Cliffs rookeries on the northeast side of the island foraged from the northwest to the east of the island.

3.2.2.5 Anthropogenic Sources of Mortality

Anthropogenic sources of mortality include commercial harvest, subsistence harvest, incidental take from commercial fisheries, and entanglement. The most significant source of mortality came from the commercial harvest of NFSs, which began in 1786 and continued for 200 years (NMFS 1993b). Commercial harvest of fur seals peaked in 1961, with over 126,000 animals taken, and was eventually halted in 1985. Commercial harvests of females from 1956 through 1968 precipitated a substantial population decline and may have had lingering effects after its cessation (York and Hartley 1981).

Alaska Natives are allowed to harvest NFSs for subsistence purposes, with a take range determined by annual household surveys. This subsistence harvest is governed by the Fur Seal Act (16 United States Code [U.S.C.] 1151), the MMPA (16 U.S.C. 1361), and NMFS implementing regulations (50 CFR 216), which require NMFS to publish a harvest summary every three years. Estimated annual harvest needs for 2005 through 2007 are 1,645 to 2,000 NFSs on St. Paul Island and 300 to 500 NFSs on St. George Island. An annual average of 754 NFSs were actually harvested between 2000 and 2004 (Angliss and Outlaw 2007). Only juvenile males are taken during the subsistence harvest, which minimizes the impact on population growth. The intentional taking of females or disturbance of the breeding rookeries is prohibited. Subsistence take in other areas besides the Pribilof Islands is known to occur, but is thought to be minimal (Angliss and Outlaw 2005).

Commercial fisheries can cause NFS mortality from incidental take, entanglement, disturbance, and competition for food resources. NMFS and NPFMC manage the current groundfish fisheries in Alaska in order to regulate fisheries in offshore waters used by NFSs during the spring, summer, and fall. ADF&G oversees Bering Sea/AI crab, salmon, and some rockfish fisheries under Fishery Management Plans adopted by the NPFMC. Listed below is a summary of the incidental take of NFS from commercial fisheries. Also included in the summary is incidental take of NFS from the high sea driftnet fishery, which has been prohibited since 1992 via the U.N. moratorium (U.N. Resolution 46/215) and the U.S. High Seas Driftnet Fisheries Enforcement Act (Public Law 102-582). Information regarding incidental take is from the 1993 and 2006 (draft) northern fur seal conservation plans. Intentional killing of NFSs by commercial fishermen, sport fishermen, and others likely occurs but the magnitude of this mortality is not known. Intentional take is illegal under the MMPA except for subsistence use by Alaska Natives and for research authorized by permit.

- From 1978-1988 incidental take of NFSs from both foreign and joint U.S.-foreign commercial groundfish trawl fisheries averaged 22 animals per year (Perez and Loughlin 1991).
- Approximately 31 NFSs were taken by domestic trawl fisheries in Alaska and the North Pacific Ocean between 1989 and 2001 (Perez 2003).
- The average annual take of NFSs from the Bering Sea/AI trawl fishery is 1.4 NFSs from 1994-1998.
- Observer Program data from 1990 to 1998 indicate that NFSs were taken incidentally only in the Bering Sea/AI and not in the GOA groundfish fishery.
- The minimum estimates, based on self-reported mortalities of the state of Alaska-managed salmon fisheries, averaged 15 NFSs per year from 1990-1998. Most of these mortalities came from the Bristol Bay salmon drift gillnet fishery (Angliss *et al.* 2001).
- The high seas driftnet fisheries killed thousands of NFSs every year from 1978-1992. Incidental take of NFSs associated with this fishery peaked in 1991, where an estimated 5,200 seals were killed (Hill and

DeMaster 1999). Illegal driftnet fishing apparently continues at low levels, but no quantitative information is available on incidental take.

Commercial fisheries are not considered a source of mortality for the San Miguel stock of NFSs. The estimated incidental takes of NFSs by commercial fisheries off California, Oregon, and Washington was zero during the period of 1990 through 1996. Similarly, there were no reports of NFS mortalities between 2000 and 2004 (Carretta *et al.* 2007).

Another mechanism for incidental take of NFSs is entanglement with fishing gear, packing bands, and other debris lost or ejected from fishing vessels, shipping vessels, and shoreside sources. The contribution of particular fisheries to this problem is not known, but these sources of entanglement may continue to circulate in the environment for many years. The incidence of entanglement in juvenile male NFSs reached 0.71 percent in 1976, and has since decreased (NMFS 1997). More recent surveys of NFS on the Pribilof Islands indicated that the proportion of animals entangled in debris ranged from 0.2 percent to 0.5 percent from 1995-2003. Because animals entangled at sea may never make it back to land, deaths caused by entanglement could be underestimated. Fowler (1985) and Fowler *et al.* (1987) estimated entanglement mortality could be as high as 15 percent for NFSs from birth to age three. It has been suggested that the number of NFSs killed by entanglement at sea may be a factor in the current NFS population decline (Laist 1997), and likely was a factor in the population decline observed during the 1980s (Trites and Larkin 1989).

Commercial fisheries can also affect NFSs via reduction, redistribution, or alteration of prey species, predators, and competitors. Important commercial fisheries for species in the NFS diet include pollock, cod, herring, mackerel, squid, and salmon. Ecosystem-wide and localized depletions of these species could result from fish removal, which could consequently affect NFS foraging success. The presence of vessels and gear in the water during fishing operations could disturb foraging patterns or cause abandonment of foraging areas. Conversely, commercial fisheries may remove species that compete with NFS for food, thereby increasing the availability of NFS prey.

Scientific research is also a potential source of mortality in NFSs. Mortality can occur at the time of research activities, or at some time after disturbance has occurred or the animal released. Mortality occurring while present on a rookery or haulout, or during capture and handling activities, is directly observable and recorded. Mortalities occurring later may or may not be observed. During the past nine seasons of research (1998-2006), there have been 7 mortalities of NFSs caused directly by research activities. The mortalities and related research activities fall into two categories:

1. Incidental mortalities of pups resulting from research activities to estimate population size and pup condition. These research activities involve rounding up groups of pups for measurements and marking. During 1998-2006, there were 702,594 northern fur seal pups incidentally disturbed during this research, and 5 mortalities (0.0007%) were observed.

2. Direct mortalities of non-pups due to handling and restraint. During 1998-2006, there were 683 handling events of adults and juveniles for a variety of projects, and 2 mortalities (0.293%) occurred while restraining adult females. Not included in mortality estimates were the 2 orphaned pups of these females, which were euthanized.

More information regarding anthropogenic sources of mortality can be found in the *2006 Draft Conservation Plan for the Eastern Pacific Stock of Northern Fur Seal* (NMFS 2006b).

3.2.2.6 Natural Predators

NFSs are preyed upon by several predator species, including killer whales, SSLs, sharks, and foxes. Of those natural predators, the killer whale (*Orcinus orca*) is probably the most important. Eyewitness accounts of predation on NFS by killer whales have been reported since the late 1800s and early 1900s (Bychkov 1967; Scheffer *et al.* 1984). The Tribal Government of St. Paul's Ecosystem Conservation Office reports that one to five sightings of killer whales feeding on NFSs are made each year (NMFS 2006b). Some authors have suggested that killer whale predation has played a major or dominant role in the population decline of NFSs and other marine mammals since the 1970s (Springer *et al.* 2003), but others argue the assumptions of the "Sequential Megafaunal Collapse" hypothesis are not supported by killer whale ecology or observed ecosystem changes (DeMaster *et al.* 2006, Trites *et al.* 2006b).

Foxes are primarily scavengers, but have been reported to attack and prey upon live NFS pups (Roppel 1984). Attacks on NFS pups by SSLs have also been reported (Gentry and Johnson 1981), but may be lower in recent years due to the decline in the SSL population (NMFS 2006b).

3.2.2.7 Disease and Contaminants

Infectious Diseases

Necropsies of juvenile NFSs from St. Paul Island during the 1980s indicated the population was relatively disease free compared to the period from the 1950s to early 1970s (NMFS 2006b). During the 1950s and 1960s, mortality from nematode worm infection may have been important (Neiland 1961; Keyes 1965). In the 1970s hookworm disease was responsible for 45 percent of the NFS pup mortality (Gentry 1981). This disease has declined dramatically in the Pribilof Islands, but has recently become an important source of mortality for the NFS pups of San Miguel (Melin *et al.* 2006). Little is known of the effects of diseases and parasites on NFSs, but evidence suggests NFSs do not experience high rates of disease, and it is currently not a factor in the declining NFS population. However, disease could impact NFSs in the future and should always be considered a constant threat given the movement of NFSs between haul out locations and the densities of NFSs during the breeding season (NMFS 2006b).

Contaminants

Contaminants are present in the marine environment and have the potential to adversely affect marine mammals. Persistent organic pollutants (POPs) including PCBs and DDTs are known to biomagnify, resulting in subsequently higher concentrations for each increase in trophic level. These chemicals are also fat soluble and tend to accumulate in the fat stores of marine mammals such as blubber and lactation milk. Contaminant studies on NFSs and other marine mammals have shown exposure to various toxic substances and evidence of accumulation in various tissues. However, it is not known how exposure to these contaminants affects NFSs at the individual or population level (NMFS 2006). It is known that some contaminants have the potential to affect the immune system, resulting in increased vulnerability to disease. Organochlorine contaminants have the potential to affect the reproductive systems. Higher concentrations of organochlorine compounds have been found in the blubber of Pribilof Islands NFSs compared to other seal species. Research suggests that feeding habits and migratory patterns may account for the observed differences (Krahn *et al.* 1997). Heavy metals such as mercury, cadmium, silver, vanadium, and lead have also been measured in NFSs, but no clear trends have been identified.

Exposure to an oil spill could have a severe direct impact. Inhalation of petroleum vapors may increase levels of hydrocarbons in the blood and tissue, resulting in effects to the central nervous system and potential mortality. Petroleum that comes in contact with the fur would diminish the insulating capacity of the fur, resulting in death from hypothermia (Kooyman *et al.* 1976). Direct exposure can also cause irritation to the eyes and mucous membranes. Because marine vessels travel in and around NFS habitat outside of the breeding season, there is the potential for oil spills to occur and for those spills to affect NFSs. However, the severity of those effects would depend upon the amount, location, and season of the spill (NMFS 2006b).

3.2.2.8 Disturbance from Marine Vessel Traffic

Similar to that described in Section 3.2.1.9, disturbance from marine vessels can cause short-term behavioral reactions. Marine traffic from commercial fishing vessels, particularly actively fishing vessels, is a potential source of disturbance to NFSs (NMFS 2006b). This type of disturbance is limited off the Pribilof Islands because the Pribilof Islands Area Habitat Conservation Zone prohibits trawling in waters surrounding the Pribilof, St. Matthew, and St. Lawrence islands. Fuel barges, floating fish processors vessels, and container vessels can contribute to underwater noise. The level of disturbance caused by underwater noise is largely unknown. Other marine vessels that could potentially disturb NFSs on the Pribilof Islands include those vessels traveling to and from the harbors and fish processing plants. Evidence suggests that NFSs are more tolerant to this type of general vessel traffic (NMFS 2006b).

3.2.2.9 Traditional Knowledge

Sections 3.2.1.10 provided additional background on traditional knowledge. Coastal Alaska Natives have a long history of living closely with the marine resources of the Bering Sea and GOA. Their knowledge has been passed from generation to generation within Alaska Native communities, but has traditionally not been integrated with western science. As an attempt to bridge this gap, the Bering Sea Coalition and the Whirling Rainbow Center held the first International Indigenous People's Summit Conference on the Bering Sea, March 16 through 20, 1999, entitled "Wisdom Keeper's of the North: Vision, Healing, and Stewardship for the Bering Sea" (Bering Sea Coalition 1999).

At this meeting, many observations regarding environmental changes were made by Alaska Natives and others on the state of the Bering Sea ecosystem. In summary, Alaska Natives have identified the presence of natural and anthropogenic stressors on the marine environment and the effects of those stressors. The stressors include increased sea temperature, pollution, and overfishing. The effects include changes in sea ice thickness, declining or changing fish and animal populations, increases in fish parasites, contaminated fish and animal meat, and decreased quality of subsistence resources. Each of these observations directly or indirectly relates to NFSs and integration of this knowledge with western science may provide a better understanding of the declining NFS population. Additional examples of traditional knowledge of NFSs and their environment can be found in Merrill (1999), Vining (1995), and Vining (1998).

3.2.2.10 NFS Past Research

Past research has been driven by priorities identified in the 1993 NFS Conservation Plan, which included the following topics:

- Monitoring status and trend of NFSs;
- Monitoring health, condition, and vital parameters;
- Assessing and evaluating causes of mortality;
- Assessing and minimizing the effect of disturbance on NFSs;
- Investigating feeding ecology and factors affecting energetic requirements;
- Investigating relationships between NFSs, fisheries, and fish resources;
- Identifying natural ecosystem changes; and
- Coordinating conservation efforts with other agencies and countries.

NFS Research Overview

Each year NMML publishes *Fur Seal Investigations*, which annually reports the results of NMML's research on NFSs. Research on NFSs has been conducted since at least 1909 when adult male NFSs were counted on the Pribilof Islands. Surveys of adult males have continued annually since that time. One of the most accurate methods to monitor population trends is to observe and estimate pup production. Researchers monitor pup production by marking and then resighting the pups. NMML currently estimates Pribilof Islands pup production biennially.

Tissues and teeth collected from dead NFSs, either from natural death or death by subsistence harvests, are used to determine age-specific mortality and other health indicators. The mass and length, as well as the sex, of pups born on the Pribilof Islands has been recorded for many years, which also helps determine basic life history and health. In addition, NMML and other researchers have studied the feeding ecology of female NFSs. This research has been carried out by examining foraging locations and diving behavior, as well as scat and regurgitations of animals in the wild. Advances in technology, miniaturization of instruments and reduced costs have allowed increases in the frequency of this research, and has greatly increased the knowledge of the species and of the habitat critical to its health and survival.

Research has also been conducted on the frequency of occurrence and effects of human-caused disturbance, harassment, and displacement of NFSs. These studies examined the effects of roads and flight corridors near the NFS breeding and resting areas on the Pribilof Islands. NMML has collected and archived NFS tissue for analysis of chemical contamination and implications on the NFS population and subsistence use of contaminated seals. Migration preferences of NFSs have also been researched and indicate that patterns in migration and natal site fidelity are related to age, sexual maturity, and season. Coordination of NFS research is briefly discussed in Section 3.2.1.12 of this document.

Until recently, the relatively low level of NFS research has largely been the result of funding limitations. Population monitoring, basic pup condition studies, and pup mortality studies were conducted regularly, but most other studies relied on external funding sources or supplemental, short-term funds. As the NFS population in Alaska has declined, demands for research that could identify and mitigate the cause(s) have increased. Designated funding for a number of additional studies became available beginning in 2005, in part due to the declines observed on the Pribilof Islands during 2002 and 2004. Overall disturbance to NFSs by research activities is largely driven by population monitoring studies; census activities account for the majority of disturbance (92% of all incidental takes estimated to have occurred during research conducted from 1998 to 2005). NMML has implemented a number of methods to minimize disturbance by scaling back some research activities known to cause disturbance to NFS. Most notably, pup production estimates are conducted biennially rather than annually, and rookeries are subsampled (rather than sampling the entire rookery) to derive various components of the estimates. Because NMML has conducted the majority of NFS research in recent decades, a review of its research activities provides insight into the general research topics and activity levels in recent years. The following sections describe highlights of NMML's NFS research as conducted under its three most recent MMPA research permits.

NFS research conducted from 1993-1997 by NMML under MMPA Permit #837.
Research was conducted on NFSs by NMML at the Pribilof Islands (St. George and St. Paul islands), Alaska, and San Miguel Island, California, during each year from 1993 to 1997, and on Bogoslof Island, Alaska, during 1993, 1994, 1995 and 1997. No aerial or vessel surveys of NFSs were conducted. The following research occurred:

- Censuses of adult males were conducted on San Miguel and the Pribilof Islands during each year that the permit was valid.
- Pup censuses were conducted on Bogoslof Island during 1993, 1994, and 1995 using a direct count, and during 1997 using the shear-sampling method (due to the increase in the size of the population). Pup

censuses were conducted on the Pribilof Islands during 1994 and 1996; and on San Miguel Island during each year the permit was valid.

- Condition indices were collected on St. George Island during each year the permit was valid, and on St. Paul and San Miguel islands during 1994, 1995, 1996, and 1997.
- On San Miguel Island, pups were tagged and tag resight surveys were made during each year the permit was valid to assess vital rates.
- Teeth were collected annually during the subsistence harvest to monitor annual variability in animal health and to evaluate trends in female feeding cycles. Upper canine teeth were also collected in 1994 and 1996 from dead adults and sub-adults during pup production studies.
- Pup mortality studies were conducted on St. Paul Island during each year the permit was valid. From 1993 to 1997, necropsies were performed on 800 dead pups to assess and monitor the causes of death of NFS pups. Dead pups (25) were examined for the presence of hookworms on San Miguel Island in 1996.
- Surveys to assess the rate of entanglement of adult and juvenile male fur seals in marine debris were conducted on the Pribilof Islands during 1995, 1996, and 1997.
- Female foraging ecology data were collected on St. Paul Island in 1994, 1995, and 1996; on St George Island in 1995 and 1996; on San Miguel Island in 1996; and on Bogoslof Island in 1997. Trip duration, foraging location, diving behavior, and diet information were collected during these studies. The largest body of data was collected in 1995 and 1996 on the Pribilof Islands as part of a collaborative study with the University of California, Santa Cruz, working under the authority of MMPA Permit 927. During this study, location data were collected using satellite transmitters for 55 foraging trips in 1995 and 65 foraging trips in 1996.
- Fecal samples (scats) were collected for analysis of diet on the Pribilof Islands during each year the permit was valid, and on Bogoslof Island during 1997. On the Pribilof Islands, 2816 scats were collected from rookeries and haulouts, while on Bogoslof Island, 97 scats were collected from rookeries and haulouts.
- Biopsy samples were collected for stable isotope studies on St. Paul and St. George Islands in 1997.
- Data were collected to examine the ontogeny of diving using 112 deployments of time wet recorder (TWR) on NFS pups in 1995 and 1996.
- Pup migration data were collected using satellite transmitters attached to 6 pups in 1996 on St. Paul Island and 11 pups in 1997 on St. Paul and St. George islands.
- Hind flipper tissue plugs were collected for genetics studies from St. Paul, St. George and Bogoslof islands during 1995.

NFS research conducted from 1998-2002 by NMML under MMPA Permit #782-1455.
Research was conducted on NFSs by NMML at the Pribilof Islands (St. George and St. Paul Islands), Alaska, and San Miguel Island, California, during each year the permit was valid. No aerial or vessel surveys of NFSs were conducted. The following research occurred:

- Censuses of adult males were conducted on San Miguel and the Pribilof Islands during each year that the permit was valid.
- Pup censuses were conducted on the Pribilof Islands during 1998, 2000 and 2002; and on San Miguel Island during each year the permit was valid.

- Condition indices were collected on St. George Island during 1998, 2000 and 2002, and on St. Paul and San Miguel Islands during each year the permit was valid.
- On San Miguel Island, pups were tagged and tag resight surveys were made during each year the permit was valid to assess vital rates.
- On St. Paul Island, adult females were handled during 2002 for condition studies and to determine reproductive status using blood hormone analysis.
- Teeth were collected annually during the subsistence harvest to monitor annual variability in animal health and to evaluate trends in female feeding cycles. Upper canine teeth were also collected during 1998, 2000 and 2002 from dead adults and sub-adults during pup production studies.
- Pup mortality studies were conducted on St. Paul Island during each year the permit was valid.
- Juvenile male foraging ecology data were collected on St. Paul Island during 1999 and 2000. Adult female foraging ecology data were collected on St. Paul Island during 1998, 2000, 2001 and 2002, and on San Miguel Island in 2001. Trip duration, foraging location, and diving behavior were collected during these studies.
- Fecal samples (scats) were collected for analysis of diet on the Pribilof Islands during each year the permit was valid.

NFS research conducted from 2003-2005 by NMML under MMPA Permit #782-1708.
Research was conducted on NFSs by NMML at the Pribilof Islands, Alaska, during 2004 and 2005; at San Miguel Island, California, during each year the permit was valid; and on Bogoslof Island, Alaska, during 2005. No aerial or vessel surveys of NFSs were conducted. The following research occurred:

- Censuses of adult males were conducted on San Miguel and the Pribilof Islands during 2004 and 2005, and on Bogoslof Island during 2005.
- Pup censuses were conducted on the Pribilof Islands during 2004; on Bogoslof Island during 2005; and on San Miguel Island during 2004 and 2005.
- Condition indices were collected on the Pribilof Islands during 2004, and on San Miguel Islands during 2004 and 2005.
- On San Miguel Island, pups were tagged and tag resight surveys were made during each year the permit was valid to assess vital rates.
- On St. Paul Island, adult female fur seals were handled during 2005 for condition studies and to determine reproductive status using transrectal ultrasonography.
- Teeth were collected annually during the Pribilof Islands subsistence harvest to monitor annual variability in animal health and to evaluate trends in female feeding cycles. Upper canine teeth were also collected on the Pribilof Islands during 2004, and on Bogoslof Island during 2005, from dead adults and sub-adults during pup production studies.
- Pup mortality studies were conducted on St. Paul Island during 2004 and 2005.
- Adult female foraging ecology data were collected on St. George Island during 2004; on St. Paul Island in during 2004 and 2005; on Bogoslof Island during 2005; and on San Miguel Island during 2004 and 2005. Trip duration, foraging location, and diving behavior were collected during these studies.
- Fecal samples (scats) were collected for analysis of diet on the Pribilof Islands during 2004 and on Bogoslof Island during 2005.
- Pup migration studies were conducted on the Pribilof Islands, Bogoslof Island and San Miguel Island during 2005.

3.2.2.11 Co-Management Agreements

NMFS entered into co-management agreements with the tribal governments of St. Paul Island in 2000 (Appendix F) and the tribal government of St. George Island in 2001 (Appendix F). These agreements provided for shared responsibilities over subsistence harvests of NFSs and SSLs on the Pribilof Islands, with a combined purpose of recovering and maintaining the NFS and SSL populations for a sustainable subsistence take in the region. The tribal governments have expressed interest in a more comprehensive cooperative management regime for the NFS, which would include shared responsibility for setting harvest limits, research, and addressing conservation issues such as habitat protection and the effects of commercial fishing on this stock. Under each of the agreements a co-management committee review, among other things, the manner in which the subsistence harvest is executed and managed, and regulations governing the subsistence harvest of NFSs.

In conjunction with the implementation of the co-management plans, NMFS has worked with and obtained valuable input from both Tribal Governments on the Pribilof Islands in preparation of the 2006 Draft Conservation Plan for the eastern Pacific stock of NFS (NMFS 2006b).

3.2.2.12 1993 Conservation Plan

As required by the MMPA for depleted stocks, NMFS developed and published a conservation plan for NFS in 1993 (NMFS 1993b). This conservation plan included information on the status of NFSs on the Pribilof Islands, causes of declines, threats to the species, critical information gaps, and recommended research and management actions for meeting the objectives of the plan.

The overall goal of the 1993 Conservation Plan was to promote recovery of the NFS population on the Pribilof Islands to a level appropriate to justify removal from the MMPA depleted listing, and towards this end take actions to promote the recovery of the NFS. Immediate objectives of the conservation plan were to 1) identify factors that might be limiting the population, and 2) to propose a set of actions that will minimize any human-induced activities that may be detrimental to the population.

3.2.2.13 2006 Draft Conservation Plan

The 2006 Draft Conservation Plan (NMFS 2006b) for the eastern Pacific stock of NFS was published as a revision to the 1993 Conservation Plan. This revision takes into account the reclassification of the eastern Pacific stock of NFS to include the Pribilof Islands and Bogoslof Island, but not San Miguel Island. This revision incorporates changes in management structure, including the co-management agreements with the Pribilof Islands Native communities for marine mammal species used for subsistence. It also includes interpretation of new information, identification of important research priorities, and recommendations for continued management of human activities that are thought to affect the eastern Pacific stock of NFSs.

The 2006 Draft Conservation Plan reviews and assesses the known and possible factors influencing NFSs in Alaska and contains pertinent information on NFSs breeding in California and Russia. Natural factors influencing the population include predation, parasitism, disease, and environmental change. Human-related factors influencing the population include subsistence harvests, direct and indirect effects of commercial fishing, marine debris, poaching, pollution, vessel and aircraft traffic, tourism, coastal development, noise, research activities, and oil and gas activities.

Consistent with the 1993 Conservation Plan, the goal of the 2006 Draft Conservation Plan is to recover the eastern Pacific stock to a level such that it is no longer designated as depleted. The 2006 Draft Conservation Plan builds on the two main objectives of the 1993 plan and proposes two additional objectives aimed at restoring and maintaining the eastern Pacific stock to its Optimum Sustainable Population (OSP) level (180,000 animals). The four objectives include 1) identify and eliminate or mitigate the cause or causes of human-related mortality of

NFSs; 2) assess and avoid or mitigate adverse effects of human-related activities on or near the Pribilof Islands and other habitat essential to the survival and recovery of NFS; 3) continue and, as necessary, expand research or management programs to monitor trends and detect natural or human-related causes of change in the NFS population and habitats essential to its survival and recovery; and 4) coordinate and assess the implementation of the 2006 Draft Conservation Plan, based on implementation of conservation actions and completion of high priority studies.

Enhancing participation by Alaska Natives and other interested stakeholders is a cost-effective means to facilitate the long-term continuity of some research programs. Pribilof Islands residents have a long history of interactions with NFSs. Pribilovians have and will continue their involvement in many aspects of NFS conservation, subsistence harvest, management, and research.

NMFS intends to implement the following conservation actions based on the current understanding of NFS ecology. As new data are collected, analyzed, integrated, and interpreted, conservation measures and subsequent actions will change.

- Improve understanding of sources, fates, and effects of marine debris;
- Improve assessments of incidental take of fur seals in commercial fishing operations;
- Evaluate harvests and harvest practices;
- Work with the Tribal Governments under co-management agreements;
- Advise and consult with the relevant action agencies and industries;
- Review and make recommendations on proposed activities and actions that have the potential for adversely affecting NFSs;
- Conduct studies to quantify effects of human activities at or near breeding and resting areas;
- Undertake conservation or management measures as necessary to eliminate or minimize deleterious impacts to NFS;
- Assess and monitor pollutants;
- Quantify relationships between NFS, fisheries, and fish resources;
- Monitor and study changes in NFS population;
- Improve assessment of the effects of disease;
- Describe and monitor essential NFS habitats;
- Identify and evaluate natural ecosystem changes;
- Establish a conservation plan coordinator position;
- Develop and implement education and outreach programs;
- Develop and promote international conservation efforts; and
- Enforce existing regulations.

3.2.2.14 Current Research Priorities

The 2006 Draft Conservation Plan identified actions needed to achieve recovery of the depleted eastern Pacific stock, including the following field research components:

- Monitor and manage subsistence harvest;
- Identify and evaluate illegal harvests;
- Conduct basic studies on fur seal feeding ecology;
- Determine impact of fisheries;

- Monitor male and pup abundance at Pribilof Islands;
- Estimate pup survival;
- Evaluate marking and resighting program;
- Study vital rates;
- Conduct behavioral/physiological studies;
- Conduct comparative studies between Pribilof animals and other islands;
- Conduct oceanographic and fishery surveys in relation to essential fur seal habitat; and
- Reevaluate carrying capacity.

The Pribilof Islands Collaborative (PIC), together with scientists from the Alaska Fisheries Science Center (AFSC), NMML, and various universities, identified key data gaps in NFS research and agreed on the eight research priorities to help understand the decline of NFSs. PIC believes the following research priorities, if addressed in a coordinated fashion, would help identify the causes of the declining NFS population, thereby providing the basis for more effective planning, management, and remediation:

- Determine age-specific reproduction and survival rates across all age classes.
- Study foraging behavior, diet preferences, and nutritional requirements for all age classes and throughout the entire year.
- Evaluate late-season pup condition on the Pribilof Islands, just prior to their departure for sea.
- Determine the location and magnitude of predation, particularly by killer whales.
- Determine whether or not current system comparisons can act as natural experiments to distinguish among alternative hypotheses and help lay the groundwork for the possible future use of directed adaptive management experiments.
- Continue monitoring of mortality rates due to entanglement in marine debris.
- Evaluate the relationships between shifts in ocean climate and the NFS decline.
- Conduct investigations into which adaptive or experimental management approaches and designs would be most appropriate.

3.2.3 Killer Whales

Killer whales (*Orcinus orca*) are the ocean's top predator and can live up to 80 years, reaching a length of about 27 feet, and weighing up to 10 tons (Zimmerman 1994). These whales begin breeding around the age of 15, and calve every three to 10 years until the age of 40. Calving can occur during all months of the year, with increasing frequency during the winter months. Physical characteristics of the killer whale include contrasting black and white pigmentation, and a prominent dorsal fin. Killer whales are found in all oceans and seas of the world, but prefer the colder waters of both hemispheres. Along the west coast of North America, killer whales occur seasonally as well as year-round along the entire Alaskan coast (Braham and Dahlheim 1982), in British Columbia and Washington inland waterways (Bigg *et al.* 1990), and along the outer coasts of Washington, Oregon, and California (Green *et al.* 1992; Barlow 1995 and 1997; Forney *et al.* 1995; Angliss and Outlaw 2007).

Killer whales are known to form stable social groups called pods, which usually consist of less than 40 individuals. Researchers often label pods as "resident," "transient," and "offshore" to describe the whales' patterns of occurrence (Bigg *et al.* 1990; Ford *et al.* 2000; Angliss and Outlaw 2005). These three very distinct types of whales can also be distinguished from one another based on aspects of morphology, ecology, genetics, and behavior (Ford and Fisher 1982; Baird and Stacey 1988; Baird *et al.* 1992; Hoelzel *et al.* 1998 and 2002; Barrett-Lennard 2000; Heise *et al.* 2003). Eight killer whale stocks are recognized within the Pacific U.S. Exclusive Economic Zone (EEZ) is provided below. Range and abundance information has been gathered from the 2003 and 2004 U.S. Pacific Marine Mammal Stock Assessments (Carretta *et al.* 2004 and 2005) and the 2005 Alaska Marine Mammal Stock Assessments (Angliss and Outlaw 2005).

- **Alaska Resident stock** occurs from southeastern Alaska to the AI and Bering Sea. The estimated population of Alaska resident whales is 1,123 animals.
- **Northern Resident stock** occurs between British Columbia and part of southeastern Alaska. The population of this resident stock is estimated at 216 whales.
- **Southern Resident stock** occurs mainly in the inland waters of Washington state and southern British Columbia, but is also found in coastal waters between British Columbia and California. The population of this resident stock is estimated at 84 whales. This resident stock is designated as "endangered" under the ESA.
- **GOA, AI, and Bering Sea Transient stock** (GOA transient stock) occurs mainly from Prince William Sound through the AI and Bering Sea. The minimum population is estimate 314 whales.
- **AT1 Transient stock** occurs in Alaska between Prince William Sound and Kenai Fjords. The estimated population of the AT1 stock is eight whales. This stock was designated as "depleted" under the MMPA but is not listed as "threatened" or "endangered" under the ESA.
- **West Coast Transient stock** occurs between California and southeastern Alaska and includes whales observed in Canadian waters. The minimum population estimate for west coast transient whales is 314 animals.
- **Offshore stock** occurs off the coasts from California through Washington, and rarely in southeast Alaska. The minimum population estimate for offshore whales is 361 animals.
- **Hawaiian stock** occurs off the Hawaiian Islands. The estimated population of the Hawaiian stock is from 250 to 430 whales.

Transient killer whales on the other hand, have been known to prey on various species of marine mammals, including SSLs, grey whale, minke whale, NFSs, harbor seals, and sea otters. This predation has been documented throughout Alaska and British Columbia via surface observations (NMFS 2004b; NMFS 2004b), the collection of prey fragments at kill sites, and the examination of stomach contents of killer whale carcasses (Barrett-Lennard *et al.* 1995; Saulitis *et al.* 2000; Heise *et al.* 2003; NMFS 2005c). Resident and offshore killer whales on the other hand, feed on fish and tend to avoid contact with other marine mammals.

Researchers have suggested that predation of SSLs by transient killer whales could have played a significant role in the decline of the SSL population (Barrett-Lennard *et al.* 1995; Springer *et al.* 2003; Williams *et al.* 2004). Over the past 50 years the diet of the transient killer whale may have shifted from great whales, which became scarce after intensive whaling in the early 1900s, to other marine mammals. The need to change foraging behavior combined with the caloric intake of killer whales have led scientists to hypothesize that transient killer whales could decimate an SSL population (Springer *et al.* 2003; Williams *et al.* 2004). Conversely, documented observations of kills indicate that the diet of the transient killer whale primarily consists of harbor seals (Jefferson *et al.* 1991; Baird 1994), with only about 9 percent (observed) to 12 percent (modeled) of the kills being sea lions (California and Steller) (Ford *et al.* 1998; Matkin *et al.* 2001). Of the SSLs consumed by transient killer whales, pups and young adults are more likely to be preyed upon due to the greater size and aggressiveness of adult SSLs. Heise *et al.* (2003) documented 32 lethal killer whale/SSL interactions in British Columbia and Alaska, and the majority involved young adult SSLs off the AI. Because research on transient killer whale predation of pinnipeds other than SSLs show that pups are more often consumed than adults, Heise *et al.* (2003) suggests that a higher percentage of SSL pups are killed than is documented.

3.2.4 Other ESA-listed Species

A discussion of federally designated threatened and endangered terrestrial and marine mammals that could occur in the project area is provided below. Other federally designated species may occur in the project area, but whether or not these species are relevant to SSL and NFS research activities will be determined by further Section 7 consultation for the Final PEIS. If necessary, this section will be updated to include other relevant ESA listed species following this consultation.

San Miguel Island Fox

The San Miguel Island fox (*Urocyon littoralis littoralis)* is present on San Miguel Island, California, an important breeding ground for NFSs. The San Miguel Island fox is the largest native carnivore on San Miguel Island, which feeds primarily on deer mice and insects. Between 1994 and 1999, annual population monitoring documented a decrease in San Miguel Island foxes from 450 to 15 adults (Coonan *et al.* 1998). This marked decline in the population was a result of predation by golden eagles and disease from domestic dogs. The USFWS listed the San Miguel Island fox as an endangered species in 2004 (69 FR 10335). A captive propagation program initiated in 1999, has successfully bred and released foxes in order to aid species recovery (Coonan *et al.* 2005). Relocation of golden eagles from the island to the mainland is also expected to aid recovery of the fox.

Sea Otter

The USFWS, under MMPA guidelines, recognizes five stocks of sea otters in U.S. waters, including the southeast Alaska, southcentral Alaska, southwest Alaska, and Washington stocks (*Enhydra lutris kenyoni*), and the California (or southern) stock (*Enhydra lutris nereis*). Of these sea otter stocks, the southwest Alaska and California stocks are listed as threatened under the ESA. The other three sea otter stocks are not formally designated under the ESA, however, the Washington stock is legally designated as endangered by the State of Washington (Lance *et al.* 2004). In general, sea otters occur in nearshore coastal waters of the U.S. along the North Pacific Rim from the AI to California. The southwest Alaska stock includes Alaska Peninsula and Bristol Bay coasts, the Aleutian, Barren, Kodiak, and Pribilof Islands; and the California stock ranges along the mainland coast in California, from Santa Cruz County to Santa Barbara County. Sea otters are keystone species in nearshore kelp beds, where they feed on and maintain populations of sea urchins, crabs, sea cucumbers, clams, mussels, abalone, and other shellfish. The primary causes of sea otter decline are the historical commercial harvest of the 1700s and 1800s, oil and gas development, commercial fisheries, subsistence harvest, contaminants, habitat destruction, and disease.

Guadalupe Fur Seal

The Guadalupe fur seal (*Arctocephalus townsendi*) is generally found off the coast of Baja California, Mexico, but individuals can be seen in California's Channel Islands and as far north as the Point Reyes National Seashore, California. Commercial sealing during the 1700s and early 1800s severely depleted the population and resulted in their extinction from California waters. Guadalupe fur seal are now fully protected by Mexican national legislation, the U.S. ESA, and the U.S. MMPA. The Guadalupe fur seal is recovering from exploitation, and in 1993 the population was estimated at about 7,408 animals (Forney *et al.* 2000). Recent impacts on the Guadalupe fur seal include entanglement in drift and set gillnets and El Nino events.

Great Whales

Seven great whales known to occur in the project area are currently listed as "endangered" under the ESA as a result of heavy exploitation by commercial whalers during the 1900s. Other human influences such as ship strikes and net entanglements continue to deplete the current whale stocks, and environmental changes such as shifting predators and prey threaten the future of the whale species. In order to promote the recovery of these whale species, NMFS has published or is currently developing the required recovery plans that identify protection measures and actions to monitor the species. The ESA-listed species of great whales in the project area are listed in Table 3.2-7.

Table 3.2-7
ESA-Listed Great Whale Species in the Project Area

Common Name	Scientific Name	Area of Distribution
Humpback whale	*Megaptera novaeangliae*	Western Central, North Pacific
Blue whale	*Balaenoptera musculus*	North Pacific
Bowhead	*Balaena mysticetus*	Western Arctic
Fin whale	*Balaenoptera physalus*	Northeast Pacific
Right whale	*Eubalaena japonica*	North Pacific
Sei whale	*Balaenoptera borealis*	North Pacific
Sperm whale	*Physeter macrocephalus*	North Pacific

Source: Adapted from the International Whaling Commission web site and NMFS Office of Protected Resources web site accessed November 2006.

The primary prey of ESA-listed great whales consists of krill, copepods, and schooling fish. Because these whales and SSLs and NFSs are known to prey on similar species of fish, some competition for food resources may exist. Further depletion or extinction of these whales could indirectly affect SSLs and NFSs via cascading effects throughout the marine food webs. Brief descriptions of the current distribution and abundance of these whales within the project area are provided in Sections 3.2.4.1 through 3.2.4.7. Additional information on whale biology and life history can be found at the International Whaling Commission (IWC) website: http://www.iwcoffice.org/conservation/lives.htm, the NMFS Office of Protected Resources website: http://www.nmfs.noaa.gov/pf/species/esa.htm, and in the 2005 Pacific Coast Groundfish Essential Fish Habitat EIS (Carretta *et al.* 2007).

3.2.4.1 Humpback Whale

At least three relatively separate populations of humpback whales are recognized in the U.S. EEZ and occur within the project area: the eastern North Pacific stock, the central North Pacific stock and the western North Pacific stock. The eastern North Pacific stock is found in coastal Central America and Mexico during the winter and spring and along the coast between California and southern British Columbia during the summer and fall months (Angliss and Outlaw 2007). The central North Pacific stock spends the winter and spring in the Hawaiian Islands, then migrates to northern British Columbia/southeast Alaska and the GOA to feed during the summer and fall (Angliss and Outlaw 2007). The western North Pacific stock is found in Japan during the winter and spring, and then probably migrates to waters of the Bering Sea and AI where they spend the summer/fall (Angliss and Outlaw 2007).

The abundance for the central North Pacific humpback whale stock was estimated at 4,005 animals (Calambokidis *et al.* 1997) and for the western North Pacific humpback whale stock was estimated at 394 animals (Calambokidis *et al.* 1997; Carretta *et al.* 2007). Recent population estimates for the eastern North Pacific stock include 1,034 humpbacks in the feeding areas off the coasts of California, Oregon, and Washington (NMFS 2004b).

3.2.4.2 Blue Whale

The blue whale is the largest animal ever known to have lived on Earth. The IWC recognizes only one stock of blue whales in the North Pacific (eastern North Pacific stock), but some evidence suggests that there may be as many as five separate stocks (Carretta *et al. 2007*). Blue whales feed in California waters during the summer/fall and migrate south to productive areas off Mexico during the winter/spring. Blue whales are occasionally seen or heard off Oregon, but sightings are rare (Carretta *et al.* 2007). Recent stock estimates include 1,744 blue whales in waters off California (Carretta *et al. 2007*).

3.2.4.3 Bowhead Whale

The IWC recognizes five stocks of bowhead whales. The western Arctic stock is the only stock found in U.S. waters and is widely distributed in the central and western Bering Sea in winter (October/November-April). Bowhead whales are generally associated with the marginal ice front. From April through June, the whales follow leads in the ice and migrate north to the Beaufort Sea, where they remain until September when they begin their return to the Bering Sea (Carretta *et al. 2007*).

From 1978 to 1993, counts of bowheads have indicated that the western Arctic stock increased from approximately 5,000 to 8,000 whales, a rate of 3.1 percent (Raftery *et al.* 1995). In 1993, the bowhead whale population was estimated to be 8,200 animals (IWC 1997). The 2001 spring census yielded data indicating a population of about 9,860 animals (IWC 2003; Angliss *et al.* 2001).

3.2.4.4 Fin Whale

Fin whales are divided into three stocks for management purposes: the Northeast Pacific (Alaska) stock, the California/Oregon/Washington stock, and the Hawaii stock. The Northeast Pacific stock of fin whales ranges throughout the Bering Sea, AI, and GOA (Carretta *et al. 2007*; Angliss and Outlaw 2007). The California/Oregon/Washington stock is found inside and outside of coastal waters along these three states.

Current abundance of fin whales in the Northeast Pacific is not available, but visual surveys in 1999 and 2000 yielded a regional estimate of abundance of 4,051 fin whales for the central-eastern and the southeastern Bering Sea areas (Angliss and Outlaw 2007). A rough estimate of the size of the population west of the Kenai Peninsula (western GOA) yielded a minimum estimate of 5,703 individuals (Carretta *et al.* 2007). From 1996 and 2001 surveys, fin whales off the coasts of California/Oregon/Washington were estimated at 3,279 individuals (Carretta *et al. 2007*).

3.2.4.5 Right Whale

As determined from recent genetic analysis, two genetically different stocks of northern right whale are present in the waters off North America, including one stock in the North Atlantic and another in the North Pacific (Rosenbaum *et al.* 2000; Angliss and Outlaw 2007). Although both stocks of right whales are officially considered northern right whales (*Eubalaena glacialis*) under the ESA, right whales in the North Pacific are often referred to as *Eubalaena japonica*. Along the Pacific coast, sightings of the North Pacific right whales have been reported from Baja California in the south, Hawaii in the west, and the Bering Sea and Sea of Okhotsk in the north. Currently, there is no reliable estimate for the North Pacific right whale stock (Carretta *et al.* 2007).

North Pacific right whales prefer coastal and shelf waters where they feed on copepods and krill. While little is known of their migratory pattern, their general distribution follows the distribution of their prey. In July 2006, NMFS published a final rule designating critical habitat for the northern right whale in the GOA and the southeastern Bering Sea, which comprises approximately 95,200 square kilometers of marine habitat (71 FR 38277).

3.2.4.6 Sei Whale

The IWC recognizes only one stock of Sei whales in the North Pacific (the eastern North Pacific stock) for management purposes, although there is evidence that more than one stock exists (Carretta *et al.* 2006). Sei whales are distributed in temperate waters in all oceans, and are not usually associated with coastal features. In the North Pacific Ocean, the summer range extends from southern California to the GOA and across the North Pacific south of the AI, extending into the Bering Sea in the deep southwestern Aleutian Basin (Gambell 1985;

Rice 1998; Carretta *et al.* 2007). Based on surveys from 1996 and 2001, the abundance estimate for Sei whales in California, Oregon, and Washington waters is 56 whales (Angliss and Outlaw 2005).

3.2.4.7 Sperm Whale

The sperm whale is one of the most widely distributed of any marine mammal species, found in pelagic waters as far north as the Bering Sea (Leatherwood *et al.* 1982). For management purposes, the IWC has divided sperm whales in the North Pacific into eastern and western stocks. The western North Pacific stock is found near Japan. The eastern stock of North Pacific sperm whales has been further divided into three separate stocks as dictated by the U.S. waters in which they are found: California/Oregon/Washington, Alaska (North Pacific stock), and Hawaii (Carretta *et al.* 2007).

The most recent population abundance estimate for sperm whales from 1996 and 2001 summer/fall ship surveys off California, Oregon and Washington is approximately 1,233 whales (Angliss and Outlaw 2007). The number of sperm whales occurring within Alaskan waters is unknown (Carretta *et al.* 2007).

3.2.5 Other Marine Mammals (Cetaceans and Pinnipeds)

All species of marine mammals, including those listed under the ESA, are protected under the MMPA of 1972 as amended (16 U.S.C 1361-1421h). The MMPA places responsibility for conservation of marine mammals on two agencies: the Department of Commerce for cetaceans and pinnipeds other than walrus and the Department of the Interior for all other marine mammals, including walrus and Alaska polar bear. Discussion of sea otters can be found in Section 3.2.4. The MMPA provides protection to marine mammals so that they may attain an OSP within the carrying capacity of the habitat. The marine mammals that may share habitat range and food resources within the project area are presented in Table 3.2-8. Information regarding species abundance can be found in the U.S. Pacific Marine Mammal Stock Assessments (CArretta *et al.* 2007) and Alaska Marine Mammal Stock Assessments (Angliss and Outlaw 2007). General life history information can be found in the Pacific Coast Groundfish Essential Fish Habitat Final EIS (Lowry 1992). A discussion of the California sea lion and its relationship to SSLs is provided below.

3.2.5.1 California Sea Lion

The California sea lion is of particular importance because it has been used as a surrogate species for SSLs in the past for testing new instrumentation devices and procedures. The California sea lion includes three subspecies: *Zalophus californianus wollebaeki* (on the Galapagos Islands), *Z. c. japonicus* (in Japan, but now thought to be extinct), and *Z. c. californianus* (found from southern Mexico to southwestern Canada; herein referred to as the California sea lion). The breeding areas of the California sea lion are on islands located in southern California, western Baja California, and the Gulf of California. These three geographic regions are used to separate this subspecies into three stocks: (1) the U.S. stock begins at the U.S./Mexico border and extends northward into Canada; (2) the western Baja California stock extends from the U.S./Mexico border to the southern tip of the Baja California Peninsula; and (3) the Gulf of California stock which includes the Gulf of California from the southern tip of the Baja California peninsula and across to the mainland and extends to southern Mexico (NMFS 2005c). California sea lions have also shown an increasing presence in Alaska in recent years and have been observed during all seasons of the year (Maniscalco *et al.* 2004). Population trends indicate that counts of pups increased at an annual rate of 5.4 percent between 1975 and 2001.

Table 3.2-8
Summary of Other (Non-ESA) Marine Mammal Species in the Project Area and the Area of Distribution

Common Name	Scientific Name	Area of Distribution (reduced to that which coincides with the project area)
Cetaceans		
Gray whale	*Eschrichtius robustus*	North Pacific: Two isolated geographic distributions, eastern and western
Minke whale	*Balaenoptera acutorostrata*	North Pacific: From the Bering and Chukchi Seas south to near the Equator
Beluga whale	*Delphinapterus leucas*	North Pacific: Beaufort Sea, eastern Chukchi Sea, EBS, Bristol Bay, Cook Inlet
Dall's porpoise	*Phocoenoides dalli*	North Pacific: over continental shelf, adjacent to the slope, and over deep oceanic waters. As far as 65ºN and 28ºN
Harbor porpoise	*Phocoena phocoena*	North Pacific: from Point Barrow to Point Conception, California
Pacific white-side dolphin	*Lagenorhynchus obliquidens*	Eastern North Pacific: from the southern Gulf of California, north to GOA, west to Amchitka in the AI; rare in southern Bering Sea
Baird's beaked whale	*Berardius bairdii*	North Pacific and adjacent seas (Bering, Okhotsk, Japan, and Cortez)
Cuvier's beaked whale	*Zihius cavivostris*	North Pacific: from Alaska (excluding high polar waters) to Baja California
Bottlenose dolphin	*Tursiops truncatus*	Pacific Ocean: From coasts of Hawaii to California
Risso's dolphin	*Grampus griseus*	Pacific Ocean: From GOA to California
Striped dolphin	*Stenella coeruleoalba*	Pacific Ocean: California to Washington; around Hawaii
Long-beaked common dolphin	*Delphinus capensis*	Pacific Ocean: Baja Peninsula
Short-beaked common dolphin	*Delphinus delphis*	Pacific Ocean: north to Washington, south to Baja California, Mexico, and west to Hawaii
Short finned pilot whale	*Globicephala macrophynchus*	Pacific Ocean: north to Washington, south to Baja California, Mexico
Pygmy sperm whale	*Kogia breviceps*	Pacific Ocean: north to Washington, south to Baja California, Mexico
Dwarf sperm whale	*Kogia sima*	Pacific Ocean
Stejneger's beaked whale	*Mesoplodon stejnegeri*	North Pacific, Sea of Japan, and deep waters of southwest Bering Sea
Pinnipeds		
California sea lion	*Zalophus californianus*	North Pacific: from southwestern Canada to southern California
Pacific harbor seal	*Phoca vitulina*	North Pacific: From Baja California, Mexico to Pribilof Islands in Alaska
Pacific walrus	*Odobenus rosmarus*	North Pacific: Bering Sea and Adjacent Arctic Ocean
Spotted seal	*Phoca largha*	Beaufort, Chukchi, Bering, and Okhotsk seas
Bearded seal	*Erignathus barbatus*	Bering, Chukchi, and Beaufort seas
Ringed seal	*Phoca hispida*	Southern Bering Sea
Ribbon seal	*Phoca fasciata*	North Pacific: From Bristol Bay in Bering Sea to Chukchi and western Beaufort seas
Northern elephant seal	*Mirounga angusirostris*	North Pacific: From AI in Alaska to Baja California, Mexico
Sea otter	*Enhydra lutris*	North Pacific: From AI in Alaska to Baja California, Mexico

Source: NMFS Protected Resources Division website: http://fakr.noaa.gov/protectedresources/esakspecies.pdf

California sea lions are not listed as “endangered” or “threatened” under the ESA or as “depleted” under the MMPA. They are not considered a “strategic” stock under the MMPA.

3.2.6 Fish

3.2.6.1 Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) was reauthorized and amended by the Sustainable Fisheries Act (1996), and requires the existing eight regional fishery management councils to describe and identify essential fish habitat (EFH) in their respective regions, and to specify actions to conserve, enhance, and minimize adverse effects of fishing on EFH. Congress defined EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity". The Magnuson-Stevens Act requires NMFS to assist the regional fishery management councils in the implementation of EFH in their respective fishery management plans (FMPs).

For the purposes of this PEIS, marine EFH encompasses all estuarine and marine areas used by marine species, including tidewater and tidally submerged habitats from Alaska to Washington, Oregon, and California, excluding Canadian waters. The project area includes all state waters and the 200 nm offshore U.S. EEZ. In Alaska, the NPFMC has prepared and implemented five FMPs for Alaskan fisheries that encompass regional fisheries for certain species. The five FMPs for Alaska are: 1) Bering Sea/AI groundfish FMP, 2) GOA groundfish FMP, 3) Bering Sea/AI King and Tanner Crab FMP, 4) Alaska Scallop FMP, and 5) Salmon Fisheries FMP. All five FMPs are applicable to this project based on project location and identification of applicable EFH.

The Final Environmental Impact Statement (FEIS) for EFH Identification and Conservation in Alaska (Marsh 2005) and several other environmental reports describe the EFH baseline for this PEIS. The EFH FEIS provides a comprehensive evaluation of marine habitats for fish, invertebrates, and marine mammal species present in the project area. Other detailed descriptions of EFH within the project area are available from NMFS sponsored documents and Pacific FMPs.

Alaska’s immense size provides EFH from two major offshore marine ecosystems, the GOA and the EBS. Designated marine EFH species present in these waters are listed in Table 3.2-9.

All five species of Pacific salmon are also present in the project area: pink (*Oncorhynchus gorbuscha*), coho (*O. kisutch*), chum (*O. keta*), sockeye (*O. nerka*), and Chinook (*O. tshawytscha*). All life stages of the species listed in Table 3.2-9 occur in the project area.

The population decline of SSLs coincided with the rapid growth of the groundfish fisheries in Alaska, and the reduction of other Alaskan pinniped species, including harbor seals (Pitcher 1990) and NFSs (Trites 1991a). Major prey species for these marine mammals include a variety of schooling fishes such as Walleye pollock, Atka mackerel, Pacific cod. Other fish such as capelin, Pacific sand lance, rockfish, Pacific herring, salmon, and cephalopods (octopus) are also part of the SSL diet (NOAA 2005c). Many of these fish species are also harvested in the Alaska groundfish fisheries.

Walleye pollock is an EFH species, one of the largest single-species fisheries in the world (Calkins 1988), and make up over 50 percent of the prey consumed by SSLs (Marsh 2005). A member of the cod family, Walleye pollock occurs in dense schools throughout the year. In the Bering Sea, pollock is the most abundant groundfish, with current biomass levels above the biomass at which maximum sustainable yield (MSY) is produced. The Bering Sea stock is considered healthy, but concerns exist about the level and trend of the GOA stock. The GOA stock is slightly above the biomass at which MSY is produced and has steadily declined since the 1980s until only recently (Kajimura and Fowler 1984).

Table 3.2-9
Alaska Groundfish and Shellfish Species Found in the GOA and the EBS EFH Marine Ecosystem

Common Name	Scientific Name	Common Name	Scientific Name
Walleye pollock	*Theragra chalcogramma*	Sablefish (black cod)	*Anoplopoma fimbria*
Pacific cod	*Gadus macrocephalus*	Pacific halibut	*Hippoglossus stenolepis*
Yellowfin sole	*Pleuronectes asper*	Greenland halibut	*Reinhardtius hippoglossoides*
Arrowtooth flounder	*Atheresthes stomias*	Atka mackerel	*Pleurogrammus monopterygius*
Rock sole	*Pleuronectes bilineatus*	Alaska plaice	*Pleuronectes quadrituberculatus*
Flathead sole	*Hippoglossoides elassodon*	Butter sole	*Pleuronectes isolepis*
Rex sole	*Errex zachirus*	Dover sole	*Microstomus pacificus*
Longhead dab	*Pleuronectes proboscideus*	Rockfishes Pacific ocean perch	*Sebastes alutus*
Starry flounder	*Platichthys stellatus*	Roughey rockfish	*Sebastes aleutianus*
Thornyhead rockfish	*Sebastolobus spp.*	Northern rockfish	*Sebastes polyspinis*
Dusky rockfish	*Sebastes ciliatus*	Shortraker rockfish	*Sebastolobus borealis*
Shortspine thornyhead	*Sebastolobus alascanus*	Sharpchin rockfish	*Sebastes zacentrus*
Darkblotched rockfish	*Sebastes crameri*	Blue rockfish	*Sebastes mystinus*
Yelloweye rockfish	*Sebastes ruberrimus*	Skates	*Raja spp.*
Others Rattail	*Coryphaenoides spp.*	Octopus	*Octopoda*
Squids	*Sepioidea and Teuthoidea*	Blue king crab	*Paralithodes platypus*
Red king crab	*Paralithodes camtschatica*	Tanner (snow) crab	*Chionoecetes bairdi, C. opilio*
Golden (brown) king crab	*Lithodes aequispina*	Abalone	*Haliotis spp.*
Sea Snails	*Neptunea pribiloffensis, N. heros, N. lyrata, N. ventricosa, Fusitriton oregonensis, Buccinum angulossum, B. plectrum, B. scalariforme, B. polare, Volutopsius middindorffii, V. fragilis, Plicifusus kroyeri, Pyrulofusus deformis*	California sea cucumber	*Parastichopus californicus*
Shrimp	*Penaeus spp.*	Pacific weathervane scallop	*Patinopecten caurinus*
Sea urchins	*Diadema spp.*		

Source: Compiled by NMML

3.2.6.2 Commercially Harvested Species

Dozens of commercially harvested fish species may occur within the project area including Walleye pollock, Pacific cod, Atka mackerel, herring, Pacific halibut, flatfish, rockfish, sablefish, Pacific salmon, highly migratory species (e.g., tuna, shark, and billfish/swordfish), and skate. Of these species, walleye pollock, Atka mackerel, Pacific herring, Pacific cod, and Pacific salmon are important prey of SSLs and NFSs. Because there is an overlap in the species consumed by marine mammals with those targeted by commercial fisheries, direct competition for resources may occur (Calkins and Pitcher 1982; NMFS 2005b; Perez and Bigg 1986; Sinclair *et al.* 1994 and 1996; Sinclair and Zeppelin 2002; Zeppelin *et al.* 2004). Detailed information on life history, trophic interactions, fisheries, and stock assessments for each of the commercially harvested species is provided in the Alaska Groundfish Fisheries Draft PSEIS (NMFS 2001a). The distribution and trophic interactions of the commercially harvested species that are important prey to SSLs and NFSs are summarized below.

<u>Walleye Pollock</u>

Walleye pollock is the most abundant groundfish species in the EBS, where the largest concentrations occur in the southeast, north of Unimak Pass (Kendall *et al.* 1996). It is the second most abundant groundfish stock in the GOA, with the largest spawning concentrations occurring in Shelikof Strait and the Shumagin Islands (Kendall *et al.* 1996). Increases in biomass of age three and spawning female pollock have been estimated in the AI stock since 2000, while the biomass of age five fish and spawning females of the Bogoslof Island stock have been increasing since 2004 (NPFMC 2006). Between 2006 and 2007, biomass of age three fish and spawning females has been estimated to have decreased in both the EBS and GOA regions (NPFMC 2006).

Pollock is a major prey item for SSLs in the GOA and the Bering Sea (Merrick and Calkins 1995; Pitcher 1980a, 1980b and 1981). In the GOA, pollock is a major prey of both juvenile and adult SSLs. It appears that the proportion of animals consuming pollock increased from the 1970s to the 1980s, and this increase was most pronounced for juvenile SSLs. Sizes of pollock consumed by GOA SSLs range from 5 to 56 cm, and the size composition of pollock consumed appears to be related to the size composition of the pollock population. Juvenile SSLs consume smaller pollock on average than adults. Age one pollock were dominant in the diet of juvenile SSLs in 1985, possibly a reflection of the abundant 1984 year class of pollock available to SSLs in that year.

In the Bering Sea, available data indicate that pollock and Atka mackerel are currently the two dominant prey species of SSLs. Pollock is the principal prey year-round from the Bering Sea to the central AI. In the AI, pollock is replaced by Atka mackerel as the major prey source. Although pollock is a major prey item of SSLs, adult pollock may also be a major competitor with SSLs for prey resources such as forage fish and juvenile pollock. Researchers with the AFSC are currently investigating pollock and SSL interactions as prey competitors to predict how pollock populations affect SSL populations.

Pollock is also a significant prey item for other species of marine mammals in the EBS. Studies suggest that pollock is a primary prey item of NFSs when feeding on the continental shelf during the summer (Sinclair *et al.* 1994 and 1997). The pollock consumed by fur seals are primarily age zero and age one fish. Older age groups of pollock may appear in the diet, particularly when young pollock are less abundant (Sinclair *et al.* 1997).

<u>Atka Mackerel</u>

Atka mackerel is in greatest abundance in the AI. A decrease in biomass of fish older than three years (18%) and spawning females (17%) was estimated from 2006 to 2007 (NPFMC 2006) within the Bering Sea and AI population. Evidence suggests that the GOA may be at the edge of the species range. It is possible that Atka mackerel only populate the GOA during periods when juvenile recruitment from the AI is strong (Lowe and Fritz 2000).

Marine mammals, mainly NFS and SSL, prey on Atka mackerel (Byrd *et al.* 1992; Livingston *et al.* 1993; Fritz *et al.* 1995; Yang 1996). It is a major prey species for SSLs in the Bering Sea and AI, and is the dominant species from the central AI west. The importance of Atka mackerel in SSL diet declines in winter when the availability of cod and pollock increase.

Pacific Cod

Pacific cod occur on the continental shelf and upper slope from Santa Monica Bay, California, through the GOA, AI, and EBS to Norton Sound (Bakkala 1984). The Bering Sea represents the center of greatest abundance, although Pacific cod are also abundant in the GOA and AI. An increase was estimated in biomass of cod aged at three years and up and spawning females from 2006 to 2007 in both the Bering Sea and AI (spawning females: 14%, three-year cod: 13%) and GOA regions (spawning females: 9%, three-year cod: 15%) (NPFMC 2006).

Pacific cod is known to be important prey for SSLs year around, becoming more significant during winter months when salmon are less available. Studies of winter diet indicate that Pacific cod have been a top prey item for both the western stock and the eastern stock of SSLs since the 1970s. Other predators of cod include NFSs, harbor porpoises, various whale species, and tufted puffins (Westrheim 1996).

Pacific Herring

Pacific herring is a pelagic species that occurs from California through the GOA and Bering Sea to Japan. Following spawning in the Bering Sea, herring move clockwise along the Alaska Peninsula to feed. They typically reach the Unimak Pass area by mid-summer. In late summer, herring from the Bering Sea move to overwintering areas in the vicinity of the Pribilof Islands (NPFMC 1998). In the GOA, spawning concentrations occur mainly off southeastern Alaska, in Prince William Sound (PWS), around Kodiak Island, and in Cook Inlet. However, little is known about GOA herring overwintering locations.

Evidence suggests that SSLs need fat-rich prey, such as herring, in their diet and may prefer to feed on herring during the winter in the GOA. However, the decline in herring stock over the past 20 years has translated to a potential decline in herring consumption by SSLs and a shift in diet to less fat-rich prey such as pollock. This shift has also been observed with NFSs. Herring are also important food sources for other marine mammals, fishes, and birds.

Pacific Salmon

Five species of Pacific salmon are found in the project area: pink, chum, sockeye, coho, and chinook salmon. These species are anadromous and have life cycle ranges that include coastal streams and river systems from central California to Alaska, and marine waters along the U.S. and Canada. Some of the more critical portions of these ranges are the freshwater spawning grounds and migration routes. Salmon are affected by a wide variety of factors in the ocean and on land, including ocean and climatic conditions, dams, habitat loss, urbanization, agricultural and logging practices, water diversion, and predators. Several wild salmon populations have disappeared from areas along California, Oregon and Washington where they used to flourish, and several evolutionarily significant units (ESUs) have been listed or proposed for listing as at risk for extinction under the ESA (Section 3.2.6.4).

Salmon are preyed upon by SSLs and NFSs and are also important food sources for other marine mammals, fish, birds, and terrestrial mammals.

3.2.6.3 Forage Fish

In 1999, the NPFMC amended FMPs to include a category for forage fish species. The amendments were developed to protect forage fish resources by controlling fishing harvest and identifying the importance of these species as indicators on the health of the ecosystem. The forage fish categories include a diverse group of fish species with high lipid content. Many of these species are R-selected species (e.g., capelin and sand lance), which generally have higher reproductive rates, shorter life spans, attain sexual maturity at younger ages, and have faster individual growth rates than K-selected species (e.g., rockfish and many flatfish), which are generally long-lived, reach sexual maturity at an older age, and grow slowly.

Forage species are known to exist throughout the project area, from intertidal areas to depths of over 1,000 m (Brodeur *et al.* 1999). These species play a critical role in the transfer of energy between primary producers (plankton) and top predators such as seabirds, larger fish, and marine mammals, including SSLs and NFSs. Forage fish are also harvested by recreational, commercial, and subsistence fisheries. The following forage fish species are recognized and managed by NMFS:

- Eulachon, capelin, and other smelts (Family: *Osmeridae*);
- Lanternfishes (*Myctophidae*);
- Deep-sea smelts (*Bathylagidae*);
- Pacific sand lance (*Ammodytidae*);
- Pacific sandfish (*Trichodontidae*);
- Gunnels (*Pholidae*);
- Pricklebacks, warbonnets, eelblennys, and cockscombs (*Stichaeidae*);
- Shannys (*Stichaeidae*); and
- Bristlemouths, lightfishes, and anglemouths (*Gonostomatidae*).

Forage fish have undergone large, unexplained fluctuations in abundance. Fluctuations in forage fish densities have been implicated as contributing factors in the decline of seabirds, NFSs, and SSLs in the North Pacific (Kultez *et al.* 1997). SSLs and NFSs primarily feed on capelin and other r-selected fish species and have evolved in an ecosystem in which fluctuations and changes in relative abundance of these species have occurred. These marine mammals are generalists that are not dependent on the availability of a single species to sustain them, but instead rely on a suite of species, any one (or more) of which is likely to be abundant each year. However, differences in energy content exist among forage species, with herring, sand lance, and capelin containing higher energy content per unit mass than other species such as juvenile pollock (Payne *et al.* 1999). It is possible that changes in availability of higher energy content forage fish may influence growth and survival of marine mammals reliant on forage species as their main prey.

3.2.6.4 ESA-Listed Pacific Salmon Species

An ESU is defined as a population that 1) is substantially reproductively isolated and 2) represents an important component in the evolutionary legacy of the species (Johnson *et al.* 1994). Currently, there are ESA-listed Pacific salmon ESUs that originate from freshwater habitat in Washington, Oregon, Idaho, and California (see Table 3.2-10). No stocks of Pacific salmon originating from freshwater habitat in Alaska are listed under the ESA. Although, six chinook ESUs, one sockeye ESU, and five steelhead (*O. mykiss*) ESUs can be found in Alaska waters during the marine phase of their life cycle (Trites *et al.* 2006a). These salmon stocks are mixed with, and not distinguishable from, hundreds to thousands of other non-listed salmon stocks originating from the Columbia and Willamette rivers, British Columbia, Alaska, and Asia.

Populations of Pacific salmon are declining due to anthropogenic and natural factors resulting in degraded water quality, inaccessible or degraded spawning habitat, resource competition, and increased predator populations (NOAA 2005b). Recent studies indicate that predation may significantly influence depleted salmon stocks. The predators of concern for these salmon stocks are piscivorous fish and birds, and marine mammals. While SSLs and NFSs do prey on salmon species, the principal marine mammal species affecting the depleted salmon stocks on the west coast are the increasing populations of Pacific harbor seals and California sea lions.

Table 3.2-10
Summary of the Endangered Species Act Status of Pacific Salmon

Species		ESA Listing Status
Sockeye Salmon *(Oncorhynchus nerka)*	Snake River	Endangered
	Ozette Lake	Threatened
Chinook Salmon *(O. tshawytscha)*	Sacramento River Winter-run	Endangered
	Upper Columbia River Spring-run	Endangered
	Snake River Spring/Summer-run	Threatened
	Snake River Fall-run	Threatened
	Puget Sound	Threatened
	Lower Columbia River	Threatened
	Upper Willamette River	Threatened
	Central Valley Spring-run	Threatened
	California Coastal	Threatened
Coho Salmon *(O. kisutch)*	Central California Coast	Endangered
	Southern Oregon/Northern California	Threatened
	Lower Columbia River	Threatened
Chum Salmon *(O. keta)*	Hood Canal Summer-run	Threatened
	Columbia River	Threatened
Steelhead *(O. mykiss)*	Southern California	Endangered
	Upper Columbia River	Threatened
	Central California Coast	Threatened
	South Central California Coast	Threatened
	Snake River Basin	Threatened
	Lower Columbia River	Threatened
	California Central Valley	Threatened
	Upper Willamette River	Threatened
	Middle Columbia River	Threatened
	Northern California	Threatened
	Puget Sound	Proposed Threatened

Source: NOAA 2006(d); http:www.nmfs.noaa.gov/pr/species/esa.htm

3.2.7 Other Marine Species

3.2.7.1 Invertebrates

A variety of invertebrates may be present within the project area including assorted mussels, crustaceans, sponges, squid, octopi, and jellyfish. Squid, octopus, crab, and shrimp are occasional prey of marine mammals and can be found in the Pacific Ocean from southern California to Alaska. Squid (order Teuthoidea) are cephalopod mollusks that are related to octopi. Several squid species, including the magistrate armhook squid (*Berryteuthis magister*), boreal clubhook squid (*Onychoteuthis borealijaponicus*), neon flying squid (*Ommastrephes bartrami*), and market or opal squid (*Loligo opalescens*) are found in the project area. In addition to being prey items to marine mammals, squid are also fed heavily upon by seabirds and some salmon species at certain times of the year. Species of octopus in the project area include the North Pacific giant octopus (*Enteroctopus dofleini*) and the flapjack octopus (*Opisthoteuthis California*). Octopus are thought to be primarily benthic, where they establish dens in rocky areas or dig dens in sand-shell substrates.

A variety of crab species, including Dungeness (*Cancer magister*), King (*Paralithodes camtschaticus*), snow (*Chionoecetes opilio*), and Tanner (*C. bairdi*) crabs, are present in the project area and generally live in bays, inlets, around estuaries, and on the continental shelf. Pandalid shrimp species in the project area include Northern pink shrimp (*Pandalus borealis*), found from Unalaska in the AI to San Diego, California; humpy shrimp (*P. goniurus*), which ranges from the Puget Sound to the Arctic Coast of Alaska; sidestripe shrimp (*Pandalopsis dispar*) located from Oregon to the Bering Sea; coonstriped shrimp (*P. hypsinotus*), found from the Strait of Juan de Fuca to the Bering Sea; and the spot shrimp (*P. platyceros*), which ranges from San Diego to Unalaska Island. Pandalid shrimp live mostly in the subtidal zone as adults and feed on polychaetes and small crustaceans.

3.2.7.2 Sea Turtles

Sea turtles are highly migratory, and four of the six species found in U.S. waters have been sighted off the west coast, including the leatherback (*Dermochelys coriacea*), green (*Chelonia mydas*), olive ridley (*Lepidochelys olivacea*), and loggerhead (*Caretta caretta*) sea turtles. All four sea turtles are listed under the ESA. NMFS and USFWS have finalized recovery plans between the years of 1991 and 1998 for each species. These recovery plans contain more detailed information on the species and are available on the NMFS, Office of Protected Resources, Marine Turtle Recovery Planning Website; http://www.nmfs.noaa.gov/pr/species/turtles/conservation/planning.htm.

Entanglement in fishing gear, or bycatch, is a largely unquantified, ongoing problem for sea turtles. NMFS requires modifications to fishing gear (e.g., turtle excluder devices) and time-area closures to help reduce sea turtle bycatch in some commercial fisheries. Habitat loss, egg poaching, marine debris, beach nourishment, and artificial lighting are also common threats to sea turtles.

3.2.7.3 Seabirds

There are hundreds of bird species that have been documented to reside, breed, or migrate through the project area (West 2002) (Figure 3.2-10). Many of these species would be unlikely to experience any effects from SSL and NFS research activities and will not be discussed. Birds that nest or feed on lands and nearshore waters used by SSLs and NFSs may be affected by some field research activities. These include several species of seabirds, waterfowl, raptors, shorebirds, and passerines. Seabirds that nest on islands used by SSLs and NFSs include fulmars, storm-petrels, gulls, terns, puffins, murres, auklets, and murrelets. Bald eagles, peregrine falcons, ravens, crows, jays, and several species of sparrows, thrushes, and warblers also nest on these islands. Other water birds that may be present in the vicinity of rookeries and haulouts include loons, grebes, sea ducks, phalaropes, oystercatchers, and sandpipers.

The USFWS is responsible for the conservation of birds in U.S. territory and conducts or participates in numerous programs to monitor habitat quality, population trends, and reproductive success of hunted and non-hunted species in coastal areas. The USFWS Division of Migratory Bird Management website, http://www.fws.gov/birds/Management.htm, provides links to a variety of survey programs, many of which can be queried for information about specific locations and species. The USFWS has an extensive program to monitor seabirds in Alaska (Figure 3.2-11), many of which nest on islands that are also used by SSLs and NFSs. The results from these surveys are published regularly (Dragoo *et al.* 2004).

There are a number of species in the project area that are listed as endangered or threatened under the ESA. In partial fulfillment of its obligations under the ESA, Section 7, NMFS has began consultations with the USFWS to determine the ESA listed birds that could occur within the project area. The following brief accounts of ESA-listed species provide their basic status and distribution relative to this project. See the cited references for additional natural history information. If necessary, this section will be updated to include other relevant species following further consultation with USFWS.

Bald eagles (*Haliaeetus leucocephalus*) are abundant in Alaska and have never been listed under the ESA in that state. However, the populations of bald eagles in Washington and Oregon have been listed as threatened under the ESA since 1978 (43 FR 6233). The USFWS originally proposed to delist the species in the Lower 48 states in 1999 (64 FR 36454) and has recently reopened public comments on that proposal (71 FR 8238). Regardless of the outcome of the delisting effort, bald eagles everywhere will remain protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668–668d).

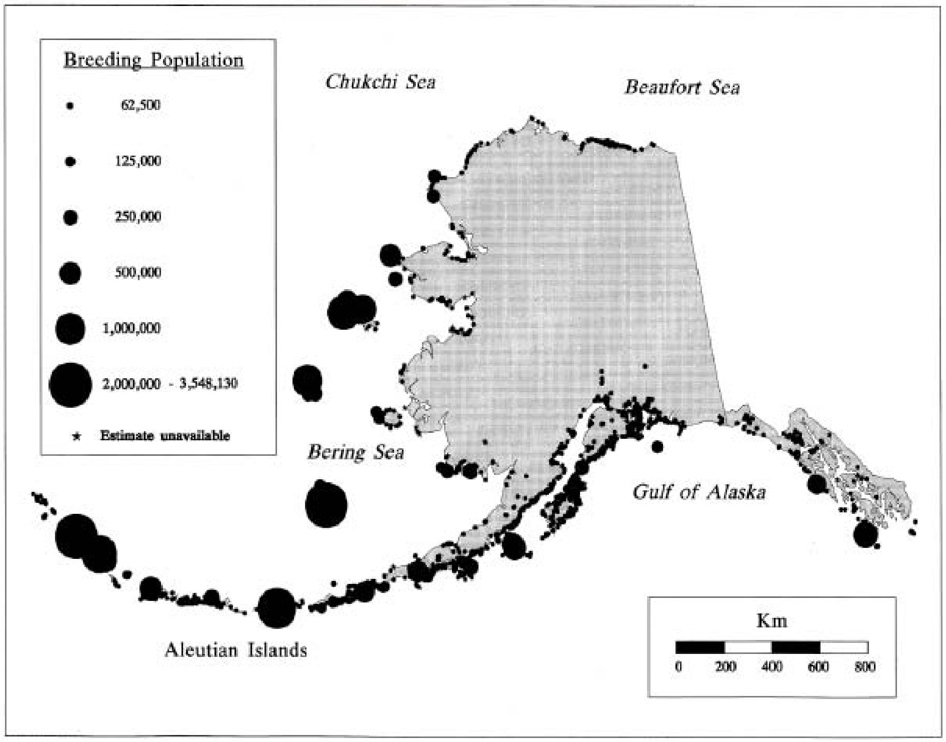

Figure 3.2-10 Seabird Colonies of Alaska.
Source: USFWS 2000.

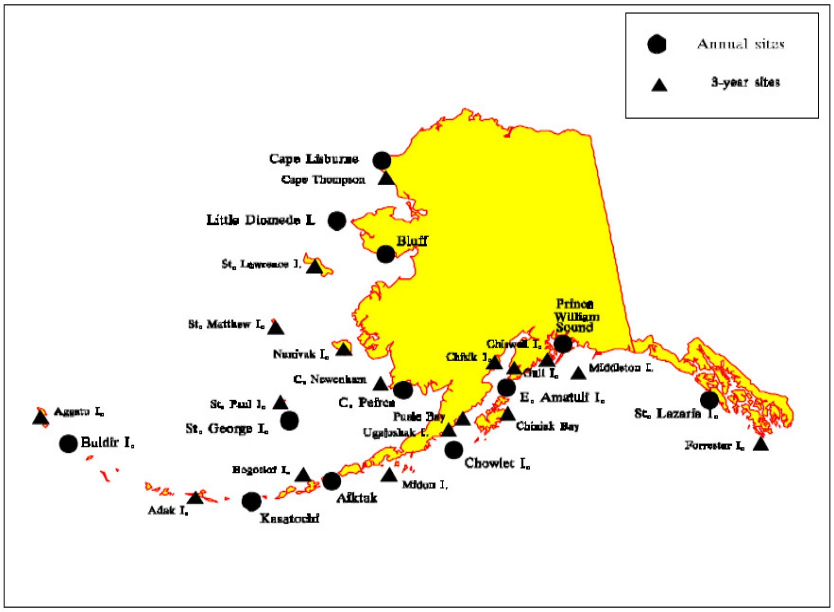

Figure 3.2-11. Location of Seabird Colony Sites in Alaska Monitored by the U.S. Fish and Wildlife Service and the USGS Biological Research Division.
Some sites are monitored annually (circles), while others are monitored on three-year rotation (triangles).
Source: NMFS 2004.

The short-tailed albatross (*Pheobastria albatrus*) was originally designated as endangered under the Endangered Species Conservation Act of 1969 as a foreign-listed species (because they do not nest in U.S. territory) and has been treated as an endangered species in U.S. waters since 1973 when the ESA replaced the 1969 Act (USFWS 2000). Short-tailed albatross have been observed in AI waters, the Bering Sea, and the GOA in all months of the year but do not come to land anywhere in Alaska (USFWS 2000). The USFWS determined that designation of critical habitat within the U.S. would not be beneficial to the short-tailed albatross (USFWS 1998 and 2000). Conservation efforts in the U.S. have focused on measures to minimize the incidental take of short-tailed albatross in commercial fisheries (NMFS 2004a).

Marbled murrelets (*Brachyramphus marmoratus*) are found along the Pacific coast of North America from California to the Bering Sea, with the largest concentrations in southeast Alaska and Kodiak Island (Piatt and Naslund 1995). This species was listed as threatened under the ESA in 1992 in Washington, Oregon, and California (57 FR 45328) but is not listed in Alaska. Critical habitat was designated in 1996 (61 FR 26255), but these areas are mostly inland and would not be affected by SSL or NFS research. Marbled murrelets travel back and forth between old-growth forests and the sea except for two months in the fall when the birds are flightless and stay at sea. Habitat loss and fragmentation by timber harvests and road building, oil spills, and incidental catch in fishing nets are all conservation concerns (DeGange 1996).

Kittlitz's murrelets (*Brachyramphus brevirostrus*) are endemic to the North Pacific Ocean, ranging discontinuously along the coast of Alaska with concentration areas in Glacier Bay, Malaspina Forelands, and PWS (Day *et al.* 1999). They nest at scattered sites located high on recently de-glaciated rocky slopes and forage in sheltered, nearshore waters that are glacially affected. The USFWS received a petition to list Kittlitz's murrelets as endangered under the ESA in 2001 (Center for Biological Diversity *et al.* 2001) and published a notice of intent to consider the species a candidate for listing on May 4, 2004 (USFWS 2004). Conservation concerns include glacial retreat due to global warming and oceanic regime shifts.

Steller's eiders (*Polysticta stelleri*) are small sea ducks that spend most of the year in nearshore marine waters, coming to land only to nest. Most of the Pacific population nests in Siberia, while a small number nest in Alaska on the Yukon-Kuskokwim Delta and the arctic coastal plain (USFWS 1999). The Pacific population winters primarily along the Alaska Peninsula and large numbers concentrate in Bristol Bay before spring migration (USFWS 2001a). Steller's eiders were listed as threatened under the ESA in 1997 (62 FR 31748) and critical habitat was designated in 2001 (USFWS 2001, Figure 3.2-12). Potential contributing factors to the population decline include predation, subsistence and sport hunting, consumption of lead shot on the breeding grounds, non-specific changes in the marine ecosystem, and toxic contamination from fish processing plants and other sources (USFWS 2001a).

Spectacled eiders (*Somateria fisheri*) are large, diving sea ducks that spend most of the year in marine waters. They nest and molt in northern Alaska coastal areas and congregate during the winter in exceedingly large and dense flocks in polynyas in the pack ice in the central Bering Sea between Saint Lawrence and Saint Matthew islands. The Alaska breeding population was listed as threatened under the ESA in 1993 (58 FR 27474) and critical habitat was designated in 2001 (USFWS 2001a), all of which is north of the Yukon-Kuskokwim Delta in areas that are not used frequently by SSL or NFS. Conservation concerns include subsistence hunting and consumption of lead shot on the breeding grounds (USFWS 2001a).

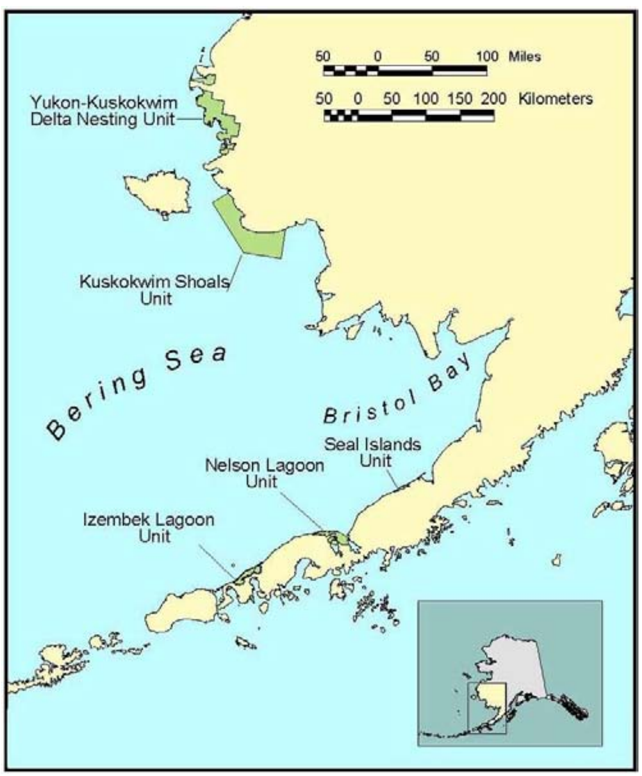

Figure 3.2-12. Steller's Eider Critical Habitat Areas.

The three areas on the north side of the Alaska Peninsula are used for molting in the fall, wintering, and staging during spring migration.

Source: USFWS (66 FR 8849).

California brown pelicans (*Pelecanus occidentalis californicus*) breed in nesting colonies on the rocky islands off California bearing steep rocky slopes, little vegetation, minimal human disturbances, and high-quality marine habitat. Non-breeding pelicans range from southern California to Washington (USFWS 1983). The California brown pelican were listed as endangered along the Pacific coast and other areas of the U.S. in 1970. Reasons for the marked decline of the species in the 1960s and 1970s include consumption of pesticide-laden fish, human disturbances, and lack of food (USFWS 1983). Because of the pelicans' recent recovery, the status of the species is currently under a five-year review initiated in May, 2006, to determine if delisting under the ESA is warranted (71 FR 29908).

California least terns' (*Sterna antillarum browni*) range extends along the Pacific coast of California, from San Francisco to Baja California. The birds nest in colonies on open beaches kept free of vegetation due to tidal scouring. The California least tern was listed as an endangered species in 1970, and is currently under a five-year review for delisting the species (70 FR 39327). Conservation concerns include habitat loss and El Nino events (USFWS 1985).

The western snowy plover (*Charadrius alexandrinus nivosus*) breeds on coastal beaches, sand spits, and dunes above the high tide line. The Pacific coast population of the western snowy plover was listed as endangered in 1993, and is currently under a five-year review for delisting the species (69 FR 13326). Conservation concerns include habitat loss and degradation caused by human disturbance, urban development, non-native beachgrass, and predators (USFWS 2001b).

Xantus's murrelets (*Synthliboramphus hypoleucus*) were listed as endangered under the California Endangered Species Act in 2002, and are designated as a candidate species for federal listing (Burkett *et al*. 2003). The breeding range of the Xantus's Murrelet is limited to the Channel Island of California and the west coast of Baja California, Mexico. Murrelets are more dispersed during the non-breeding season, extending from the Oregon coast to southern Baja California. The declining population among the Channel Islands is linked to predation by non-native (rats and feral cats) and native (island fox) species, oil pollution, and artificial light pollution (Burkett *et al.* 2003).

3.2.8 Ecosystem Interactions

A great deal of research on SSLs and NFSs is focused on testing various hypotheses concerning their population declines. These hypotheses propose different mechanisms to account for increased mortality and/or reduced reproductive success, including adverse interactions with commercial fisheries, regime shifts in the ocean environment, climate change, predation, hunting, contaminants, and disease. The extent of research efforts to test these hypotheses and the important results of that research are summarized in the respective species accounts and other sections of this chapter. Another hypothesis is that some of these factors are interacting in non-linear ways; that is, synergistically, to reduce the carrying capacity of the environment or to hold the populations below historical levels.

The PSEIS for the Alaska groundfish fisheries contained an extensive description of the North Pacific ecosystem and how it is influenced by climatic processes and fishing (Section 3.10 of NMFS 2004). In an ongoing effort to incorporate ecosystem-based management principles into fishery management, the annual Stock Assessment and Fisheries Evaluations (SAFE reports published annually by NMFS), contain an Ecosystems Considerations appendix that discusses recent advances in understanding multi-species interactions with the marine environment. The 2006 Draft Recovery Plan for SSL (NMFS 2006a) and the 2006 Draft Conservation Plan for NFS (NMFS 2006b) also contain summaries of the most recent ecosystem level research.

The physical and biological characteristics of the North Pacific Ocean ecosystem show variations on several time scales, including decadal scales (Schumacher and Alexander 1999; Trites *et al*. 2006b). Some fluctuations in fish, bird, and mammal populations seem to correlate with these decadal scale climate changes (Benson and Trites 2002; Piatt and Anderson 1996). One abrupt and major decadal scale change that is often discussed in the context of SSL population declines is the 1976/1977 regime shift that dramatically changed environmental conditions in the Bering Sea/AI and GOA (Benson and Trites 2002). However, there is considerable disagreement on the mechanisms and extent to which these environmental factors affected both fish and marine mammal populations.

During the first three quarters of the twentieth century, the growth of commercial fishing, whaling, and northern fur seal harvesting affected North Pacific Ocean ecosystems by targeting important components of the food web, including top predators (Trites *et al.* 1999). Commercial seal harvests and whaling ended in the 1980s but large-scale commercial fishing continues to the present. These human activities have affected the dynamics of competition and predation across many spatial and temporal scales, thereby directly or indirectly affecting populations of many species throughout the ecosystem. At the same time, natural environmental fluctuations, particularly climatic processes, have been major agents of change in North Pacific Ocean ecosystems (Robards 1999; Anderson and Piatt 1999; Meuter 1999; NMFS 2004a).

The effects of ocean climate change extend over different temporal, spatial, and population scales and influence the important biological processes of reproduction, growth, consumption, predation, movement, and survival of marine organisms. Human activities and oceanic fluctuations can therefore have overlapping effects on the ecosystem level that can change the carrying capacity of the environment for marine mammals. The difficulty is in trying to understand the relative contribution and combined impact of fisheries and other human perturbations with the impact of broad, regional events such as climatic shifts (Francis *et al.* 1999). The primary way scientists have attempted to address these ecosystem-level interactions is through modeling. Models can be as simple as conceptual diagrams that show a picture of how scientists think a certain ecosystem process operates or they can be complicated computer-based programs with quantitative descriptions of the relationships between various factors and the growth, reproduction, movement, or survival of different species.

Livingston (1997) and Hollowed *et al.* (2000) reviewed the status of models that have been developed to understand the effects of climate and fishing on ecosystems. These modeling efforts have been supported by data collection instituted in conjunction with fishery management programs, especially for the Bering Sea/AI and GOA groundfish fisheries. Hunt *et al.* (2002) proposed that the pelagic ecosystem in the southeastern Bering Sea alternates between bottom-up control in cold regimes and top-down control in warm regimes. In their proposed Oscillating Control Hypothesis, Hunt *et al.* (2002) hypothesize that when cold or warm conditions span decades, the survival and recruitment of piscivorous versus planktivorous fishes are variably affected, along with the capacity of fish populations, (and arguably, apex predator populations) to withstand commercial fishing pressures.

Recent models have been used to examine the relative importance and combined effects of commercial fishing, predation by killer whales, ocean climate change, and competitive interactions between different species on SSLs and their ecosystems as a whole (Trites *et al.* 1999, DeMaster *et al.* 2006, Guenette *et al.* 2006). These models indicate that bottom-up and top-down processes occur simultaneously and suggest that SSLs have been both positively and negatively affected by changes in their food base (due to fishing and ocean climate change), as well as by competition with large flatfish, and by the effects of predation by killer whales (particularly when sea lion numbers are low). These modeling efforts indicate that all four factors (fishing, ocean productivity, competition, and predation) likely contributed to the decreasing trends observed in the western DPS sea lions and the increasing trend in the eastern DPS (Guenette *et al.* 2006). Modeling efforts for ecosystem-level changes important to NFSs are not as advanced as they are for SSLs. Modeling studies have been a valuable tool for understanding complex interactions between human-caused and natural environmental changes. However, computer-based models are sensitive to the numerous assumptions made about mechanisms and interrelationships between ecosystem components that are based on relatively little data. Continued improvement in modeling efforts therefore depends on improved data from many different field studies.

3.3 Physical Environment

The project area considered in this document encompasses the entire range of SSLs and NFSs in California, Washington, Oregon, and Alaska, including the eastern (threatened) and western (endangered) populations of SSL. This area includes both state waters and the EEZ off the coasts of California, Washington, Oregon, and Alaska. However, most of the research under the proposed action would focus on animals located on rookeries and haulouts, and in waters surrounding these areas. The project area would also includes the facilities at the ASLC in Alaska.

3.3.1 The North Pacific Ocean, Bering Sea, and Gulf of Alaska Ecosystems

Bounded on the north and east by the North America land mass and essentially open to the west and south, the northeast "quadrant" of the Pacific Ocean includes the GOA and the Bering Sea. Although separated from the main ocean body by the AI, the Bering Sea is considered to be a northern extension of the northeast Pacific Ocean by virtue of hydraulic communication through the numerous passes and channels between the islands. On the west and south, the bounds of the northeast Pacific Ocean are generally considered to be the International Dateline and the northern 30th parallel, respectively.

Although dotted by numerous seamounts rising to within 1,000 m of the surface, seabed depths over most of the northeast Pacific Ocean tend to be greater than 4,000 m. Maximum depths of more than 7,000 m occur in the Aleutian Trench, which parallels and marks the southern base of the AI chain (Figure 3.3-1). Along the land boundary, the continental shelf (depth less than or equal to 200 m) is relatively narrow (less than 50 km) along the British Columbia and southeast Alaska coasts, and then broadens to 100 km or more along southcentral Alaska coast. Along portions of the Kenai and Alaska peninsulas, the continental shelf attains a width of nearly 200 km.

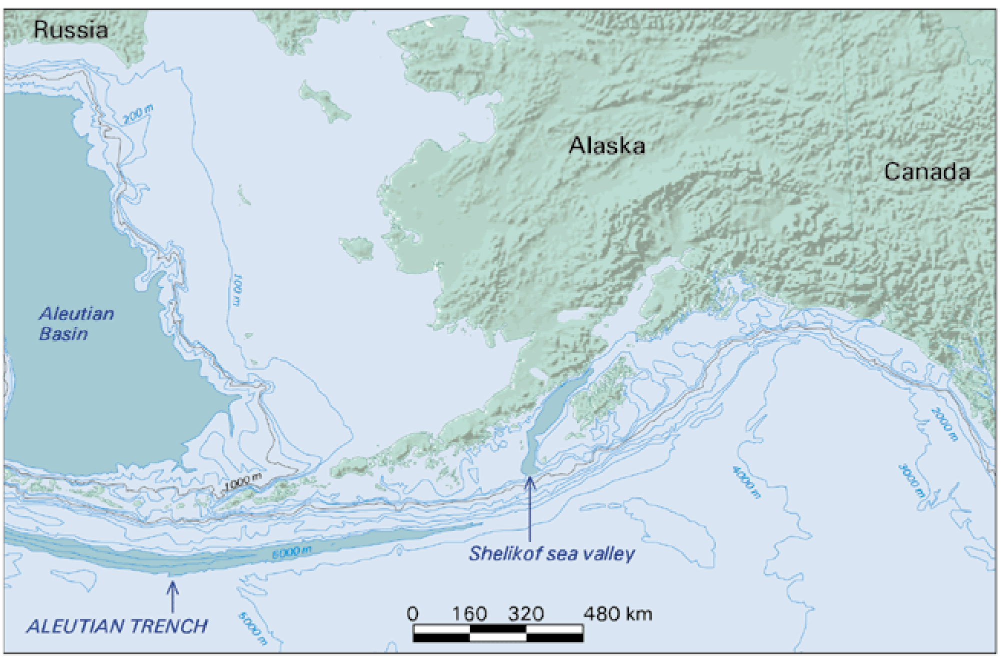

Figure 3.3-1. North Pacific Ocean
Source: http://access.afsc.noaa.gov/ichthyo/history.cfm

3.3.1.1 Bering Sea

The Bering Sea is a semi-enclosed, high-latitude sea. Of its total area of 2.3 million square km, 44 percent is continental shelf (depths less than 200 m), 13 percent is continental slope, and 43 percent is deep water basin (depths up to 3,800 m along the western margin of the sea). The EBS is characterized by an exceptionally broad (>500 km) shelf region with a narrow continental slope adjoining an extensive Aleutian Basin (see Figure 3.3-1). Its broad continental shelf on the east side of the Bering Sea is one of the most biologically productive areas in the world.

A special feature of the Bering Sea is the pack ice that covers most of its eastern and northern continental shelf during winter and spring. The dominant circulation of the water begins with the passage of North Pacific water (the Alaskan Stream) into the Bering Sea through the major passes in the AI (Figure 3.3-2) (Favorite *et al.* 1976). There is net water transport eastward along the north side of the AI, and a turn northward at the continental shelf break and at the eastern perimeter of Bristol Bay. Eventually Bering Sea water exits northward through the Bering Strait, or westward and south along the Russian coast, entering the western North Pacific via the Kamchatka Strait. Some resident water joins new North Pacific water entering Near Strait, which sustains a permanent gyre around the deep basin in the central Bering Sea.

The Pribilof Islands are situated within two large marine ecosystems: the EBS/AI and the GOA. Their continental shelf areas make up about 74 percent of the total area (2,900,785 square km) of U.S. continental shelves. They are located in the central Bering Sea, approximately 310 miles (500 km) west of the mainland and 185 miles (300 km) north of the Aleutian Chain. The Pribilof Islands support high concentrations of marine mammals, seabirds, fish, and invertebrates. This biodiversity and biological productivity results from the proximity of the islands to the continental shelf break, particularly Pribilof Canyon, along with the general ecological complexity of the isolated island habitat and its assemblage of nearshore habitats, sea cliffs, beaches, sand dunes, and coastal wetlands unique in the central Bering Sea (NMFS 2005b).

The Pribilof Islands are made up of two larger inhabited islands known as St. George and St. Paul islands, two small rocky islets called Otter Island and Walrus Island, and a small rocky outcropping known as Sea Lion Rock. St. George Island is 35 square miles in area, and is the southernmost island, located approximately 15 miles (25 km) from the shelf break. St. Paul is 44 square miles in area, and is the northernmost island, situated 47 miles (76 km) north northwest of St. George, and 62 miles (100 km) from the shelf break. Otter Island is located 9 miles (14 km) south of St. Paul, and Walrus Island is about 7 miles (11 km) east of St. Paul. Sea Lion Rock is about a quarter mile offshore of the southern tip of St. Paul (NMFS 2005b).

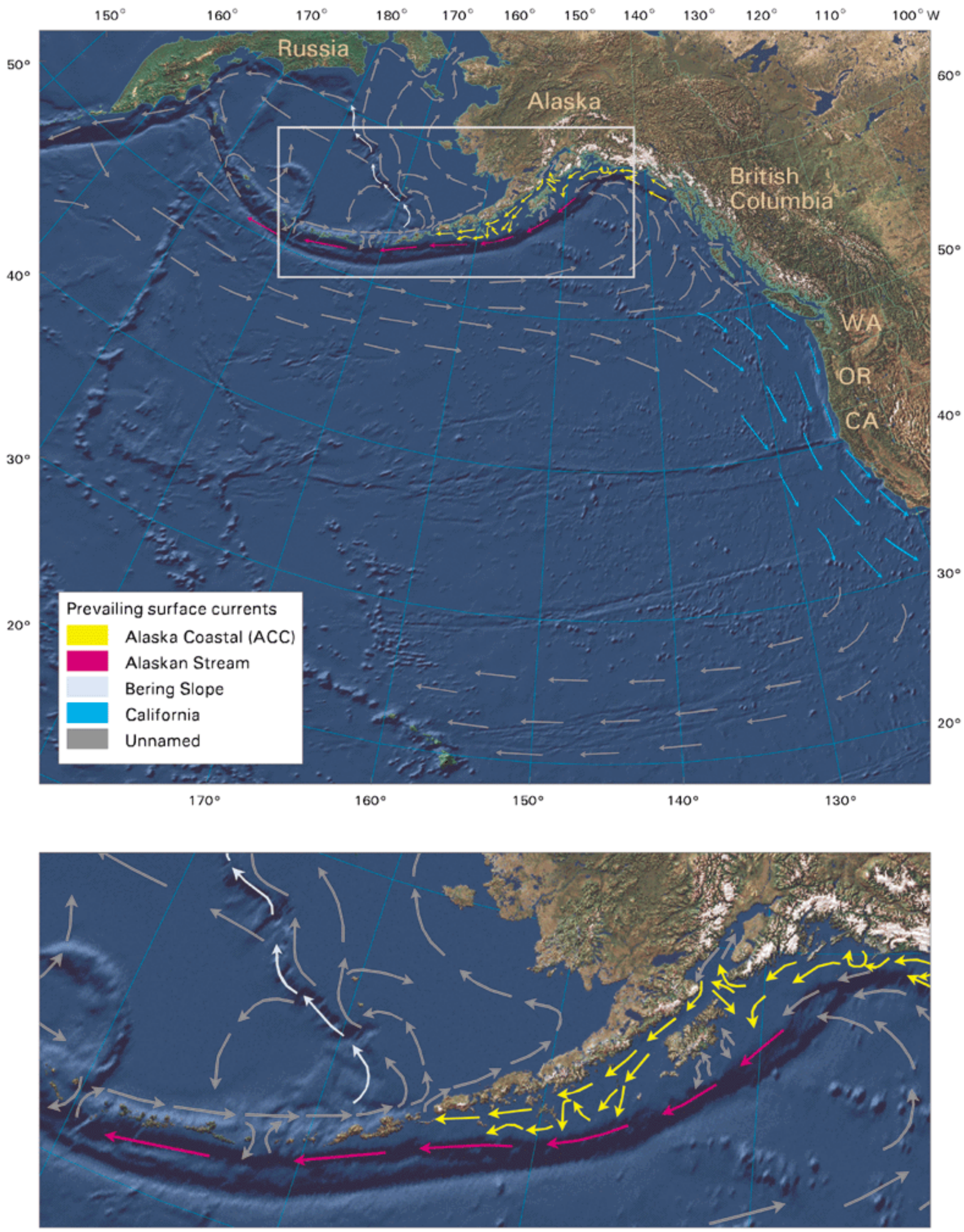

Figure 3.3-2 Circulation Patterns in the North Pacific Ocean
Source: http://access.afsc.noaa.gov/ichthyo/history.cfm

3.3.1.2 Gulf of Alaska

The GOA generally includes all waters within the EEZ along the southeastern, southcentral, and southwestern coasts of Alaska from Dixon Entrance to Unimak Pass, a distance along the Alaskan coastline of more than 2,500 km. Numerous troughs and shallow banks characterize the topography of the western GOA. The Aleutian shelf area, as defined by the 200 m isobath, is narrower than the EBS shelf (65-175 km) and drops abruptly to depths of 5000-6000 m in the Aleutian Trench, which parallels the shelf edge (see Figure 3.3-1). The Alaskan Stream, which flows southwesterly and roughly parallel to the shelf break at 50-100 centimeters per second (cm/sec), dominates offshore, near-surface circulation (see Figure 3.3-2). Nearshore, the Alaska Coastal Current (ACC) is the dominant feature (Reed and Schumacher 1986). The upper layer flows in a southwesterly direction. With surface speeds of 25-100 cm/sec, the ACC in the vicinity of Shelikof Strait is one of the most vigorous and dynamic coastal currents in the world (Stabeno *et al.* 1995). Temperatures follow a clear seasonal pattern, with the coldest values occurring in March and the warmest values in August (Reed and Schumacher 1986). Freshwater discharge into coastal waters peaks in the fall and strongly affects the circulation (Royer 1998). This region has been referred to as the Coastal Downwelling Domain and is characterized by mainly onshore flow at the surface (Ware and McFarlane 1989).

3.3.1.3 North Pacific Ocean Off of the United States West Coast

In contrast to the EBS and the western GOA, the continental shelf is narrow off the U.S. west coast (Figure 3.3-3). Off Washington and northern Oregon, the shelf width is less than 70 km, whereas off southern Oregon and northern California it narrows to less than 30 km, reaching a minimum of about 10 km off Cape Mendocino. A series of submarine canyons transect the shelf and slope off Washington and California. These canyons are absent off Oregon where rocky submarine banks are found along the shelf. The U.S. west coast is part of an extensive Coastal Upwelling Domain extending from Baja California to southern British Columbia (Ware and McFarlane 1989). The oceanography of this region is characterized by the California Current system, a typical eastern boundary current regime (Hickey 1989 and 1998) (see Figure 3.3-2). The main California Current proceeds southwards along the U.S. west coast and is slow, meandering, broad, and indistinct. Prevailing winds cause downwelling close to the coast in winter and upwelling of cold, nutrient-laden oceanic water close to the coast in summer. The intensity of Ekman transport and associated upwelling is variable along the coast and tends to increase from north to south with a local maximum at Cape Mendocino off northern California. Annual sea-surface temperature minimums and salinity maximums generally occur in summer after sustained upwelling-favorable winds.

Figure 3.3-3 North Pacific Ocean Off of the U.S. West Coast
Source: http://access.afsc.noaa.gov/ichthyo/history.cfm

3.3.2 Substrate

The EBS sediments are a mixture of the major grades representing the full range of potential grain sizes of mud (subgrades clay and silt), sand, and gravel (Smith and McConnaughey 1999). Sand and silt are the primary components over most of the seafloor, with sand as the predominate sediment in waters with a depth less than 60 m. In general, the fraction of finer-grade sediments increases (and average grain size decreases) with increasing depth and distance from shore. This grading is particularly noticeable on the southeastern Bering Sea continental shelf in Bristol Bay and immediately westward. However, there is considerable fine-scale deviation from the graded pattern, especially in shallower coastal waters and offshore of major rivers, due to local variations in the effects of waves, currents, and river input (Johnson 1983).

Considerable local variability in sediment type can be found in areas along the shores of Bristol Bay and the north coast of the Alaskan Peninsula, as well as west and north of Bristol Bay, especially near the Pribilof Islands.

There is a general pattern whereby nearshore sediments in the east and southeast on the inner shelf (0-50 m depth) often are sandy gravel and gravelly sand. These give way to plain sand farther offshore and west. On the middle shelf (50-100 m), sand gives way to muddy sand and sandy mud, which continues over much of the outer shelf (100-200 m) to the start of the continental slope. Sediments on the central and northeastern shelf (including Norton Sound) have not been extensively sampled, but Sharma (1979) reports that while sand is dominant in places, there are concentrations of silt both in shallow nearshore waters and in deep areas near the shelf slope. In addition, there are areas of exposed relict gravel possibly resulting from glacial deposits. These departures from a classic seaward fining of grain size are attributed to the large input of fluvial silt from the Yukon River and to flushing and scouring of sediment through the Bering Strait by the net northerly current (NMFS 2005a).

Compared to the Bering Sea, the GOA has relatively weaker currents and tidal action near the seafloor and, therefore, a variety of seabed types such as gravely-sand, silty-mud, and muddy to sandy gravel, as well as areas of hardrock (Hampton *et al.* 1986). Investigations of the northeast GOA shelf (less than 200 m) have been conducted between Cape Cleare (148° W) and Cape Fairweather (138°W) (Feder and Jewett 1987). The shelf in this portion of the GOA is relatively wide (up to 100 km). The dominant shelf sediment is clay silt originating primarily from either the Copper River or the Bering and Malaspina glaciers. Sediments are generally transported in a westerly fashion once they enter the gulf. Sand dominates the soil composition nearshore, especially close to the Copper River and the Malaspina Glacier.

3.3.3 Water Column

Temperature, salinity, and density remain constant with depth in the near-surface mixed-layer of the EBS, which varies from about 10-30 m in summer to about 30-60 m in winter (Reed 1984). Therefore, waters over the inner shelf (less than 50 m) are well-mixed most of the time. On the middle shelf (50-100 m), a two-layer temperature and salinity structure exists because of downward mixing of wind and upward mixing due to relatively strong tidal currents (Kinder and Schumacher 1981). On the outer shelf (100-200 m), a three-layer temperature and salinity structure exists due to downward mixing by wind, horizontal mixing with oceanic water, and upward mixing from the bottom friction due to relatively strong tidal currents. Oceanic water structure is present year-round beyond the 200-m isobath.

Overall, surface temperatures in winter vary from about -1° Centigrade (C) in the north to about 3°C in the south, then increase to a maximum in August of 8°C-12°C, with the higher temperatures nearshore. Surface salinities range from about 31.4 practical salinity units (psu) inshore to about 32.4 psu on the outer shelf to about 33.1 psu in the oceanic water. Lower salinities may be found close to shore near river mouths, and the patterns of the isohalines show low-salinity water from the GOA entering the Bering Sea at Unimak Pass and proceeding along the north side of the Alaska Peninsula to Bristol Bay (Royer 1981; Schumacher *et al.* 1982). The bottom salinities on the inner shelf also show this low-salinity feature north of the Alaska Peninsula. Bottom salinities over the entire shelf range typically from 31.4 psu to 32.8 psu, slightly higher than at the surface. The highest bottom salinities are present west of Unimak Pass in summer, possibly from enhanced inflow of oceanic water to the inner slope (NMFS 2004a).

Because of the plentiful coastal runoff in the eastern GOA and the general excess of precipitation over evaporation, the salinity changes dominate over temperature changes in controlling water density and thus water structure. Generally, water density increases with depth, but the greatest increase occurs in the permanent pycnocline at 30 m from the surface (25.0 ft thick) to 200 m from the surface (26.8 ft thick). Above this pycnocline lies a 30-m-deep constant density (25.0 ft) surface-mixed layer, and below this pycnocline are slowly increasing values, 26.8-27.7 ft from 200 to 1,500 m. The density structure closely follows the salinity structure with the permanent halocline marked by a rapid increase with depth, from 32.0 to 33.8 psu. This halocline is typically located between 30 and 200 m, underneath the surface-mixed layer. Below the halocline, salinity values slowly increase to 34.4 psu down to 1,500 m. These are the relatively permanent physical properties in the GOA and AI areas. Significant changes occur only rarely, with large-scale changes in circulation (Reed 1984).

3.3.4 Temperature and Nutrient Regimes

Surface waters have relatively low salinities in the North Pacific high latitudes because of excess precipitation and runoff over evaporation. Cooling these surface waters even to the freezing point does not make them sufficiently dense to cause them to descend any deeper than 200 m in the water column. Consequently, the deeper water in the North Pacific must originate elsewhere, and must flow in through the South Pacific because the connection with the Arctic Ocean, through the Bering Strait, is too narrow and shallow to be of consequence.

These deeper waters of the North Pacific originate in the southern (i.e., Antarctic) and North Atlantic Oceans, where the combination of surface temperatures and salinities produces very dense waters that subsequently sink to the sea floor. The Pacific Ocean has been described as a vast estuary, with low-salinity surface outflow from the North Pacific mixing with deeper, more saline water flowing in at depth through the South Pacific. Ultimately the increasingly dense North Pacific water returns to the areas of sinking in the North Atlantic to complete the circuit, which is estimated to take centuries to complete.

Nutrients are distributed throughout the world's oceans by this system of deep circulation. For example, inorganic phosphates are consumed by plant growth at the surface and are regenerated at greater depths as the plants die, sink, and decay. Consequently, nutrients are in greater concentrations at depths of 1 to 2 km than at the surface. Inflow of the deeper water into the Pacific Ocean brings in water that is high in phosphate compared to the average concentration in the Atlantic Ocean. As a result, the accumulated phosphate in the Pacific Ocean has a concentration about twice that of the Atlantic (NMFS 2004a).

3.3.5 Climatic Regime Shifts

A chronology of inter-decadal climatic changes affecting the North Pacific Ocean was compiled from available measured atmospheric pressure data by Minobe (1997) for the period 1899 through 1997. A climatic regime shift was defined as a transition from one climatic state to another within a period substantially shorter than the lengths of the individual epochs of each of the (two) climatic states. Data illustrated rapid strength changes in the Aleutian low in the winter and spring seasons. Bi-decadal pressure averages during 1899 through 1924 showed that the Aleutian low was about one millibar (mb) weaker than average, then strengthened to one mb below normal during 1925 through 1947. Similar behavior occurred in the later part of the twentieth century as the Aleutian low shifted back to one mb above normal from 1948 to 1976, and then strengthened back to one mb below normal during 1977 through 1997.

An update of evidence for regime shifts in the North Pacific Ocean in the 1920s, the 1940s, a major one in the winter of 1976/1977, and a minor one in 1988/1989 was presented recently at the North Pacific Marine Science Organization (PICES) symposium (Hare *et al.* 2000; Hare and Mantua 2000; McFarlane *et al. 2000*; Park and Oh 2000; Kang *et al. 2000*; Suga *et al. 2000;* Yasuda *et al. 2000;* Savelieva *et al. 2000*; Rogachev 2000; Overland *et al. 2000*; Miller and Schneider 2000; and Minobe 2000). Coincidently, the beginnings of another large change in 1998/1999 were mentioned at the symposium; these are discussed in more recent papers by Minobe (2002), Conners *et al.* (2002), Mantua and Hare (2002), and Schwing *et al.* (2002) (NMFS 2004a).

In the late 1970s a steep change in climate, referred to as a regime shift, occurred in the North Pacific Ocean. While evidence summarized by Minobe (1979) suggests there have been previous regime shifts, it was the 1970s regime shift that stimulated extensive research on the topic, with a particular focus on how oceanic ecosystems were responding to these phenomena. Although more than a decade was required to recognize the pattern, the regime shift of 1976/1977 is now widely acknowledged, as well as its associated far-reaching consequences for the large marine ecosystems of the North Pacific Ocean. The 1989 regime shift has been studied extensively by Hare and Mantua (2000) who assembled and examined 100 environmental time series of indices (31 climatic and 69 biological) to obtain evidence of regime shift signals. A few examples of these illustrate that such signals are evident in the Bering Sea/AI and GOA data.

Niebauer (1998) reports that prior to the late 1970s, below-normal sea ice cover in the Bering Sea was typically associated with El Niño/Southern Oscillation (ENSO) conditions. These conditions caused the Aleutian Low atmospheric pressure center to move east of its average or normal position, with the result that warm Pacific air was directed over the Bering Sea. Conversely, above-normal sea ice cover was associated with La Niña conditions, during which the Aleutian Low moves west of its normal position, allowing higher pressure and colder weather in the Bering Sea. However, since the 1970s regime shift, ENSO conditions are causing the Aleutian Low to move even farther east, causing winds to blow from the east and north off Alaska, and resulting in above-normal ice cover in the Bering Sea.

Before the regime shift, ENSO and La Niña conditions occurred with about the same frequency. Since the regime shift, ENSO conditions are about three times more prevalent. Both Mantua *et al.* (1997) and Minobe (1997) present evidence that this regime shift is the latest in a series of climate shifts that date back at least to the late 1800s and might be attributable to a 50- to 70-year oscillation in a North Pacific atmospheric-ocean coupled system.

Therefore, abundant evidence suggests that the coupled atmospheric-oceanic system of the North Pacific is subject to multiple forcing factors, each having characteristic behaviors and different frequencies of occurrence. The evidence also indicates that, rather than there being a single average or normal condition, the overall system appears to stabilize periodically around two or more normal states, changing from one to another abruptly in what has been termed a regime shift. These are the characteristics of systems whose dynamics are addressed by chaos theory, which is a body of mathematical theory that focuses on systems that have multiple states of equilibrium. Chaos theory attempts to define the mechanisms that cause the systems to change from one equilibrium state to another and to predict all such equilibrium conditions.

Using available sea level pressure and sea surface temperature data, along with coastal air temperature data from Sitka, Overland *et al.* (2000) formulated a conceptual chaotic model for the North Pacific. They were able to determine that the energy content of North Pacific time series of these parameters is broad-banded (i.e., over a broad frequency range) and temporally irregular (i.e., non-steady with respect to time). They reported that their conceptual model reflects the observed irregular behavior and suggests that the transitions from one equilibrium state to another are rapid rather than gradual.

A new review paper summarizes a pattern of multi-decadal (about 50 years) change in the Pacific Ocean (Chavez *et al.* 2003) characterized by about 25-year boom and 25-year bust cycles in the opposing anchovy-sardine populations. In the mid-1970s the change was from a cool anchovy regime to the warm sardine regime. Satellites have recently confirmed an increase in basin-wide sea-level slope after the 1997/1998 ENSO coincident with a dramatic increase in chlorophyll off California, indicating a shift back to a cool anchovy regime that occurred in the middle to late 1990s. The effects of ENSO in the tropics, which radiate north on a shorter cycle of three to seven years and have some unmeasured anthropogenic effects, may tend to mask some of the synchronicity of changes in the physical and biological systems (NMFS 2004a).

Long-term changes in fish populations around the North Pacific Ocean have apparently been influenced by climatic change of the same 50- to 70-year variability. Alaska salmon decreased in the 1940s and increased in the 1970s. Larger Japanese sardine catch amounts occurred in the regimes with the deepened Aleutian low. Baumgartner *et al.* (1992) found evidence of approximately 60-year variability in sardine and northern anchovy populations in the eastern North Pacific from sediments in the Santa Barbara basin dating back to A.D. 270 (NMFS 2004).

3.3.6 Distant Forcing Parameters

As described in Section 3.3.5, the phenomenon known as ENSO, as described by Philander (1990), has long been recognized as a significant factor in the interannual variability of atmospheric-oceanic response. ENSO events radiate from the equatorial regions at irregular intervals, but range most commonly from three to seven years between events. ENSO events account for approximately one-third of the ice and sea surface temperature variability in the Bering Sea (Niebauer and Day 1989). ENSO forcing in the oceans at high latitudes is primarily through poleward propagation of Kelvin waves (Jacobs *et al.* 1994). This conclusion is supported by data of Enfield and Allen (1980) who found poleward-propagating, coastal-trapped disturbances along the west coast of North America that were correlated with equatorial disturbances. Royer (1994) reported that ocean temperature fluctuations at depth at an oceanographic observation station near Seward (GAK 1) are well-correlated with ENSO events.

In addition to fluctuations associated with ENSO forcing, the water temperature variations at GAK 1 have been found to be associated with the lunar nodal tide component, which has a period of 18.6 years (Royer 1994). This tide component is the twelfth largest of all tidal components and is related to the 18.6-year periodicity of the lunar declination. Equilibrium tide theory predicts that this tidal component will vary with latitude, where amplitudes will increase with latitude (Parker *et al.* 1995). Because the inter-decadal sea surface variability seems to occur simultaneously in the GOA and Bering Sea, it is expected that this component forces Bering Sea parameters in a similar fashion as in the GOA. Temperature anomaly patterns are similar with no phase shift, which suggests that the forcing is simultaneous (NMFS 2004a).

3.3.7 Coastal Land Characteristics

3.3.7.1 Sanctuaries, Parks, and Historic Sites

Some existing and proposed research occurs within National Wildlife Refuges (NWRs). NWRs are maintained by USFWS, which may require holders of NMFS permits for research on SSLs to obtain special use permits for certain activities within the boundaries of an NWR. Refuges are established for three purposes: (1) the restoration, preservation, development, and management of wildlife and wetlands habitat; (2) the protection and preservation of endangered or threatened species and their habitat; and (3) the management of wildlife and wildlands to obtain the maximum benefits from these resources (NMFS 2005a).

The Alaska Maritime National Wildlife Refuge (AMNWR) includes over 3,000 islands, islets, rocks, pinnacles, and headlands from northwest Alaska into the Bering Sea and along 4,800 miles of Alaska's coastline and the Aleutian chain. Most of the AMNWR (2.64 million acres) is designated wilderness and has the most diverse wildlife species of all the NWRs in Alaska, including 15 to 30 million birds (80 percent of all Alaska seabirds, including species of puffins, kittiwakes, murres, petrels, auklets, murrelets, and gulls) representing about 55 species. In addition to SSLs, marine mammals such as harbor seals, walrus, sea otters, polar bears, and whales are also common within the AMNWR. Other animals within the AMNWR include bald eagles, peregrine falcons, bears, caribou, musk oxen, river otters, and foxes. The AMNWR also contains many Aleut archeological sites, as well as remnants of the only World War II battles fought on U.S. soil (NMFS 2005a).

3.3.7.2 Designated Critical Habitat Areas, Rookeries, and Haulouts

Critical habitat has been designated for SSLs in California, Oregon, and Alaska (50 CFR 226.202). See Section 3.2.1.2 in the SSL account for a description and maps. No critical habitat has been designated for any endangered whale species other than right whales. Right whale critical habitat has only been designated in the Atlantic Ocean (50 CFR 226.203), which is not within the project area. Critical habitat has been designated for several species of salmon and steelhead in California, Oregon, Idaho, and Washington (50 CFR 226.204, 226.205, 226.210, 226.211, and 226. 212). Critical habitat for salmon and steelhead includes stream channels within designated stream reaches, and a lateral extent determined by the ordinary high-water line or the bankfull elevation. Critical habitat in lake areas is defined by the perimeter of the lake on standard 1:24,000 scale maps or the high-water line. Estuarine critical habitat is defined by the area along the designated shore from the extreme high water line out to a depth of no greater than 30 meters relative to mean lower low water (50 CFR 226.204, 226.205, 226.210, 226.211, and 226. 212).

3.4 Social and Economic Environment

3.4.1 Subsistence Harvesting

This section describes the contemporary context of subsistence harvest of SSLs and NFSs in Alaska. In general, the subsistence use of natural resources by Alaska Native peoples represents a set of relationships with the local environment and a continuity of use that stretches back to prehistoric times, despite changes in technology and society. Subsistence activities are a central element of contemporary village life that often involve myriad social and cultural elements and whose importance ranges from being a basic component of physical sustenance to a part of relationships involved with a sense of group identity and individual feelings of well-being. Subsistence is also important to many of Alaska's non-Native residents, despite greater or lesser differences between groups in the specific cultural context of subsistence. In the case of SSLs and NFSs, however, non-Native residents may not participate in the taking of these animals. While subsistence take of sea lions and seals was common in prehistoric and historic times among residents of what are now the coastal areas of the states of Alaska, Washington, Oregon, and California, only Alaska Natives currently qualify for a subsistence take exemption for species that are otherwise protected under the terms of the MMPA of 1972 (as reauthorized in 1994 and amended through 1997; the specific exemption for Alaska Natives is found in Section 101 [16 U.S.C. 1371]) and the ESA. Specifically, the Alaska Native exemption within the MMPA allows for Alaska Natives who dwell on the coast of the North Pacific Ocean or Arctic Ocean to take marine mammals for the purposes of subsistence (or for the purposes of creating and selling authentic native handicrafts and articles of clothing).

3.4.1.1 SSL Subsistence Harvesting

<u>Harvest Levels and Regional Variation</u>

Two types of information are available on harvest levels of SSLs that are applicable across a broad geographic base. The first type of information derives from comprehensive, in-depth ADF&G subsistence surveys that are intended to provide an overall baseline for the contemporary subsistence harvest patterns in a given community. Most communities in Alaska now have such baseline documentation dating to the mid-1980s through the late 1990s. This baseline information has the benefit of closely documenting actual take, and permits analysis of the role of the harvests of SSLs and NFSs within the entire round of subsistence activity in a given community, notably the proportional contribution of harvest of these species overall subsistence production in a community. However, these comprehensive studies have not been repeated in most communities, and therefore suffer the limitation of not being particularly useful in examining time-series trends.

The second type of information derives from an annual sampling effort managed by ADF&G specifically directed toward SSL (and harbor seal) takes. This effort results in consistently produced annual estimates by community, providing the ability to more easily look at trends over time for over 60 communities. Most recently this research has been conducted by the Subsistence Division of ADF&G, the Alaska Native Harbor Seal Commission, and the Aleut Marine Mammal Commission, under contract with NMFS. The 2005 study (ADF&G Technical Paper No. 303) included information through 2004 on subsistence takes of harbor seals and sea lions in 62 coastal communities. Information for 61 communities was collected through interviews with persons in 1,209 Alaska Native households. In addition, the 2003 research included information on subsistence takes by hunters in St. Paul through a separate project run by the Ecosystem Conservation Office of The Aleut Community of St. Paul.

The survey instrument used in 2004 was similar to that used in the surveys administered between 1992 and 2003, which was developed in consultation with the Indigenous People's Council for Marine Mammals and the Rural Alaska Community Action Program. A number of Native governments, Native leaders, and special interest groups were also contacted during the research design phase, including: the Alaska Federation of Natives, the Aleutians East Borough, Aleutian-Pribilof Islands Association, Bristol Bay Native Association, Central Council of Tlingit and Haida Indian Tribes of Alaska, Cook Inlet Region Inc., Kodiak Area Native Association, and Chugachmiut.

Researchers selected households using three main designs, depending on the community being studied: census sampling, chain referral sampling ("snowball sampling"), and two-strata random sampling. Census sampling entailed the identification of all community households for surveying. For chain referral, surveyed households were identified by key respondents and other surveyed hunters in the community. Finally, the two-strata random design employed a mix of the two previously described sampling strategies, concentrating first on chain referral sampling and augmenting the sample size through a random draw of Alaska Native households in the community. Interviews were conducted by local researchers who were hired and trained for the project. Their efforts were augmented by regional staff from the Alaska Native Harbor Seal Commission and the ADF&G Division of Subsistence in some communities. Expansions, or extrapolations, of subsistence take numbers were applied to unsurveyed hunters within the community using different methods based upon the sampling design used and the proportion of households surveyed within the community. These expansions were generally straight extrapolations from data gathered, using the known numbers from contacted hunters as an average to be applied to hunters not surveyed[1] (ADF&G Technical Paper No. 303; Personal Communication with Jim Fall, 4/3/07). ADF&G calculated confidence ranges through the methods outlined in Cochran (1977:5.13, 5.15). Despite the sampling bias and statistical errors introduced through expansions, these surveys are some of the most intense and representative surveys of their type done in the state of Alaska. These surveys also provide researchers with a consistent dataset by which Alaskan communities can be compared across geographic space and time. Taken in conjunction with the baseline community surveys, these two types of data represent the best available information for SSL subsistence harvest across communities in Alaska.

The documented total community harvest information presented in this section is extracted from the ADF&G Community Profile Database. The Community Profile Database is a compilation of the data collected through the comprehensive baseline community surveys noted previously. While these are primarily focused on subsistence harvest documentation, they also typically include associated demographic and economic information. As noted, analysis of trends is not possible with these data. The comprehensive baseline community surveys are not repeated on a regular schedule. Where these studies have been repeated for a community at several points in time, it is typically due to a link to other ongoing studies or directed toward specific resource management questions. Specific management concerns can also result in detailed studies of subsistence harvests of a particular species, as is the case with the lengthy series of studies of SSL and harbor seal subsistence harvests. Thus, the time series information from some communities and for some resource categories is better than for others. For some communities, only a single year baseline survey is available, and for many communities this information is now as much as two decades old. Furthermore, even for communities with multiple years of information available, the interpretation of the differences from year to year can be complex and problematic.

Because community subsistence activities and harvests vary each year, and surveys are not conducted annually or even within an overall temporal sampling design, the results from different years cannot simply be averaged. Where information for more than one year is available, ADF&G has addressed this problem by designating one year's results as "most representative" of the overall pattern of subsistence activities and level of harvest for that given community. This designation is based on ethnographic and other non-survey community context information. This limitation is especially important for communities for which information is rather dated.

Table 3.4-1 presents information derived from ADF&G surveys of all subsistence resources harvested by a given community plus the specific SSL harvest for communities with reported sea lion harvests. Together, these two

[1] For the interested reader, ADF&G Technical Papers typically contain the data for both unexpanded and expanded subsistence takes. For example, unexpanded and expanded numbers for 2004 by region and community are present in Appendices B and C, respectively, of ADF&G Technical Paper No. 303.

types of information allow for at least a rough assessment of the relative dependency of a community on SSLs within the overall subsistence harvest. A major caveat for the information contained in this table is that each community was surveyed only a limited number of times and for different years than most other communities, meaning comparability between communities is limited. It is also important to note that the documented SSL percentage of total subsistence harvest shown in the table is a measure of the use and reliance upon this resource at the time of the study (i.e., 1980-1997). Percentages for those communities studied in the 1980s almost certainly does not represent the current harvest, which generally is assumed to be much lower than that in the past. For Atka, Akutan, Old Harbor, St. George, and St. Paul (and perhaps Unalaska and several other communities), SSLs have represented, in the past, a substantial resource in terms of relative contribution to overall community subsistence resource consumption. It should also be clearly noted that the information in Table 3.4-1 taken from the comprehensive baseline studies is not totally consistent with the information presented in Tables 3.4-2 through 3.4-8, which is taken from the intensive SSL subsistence harvest surveys conducted from 1992 to 2004. Different sampling and statistical expansion methods were involved in the two types of studies. ADF&G considers the time series data to be the more accurate assessment of SSL harvest (personal communication, Fall 2006). What is evident, however, is that the area of heaviest subsistence use of SSLs is in southwestern Alaska and is concentrated in relatively few communities.

Tables 3.4-2 through 3.4-8 present estimates extrapolated from sample surveys documenting SSL subsistence harvest in all Alaskan communities for the period 1992 (the first year of focused surveys on SSL [and harbor seal] harvests) through 2004, except for 1999, when no survey was conducted due to lack of funding. Nine communities surveyed in previous years could not be included in the 2000 survey, however, as local surveyors could not be secured. For these communities (Anchorage, Atka, Homer, Hydaburg, Kenai, Nikolski, St. George, Tyonek, and Valdez), ADF&G estimated that the SSL harvest in 2000 was the same as in 1998 (the most recent year for which harvest information was available). In addition, the 2000 harvest survey for a tenth community, St. Paul, was conducted independently by a local hunter association with funding from NMFS.

As shown in Table 3.4-2, total overall SSL takes declined sharply from 1992 to 1995, with takes leveling off in subsequent years. Especially dramatic decreases in take are seen in the Pribilof Islands over the 1992-2004 time span.

Table 3.4-1
Documented Total Community Subsistence Harvest and Relative Dependence on SSL Harvest,[1] Alaskan Coastal Communities.

Community	Region	Year	Total community subsistence harvest (edible pounds)	SSL		
				Number harvested	Edible pounds	% Community harvest
Alakanuk	W	1980	431,904	9	1,200	0.3
Quinhagek	W	1982	536,584	16	2,286	0.4
Sitka	SE	1996	1,749,772	2	400	0.0
Chenega Bay	SC	1993	27,809	12	997	3.6
Nanwalek	SC	1997	42,593	5	1,048	2.5
Tatitluk	SC	1997	322,915	19	3,712	1.1
Akhiok	SW	1992	25,735	3	600	2.3
Akutan	SW	1990	47,397	38	7,688	16.2
Aleknagik	SW	1989	54,079	2	221	0.4
Atka	SW	1994	37,307	44	8,700	23.3
False Pass	SW	1988	28,586	1	220	0.8
Iliamna	SW	1991	82,915	1	130	0.2
Ivanof Bay	SW	1989	15,677	1	150	1.0
Manokotak	SW	1985	118,337	16	1,639	1.4
Nikolski	SW	1990	36,945	26	5,143	13.9
Old Harbor	SW	1997	88,851	37	7,442	8.4
Ouzinkie	SW	1997	55,015	1	264	0.5
Perryville	SW	1989	45,729	11	2,067	4.5
Port Lions	SW	1993	78,371	2	356	0.5
St. George	SW	1994	11,330	3	556	4.9
St. Paul	SW	1994	131,814	141	28,214	21.4
Unalaska	SW	1994	355,081	72	14,423	4.1

Notes: [1]Numbers are for the "most representative" year for which information is available. ADF&G does only limited surveys and subsistence use can vary greatly from year to year. Communities with documented use but no harvest are not included.
Source: ADF&G Community Profile Database 2001.

Table 3.4-2
Estimated Subsistence Take of SSLs, by Area in Alaska, 1992-2004.

Area	Year											
	1992	1993	1994	1995	1996	1997	1998	2000	2001	2002	2003	2004
Southeast Alaska	6 (1)	1 (1)	5 (1)	0 (0)	0 (0)	0 (0)	8 (4)	2 (0)	0 (0)	7 (0)	7 (5)	12 (7)
North Pacific Rim	32 (7)	35 (9)	26 (10)	31 (3)	14 (1)	6 (1)	29 (9)	17 (5)	15 (0)	6 (0)	25 (6)	54 (16)
Upper Kenai-Cook Inlet	10 (4)	11 (3)	1 (0)	0 (0)	3 (0)	0 (0)	0 (0)	0 (0)	1 (0)	0 (0)	0 (0)	0 (0)
Kodiak Island	58 (16)	58 (17)	61 (4)	137 (8)	60 (6)	38 (5)	18 (3)	19 (0)	35 (2)	16 (0)	36 (6)	17 (4)
South Alaska Peninsula	2 (0)	6 (1)	6 (1)	8 (8)	5 (1)	8 (0)	9 (0)	13 (0)	12 (1)	8 (4)	5 (2)	4 (0)
Aleutian Islands	135 (31)	124 (25)	122 (21)	96 (11)	58 (6)	52 (1)	37 (6)	76 (5)	98 (20)	105 (18)	107 (19)	96 (25)
Pribilof Islands	297 (120)	245 (80)	193 (44)	68 (10)	46 (14)	56 (10)	78 (25)	43 (14)	38 (19)	43 (19)	32 (10)	32 (10)
South Bristol Bay	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
North Bristol Bay	8 (0)	7 (3)	1 (0)	0 (0)	0 (0)	4 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0)
TOTAL	548 (179)	487 (139)	415 (81)	340 (40)	186 (28)	164 (17)	179 (47)	170 (24)	199 (42)	185 (41)	212 (48)	216 (62)

Note: Take estimate is by individual sea lions and includes both harvested and struck and lost animals. Struck and lost animal values are presented parenthetically in each field. Values are rounded to nearest integer; sum of communities may not equal regional total in previous table due to rounding error.
Source: ADF&G 2005.

Table 3.4-3
Estimated Subsistence Take of SSLs, Southeast Alaska Communities, 1992-2004.

Area	Year											
	1992	1993	1994	1995	1996	1997	1998	2000	2001	2002	2003	2004
Angoon	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Craig	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	3 (0)
Hoonah	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	5 (5)	7 (7)
Juneau	0 (0)	0 (0)	1 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0)	0 (0)
Kake	0 (0)	0 (0)	1 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0)	0 (0)
Klawock	1 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0)	0 (0)	1 (0)	2 (0)	1 (0)
Sitka	5 (1)	1 (1)	2 (1)	0 (0)	0 (0)	0 (0)	8 (4)	0 (0)	0 (0)	6 (0)	0 (0)	0 (0)
TOTAL	6 (1)	1 (1)	4 (1)	0 (0)	0 (0)	0 (0)	8 (4)	2 (0)	0 (0)	7 (0)	7 (5)	11 (7)

Note: Take estimate is by individual sea lions and includes both harvested and struck and lost animals. Struck and lost animal values are presented parenthetically in each field. Values are rounded to the nearest integer; sum of communities may not equal regional total in previous table due to rounding error.
Source: ADF&G 2005.

Table 3.4-4
Estimated Subsistence Take of SSLs, North Pacific Rim and Upper Kenai-Cook Inlet Alaska Communities, 1992-2004.

Area	Year											
	1992	1993	1994	1995	1996	1997	1998	2000	2001	2002	2003	2004
Chenega Bay (NPR)	8 (1)	18 (7)	7 (0)	7 (0)	2 (0)	0 (0)	0 (0)	0 (0)	1 (0)	0 (0)	2 (2)	0 (0)
Cordova (NPR)	0 (0)	2 (0)	0 (0)	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	4 (0)	4 (0)	3 (0)	3 (0)
Nanwalek (NPR)	6 (0)	10 (1)	4 (2)	9 (0)	5 (1)	0 (0)	2 (0)	7 (0)	4 (0)	2 (0)	5 (2)	2 (0)
Port Graham (NPR)	5 (1)	1 (0)	0 (0)	12 (2)	1 (0)	0 (0)	1 (0)	5 (3)	0 (0)	0 (0)	1 (0)	13 (6)
Seldovia (NPR)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	2 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Tatitlek (NPR)	13 (4)	5 (1)	16 (7)	3 (0)	5 (0)	4 (1)	22 (7)	2 (0)	6 (0)	0 (0)	14 (1)	37 (10)
Valdez (NPR)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	3 (2)	3 (2)	0 (0)	0 (0)	0 (0)	0 (0)
Anchorage (UK-CI)	10 (4)	11 (3)	1 (0)	0 (0)	1 (0)	0 (0)	0 (0)	0 (0)	1 (0)	0 (0)	0 (0)	0 (0)
Kenai (UK-CI)	0 (0)	0 (0)	0 (0)	0 (0)	2 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
TOTAL	42 (10)	47 (12)	28 (9)	32 (3)	16 (1)	6 (1)	28 (9)	17 (5)	16 (0)	6 (0)	25 (5)	55 (16)

Note: Take estimate is by individual sea lions and includes both harvested and struck and lost animals. Struck and lost animal values are presented parenthetically in each field. Values are rounded to the nearest integer; sum of communities may not equal regional total in previous table due to rounding error.
Source: ADF&G 2005.

Table 3.4-5
Estimated Subsistence Take of SSLs, Kodiak Island Alaska Communities, 1992-2004.

Area	Year											
	1992	1993	1994	1995	1996	1997	1998	2000	2001	2002	2003	2004
Akhiok	4 (1)	0 (0)	3 (0)	2 (1)	7 (1)	8 (1)	3 (0)	3 (0)	1 (0)	0 (0)	4 (1)	1 (0)
Kodiak City	0 (0)	13 (13)	1 (0)	2 (0)	3 (0)	3 (0)	1 (1)	2 (0)	3 (0)	3 (0)	0 (0)	0 (0)
Larsen Bay	1 (0)	0 (0)	2 (0)	3 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Old Harbor	46 (13)	33 (1)	48 (1)	113 (6)	50 (5)	26 (4)	13 (2)	13 (0)	29 (2)	9 (0)	32 (4)	12 (4)
Ouzinkie	3 (0)	8 (2)	7 (3)	16 (0)	0 (0)	0 (0)	0 (0)	0 (0)	3 (0)	5 (0)	0 (0)	3 (0)
Port Lions	3 (2)	5 (1)	0 (0)	0 (0)	0 (0)	1 (0)	1 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0)
TOTAL	57 (16)	59 (17)	61 (4)	136 (8)	60 (6)	38 (5)	18 (3)	18 (0)	36 (0)	17 (0)	36 (5)	17 (4)

Note: Take estimate is by individual sea lions and includes both harvested and struck and lost animals. Struck and lost animal values are presented parenthetically in each field. Values are rounded to the nearest integer; sum of communities may not equal regional total in previous table due to rounding error.
Source: ADF&G 2005.

Table 3.4-6
Estimated Subsistence Take of SSLs, South Alaska Peninsula Alaska Communities, 1992-2004.

Area	Year											
	1992	1993	1994	1995	1996	1997	1998	2000	2001	2002	2003	2004
Chignik Lagoon	0 (0)	1 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Ivanof Bay	0 (0)	4 (1)	0 (0)	0 (0)	2 (0)	2 (0)	2 (0)	0 (0)	3 (1)	3 (1)	0 (0)	0 (0)
King Cove	1 (0)	1 (0)	4 (1)	5 (0)	0 (0)	4 (0)	4 (0)	4 (0)	3 (0)	2 (2)	0 (0)	2 (0)
Perryville	1 (0)	0 (0)	1 (0)	3 (0)	3 (1)	2 (0)	1 (0)	5 (0)	1 (0)	4 (1)	4 (2)	2 (0)
Sand Point	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	2 (0)	5 (0)	5 (0)	0 (0)	1 (0)	0 (0)
TOTAL	2 (0)	6 (1)	5 (1)	8 (0)	5 (1)	8 (0)	9 (0)	14 (0)	12 (1)	9 (4)	5 (2)	4 (0)

Note: Take estimate is by individual sea lions and includes both harvested and struck and lost animals. Struck and lost animal values are presented parenthetically in each field. Values are rounded to the nearest integer; sum of communities may not equal regional total in previous table due to rounding error.
Source: ADF&G 2005.

Table 3.4-7
Estimated Subsistence Take of SSLs, Aleutian Islands and Pribilof Islands Alaska Communities, 1992-2004.

Area	Year											
	1992	1993	1994	1995	1996	1997	1998	2000	2001	2002	2003	2004
Adak (AI)	-	-	-	-	-	-	-	-	-	-	1 (0)	3 (1)
Akutan (AI)	30 (4)	23 (9)	16 (14)	6 (0)	16 (5)	6 (0)	6 (0)	5 (1)	18 (3)	3 (0)	9 (0)	5 (0)
Atka (AI)	39 (10)	25 (0)	54 (9)	40 (0)	17 (0)	12 (0)	17 (0)	17 (0)	45 (12)	86 (12)	82 (13)	63 (13)
Nikolski (AI)	8 (0)	6 (0)	0 (0)	-	3 (0)	3 (0)	1 (0)	1 (0)	7 (0)	1 (0)	0 (0)	2 (0)
Unalaska (AI)	59 (17)	69 (16)	52 (8)	50 (11)	22 (6)	30 (1)	13 (6)	53 (3)	28 (5)	16 (6)	16 (6)	23 (11)
St. George (PI)	70 (55)	19 (15)	20 (17)	8 (4)	8 (4)	28 (8)	20 (9)	20 (9)	14 (7)	7 (1)	14 (5)	14 (5)
St. Paul (PI)	227 (65)	227 (65)	173 (26)	60 (6)	38 (10)	28 (2)	58 (17)	23 (6)	24 (12)	36 (18)	18 (5)	18 (5)
TOTAL	433 (151)	369 (105)	315 (74)	164 (21)	104 (25)	107 (11)	115 (32)	119 (19)	136 (39)	149 (37)	140 (29)	128 (35)

Note: Take estimate is by individual sea lions and includes both harvested and struck and lost animals. Struck and lost animal values are presented parenthetically in each field. Values are rounded to the nearest integer; sum of communities may not equal regional total in previous table due to rounding error.
Source: ADF&G 2005.

Table 3.4-8
Estimated Subsistence Take of SSLs, South Bristol Bay and North Bristol Bay Alaska Communities, 1992-2003.

Area	Year											
	1992	1993	1994	1995	1996	1997	1998	2000	2001	2002	2003	2004
All South Bristol Bay Communities	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Manokotak (North Bristol Bay)	4 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Togiak (North Bristol Bay)	4 (0)	7 (3)	1 (0)	0 (0)	0 (0)	4 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Twin Hills	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0)
TOTAL	8 (0)	7 (3)	1 (0)	0 (0)	0 (0)	4 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0)

Note: Take estimate is by individual sea lions and includes both harvested and struck and lost animals. Struck and lost animal values are presented parenthetically in each field. Values are rounded to the nearest integer; sum of communities may not equal regional total in previous table due to rounding error.

Source: ADF&G 2005.

Table 3.4-3 provides information by community for the southeast Alaska region for 1992-2004. As shown, regional harvest levels are relatively modest and for some years no SSLs were taken for subsistence in the entire region. Total subsistence take for the region never exceeded 11 SSLs during this period. Table 3.4-4 provides similar subsistence take information by community for the southcentral Alaska region. As indicated in the table, there has been considerable variation from year to year and between communities, such that in any given year one of several different communities may have accounted for the highest level of take within the region.

Table 3.4-5 provides annual community SSL harvest level estimates for the Kodiak region for 1992-2004. While there is considerable variation by year, the concentration of take in Old Harbor within this region is apparent. Table 3.4-6 provides analogous take information from the south Alaska Peninsula communities. The modest levels of take for this region are relatively evenly distributed across the communities.

As shown in Table 3.4-7, the Aleutian/Pribilof Islands region is the center of SSL subsistence activity in terms of total numbers of SSLs taken. Several communities have high levels of use relative to others, but use generally became more evenly distributed across a number of communities following a sharp decline in takes in St. Paul after 1994. The community of Atka became predominate between 2002-2004, accounting for over half the annual total take in the two regions each year. Table 3.4-8 for Bristol Bay, shows that between 1992 and 2004, only three communities in the region had any estimated take and the years of no estimated take exceeded the number of years with at least some estimated take.

Looking across regions, in 2004 approximately 45 percent of the total subsistence take of SSLs occurred in the AI region, about 25 percent in the North Pacific Rim region, about 8 percent in the Kodiak Island region, and about 15 percent in the Pribilof Islands region. The southeast Alaska and south Alaska Peninsula regions accounted for about 6 and 2 percent, respectively, of the total subsistence take in 2004, while the north Bristol Bay region accounted for less than 1 percent of take. In 2004 a total of 21 of the 62 surveyed communities reported harvesting SSLs, with 9 communities reporting takes of five or more SSLs. The seven top ranking communities were Atka (63 SSLs), Tatitlek (37 SSLs), Unalaska (23 SSLs), St. Paul (18 SSLs), St. George (14 SSLs), Port Graham (13 SSLs), and Old Harbor (12 SSLs). These seven communities accounted for 180 SSLs, or 83 percent of the total Alaska subsistence take.

The number of individuals reporting hunting SSLs has also declined substantially since the early 1990s. The estimated numbers of households that reported at least one member hunting SSLs were 199 (1992), 222 (1993), 210 (1994), 158 (1995), 130 (1996), 97 (1997), 111 (1998), 86 (2000), 98 (2001), 102 (2002), 97 (2003), and 98 (2004). In general, declines in the numbers of SSL hunters occurred at a time when SSLs became increasingly hard to find in local hunting areas and consequently more difficult and expensive to hunt. Rate of success, however, has not tracked in parallel with numbers of hunters or reported increases in time and effort necessary to hunt successfully. The proportion of unsuccessful hunting households for SSLs has been 30 percent (1992), 35 percent (1993), 40 percent (1994), 24 percent (1995), 35 percent (1996), 23 percent (1997), 33 percent (1998), 19 percent (2000), 21 percent (2001), 31 percent (2002), 22 percent (2003), and 22 percent (2004) (ADF&G 2005).

Steller Sea Lion Subsistence Methods

SSLs are taken for subsistence by a number of methods throughout the year. There is seasonal variation in the take. According to the 2003 ADF&G survey, while SSLs were reported taken in every month except June, success was greatest in November and lowest in May, June, and July. Unlike a number of other subsistence activities that are more broadly participatory, hunting for SSLs is a relatively specialized activity, and a relatively small core of highly successful hunters from a limited number of households account for most of the harvest. For the years surveyed, individuals from only 20 to 29 percent of all households in the relevant communities actually hunted SSL (Wolfe 2001). Once harvested, SSL is distributed among a much wider range of households than those participating in the harvest (Wolfe and Hutchinson-Scarbrough 1999; Wolfe 2001).

There has been some change in harvesting techniques over recent years, and there is also variation by region. For Kodiak Island communities, the SSL harvest used to take place at their haulouts, and 20 or 30 were transported at a time aboard purse seiners. Thus, one or two hunters could supply an entire village. Currently, hunting SSLs typically involves two or three individuals using skiffs to hunt in open water. The hauling capacity of such skiffs is one or two animals and Kodiak hunters prefer to take young adults of medium size rather than large bulls or young pups. Some SSLs are taken from locations where they are known to swim close to the shoreline. The animal is then retrieved using a skiff. Peak months for harvest are October through December (Hayes and Mishler 1991).

Hunting methods vary somewhat in the AI and Pribilof Islands and are documented in Wolfe and Mishler (1995). Pribilof Islands residents hunt SSLs almost exclusively from the shore and target swimming juvenile (mid-size) males. On St. Paul Island, SSL hunting is most commonly done from shore at Northeast Point, accessible by truck. St. Paul hunters take advantage of known SSL "swimways." Once shot, the hunter waits for the wind and sea to bring the carcass to shore, as heavy seas generally preclude the use of a skiff. A "sea dog" (a retrieval device consisting of a piece of wood with hooks attached to a 30- to 40-foot rope) assists in this process. Not all animals are recovered, but hunters try to shoot only those animals for which there is a high probability of eventual recovery. Hunters will at times hunt from skiffs in calm weather. SSL hunting on St. Paul occurs mainly from September through May and is predominately shorebased, as is hunting on St. George, which occurs mainly from January through May. SSL harvest in the Aleutian Chain (Atka, Unalaska, Akutan, and Nikolski) occurs mostly from skiffs in open water, and hunters target both sexes. When skiff travel is risky or for a change of pace, SSL hunting is also done from concealed shore stations. Aleutian Chain hunters will typically concentrate effort near haulout locations and take more adult and female animals than do Pribilof Islands hunters.

Declining SSL Populations and Subsistence Efforts

ADF&G has tried to address the possible linkage between the decline in the overall SSL population and a decrease in the SSL subsistence harvest effort between 1992 and 1998 (Wolfe and Mishler 1997 and 1998; Wolfe and Hutchinson-Scarbrough 1999; Wolfe 2001). They note that while the total number of SSLs harvested for subsistence use has decreased, interpretation of this change is not straightforward. A number of factors could be at work. For example, take of SSLs has decreased at the same time that the number of people hunting SSLs has decreased. One possibility is that take is down simply because fewer people are hunting. While it is not clear that the annual average harvest per hunter has declined (although ADF&G has not investigated this in a rigorous manner), it is likely that declining SSL populations play a role in the decisions people make regarding whether to hunt or not. ADF&G states:

> "… there are probably a variety of local factors related to the year-to-year changes in the number of households hunting SSLs in particular communities, including seasonal hunting conditions, local food needs, and personal circumstances of hunters. It is likely that the declines in the numbers of SSL hunters in many communities are because SSLs are increasingly harder to find and consequently more difficult and expensive to hunt. As SSLs become scarcer in a community's hunting area, an increasing number of hunters in the community probably choose to stop hunting them. While the hunters that continue to hunt appear to maintain annual harvest rates similar to past years, hunters probably are investing more time and money in pursuit of the SSL harvest. In addition to these factors, it is quite likely that some SSL hunters have chosen to reduce their hunting activity because of perceived problems with SSL populations" (Wolfe and Hutchinson-Scarbrough 1999:69, and essentially repeated in Wolfe 2001:77).

In earlier documents, ADF&G had also suggested that another factor in the decrease of SSL subsistence take may be the increased availability of seasonal wage employment in local communities. Some hunters may be choosing to work rather than to hunt, as a conscious economic choice of time allocation (Wolfe and Mishler 1997 and 1998). This explanation is not stressed as much in their 1999 report, being included more generally as "… personal circumstances of hunters" (Wolfe and Hutchinson-Scarbrough 1999:69). It should be noted that hunting SSLs requires a considerable amount of effort and in most cases the cooperation of several people, so that time management and allocation could be a significant factor. Another possible reason for the decrease in SSL subsistence harvest could be the result of a cultural change in taste, such that the consumptive demand for SSLs may have decreased over time (e.g., younger generations, less exposed to regular consumption of SSLs, may not want to eat SSL as much as elders do). While this has been mentioned anecdotally during field research conducted for other projects, no documentation exists on this possible factor.

While the available information suggests some support for a direct relationship between the overall SSL population and the level of subsistence harvest, such support is not definitive and other factors cannot be excluded. Given the relatively small numbers involved, the concentrated efforts of a single hunter or just a few hunters can make a relatively large difference in community harvest totals. It does appear that present SSL harvest methods are likely to be more successful, and certainly more efficient, when animal populations (and density) are higher. The most recent numbers from the ADF&G survey concerning SSL takes suggest that the number of hunters have stabilized in recent years. They suggest that this stabilization is in response to local perceptions of problems with the SSL population, when some hunters decided to voluntarily abandon subsistence hunting until SSL numbers recovered (ADF&G 2005). A number of factors (e.g., cost, geographic convenience) may be at work, however, such that a recovery in SSL abundance may not necessarily result in a marked increase in subsistence take. At this point, more research is necessary to fully understand the complexity of the interplay between these different factors and how this interplay determines the subsistence demand for SSLs.

3.4.1.2 NFS Subsistence Harvesting

Harvest Levels and Regional Variation

The context of subsistence harvest and the information available to document harvest levels of NFSs is somewhat different from SSLs. Similar to the situation with SSLs, NFS harvest data are included in the comprehensive baseline ADF&G surveys that have now been conducted for most communities in Alaska. A second type of information derives from annual subsistence harvest reporting conducted in the Pribilof Islands, where subsistence takes of NFSs are highly concentrated.

Table 3.4-9 provides documented total community harvest information extracted from the ADF&G Community Profile Database for all communities outside of the Pribilof Islands. As shown in the table, only three non-Pribilof communities, the Aleutian communities of Akutan, Nikolski, and Unalaska, show any level of harvest for NFSs for any ADF&G survey year. For Akutan, during the single year documented, NFS harvests accounted for about 2 percent of the total subsistence harvest in the community. For Nikolski and Unalaska, NFS harvests accounted for about 0.2 of 1 percent and less than 0.1 of 1 percent of total community subsistence harvest, respectively. As noted in the SSL subsistence discussion, community surveys are not repeated on a regular basis, and multiple comprehensive studies of a community at different times are typically performed in relation to other ongoing studies or directed towards specific resource management questions.

Table 3.4-9
Documented Total Community Subsistence Harvest and Relative Dependence on NFS Harvest,[1] Aleutian Island Communities.

Community	Region	Year	Total community subsistence harvest (edible pounds)	Northern fur seal		
				Number harvested	Edible pounds	% Community harvest
Akutan	SW	1990	47,397	67	1,005	2.1
Nikolski	SW	1990	36,945	6	90	0.2
Unalaska	SW	1994	355,081	7	105	< 0.1

Notes: [1]Little information is available on NFS subsistence harvests outside of the Pribilof Islands in the ADF&G CPDB and the years and communities shown represent all of the available harvest information in the database. Atka and Sitka do not appear in the database for fur seal harvests, but they do show up as having received at least a small amount of fur seal products from subsistence harvests elsewhere one year each (1994 and 1996, respectively). ADF&G does only limited surveys and subsistence use can vary greatly year to year.

Source: ADF&G CPDB, accessed March, 2004.

Table 3.4-10 provides documented NFS subsistence harvest information for the communities of St. Paul and St. George from 1985-2003. Subsistence harvests declined dramatically over this period in both communities. Precise reasons for this decline are unknown, but, like SSL subsistence harvesting, there is some suggestion from community members for a direct relationship between the overall NFS population and the level of yearly subsistence take. Members of the communities of St. Paul and St. George have also suggested that a declining number of elders within the community and an overall change in food preference by younger generations of residents have led to decreased demand and therefore a decreased take of NFS for subsistence. It is additionally possible that takes have declined over the years due to a perceived health risk from eating large quantities of NFS, which are suspected to contain high levels of mercury. Reports from local community members also suggest that the biology of the NFS has changed over time, resulting in a different, unnatural taste. Finally, the commercial fishing and subsistence harvest seasons coincide, reportedly resulting in a labor shortage for the subsistence harvest as more and more able-bodied men are employed by the fishing industry. At this point, however, more research is necessary to fully understand the complexity and interplay of these factors and how this interaction determines the subsistence demand for NFSs.

Table 3.4-10
Subsistence Harvest Levels for NFSs on the Pribilof Islands, 1985 - 2003

Year	Subsistence Take Ranges		Actual Harvest Levels	
	St. Paul	St. George	St. Paul	St. George
1985	–	–	3,384	329
1986	2,400-8,000	800-1,800	1,299	124
1987	1,600-2,400	533-1,800	1,710	92
1988	1,800-2,200	600- 740	1,145	113
1989	1,600-1,800	533- 600	1,340	181
1990	1,145-1,800	181- 500	1,077	164
1991	1,145-1,800	181- 500	1,645	281
1992	1,645-2,000	281- 500	1,482	194
1993	1,645-2,000	281- 500	1,518	319
1994	1,645-2,000	281- 500	1,616	161
1995	1,645-2,000	281- 500	1,525	260
1996	1,645-2,000	281- 500	1,591	232
1997	1,645-2,000	300- 500	1,153	227
1998	1,645-2,000	300- 500	1,297	256
1999	1,645-2,000	300- 500	1,000	193
2000	1,645-2,000	300- 500	754	121
2001	1,645-2,000	300- 500	597	184
2002	1,645-2,000	300- 500	648	203
2003	1,645-2,000	300- 500	522	132

Source: NOAA, 2005

Northern Fur Seal Subsistence Methods

Commercial harvest of NFSs on the Pribilof Islands began shortly after the first known discovery of the islands in 1786. The commercial harvest was continued by the U.S. when the Pribilof Islands came under U.S. jurisdiction, with the purchase of Alaska from Russia in 1867. On October 14, 1984, the Interim Convention on the Conservation of NFSs, which authorized the commercial harvest, expired and Congress failed to ratify a new treaty extension. Because domestic law did not provide for a commercial harvest of marine mammals in the U.S., the commercial harvest of NFSs was then terminated.

The method of subsistence harvest of NFSs on the Pribilof Islands is a direct outgrowth of the commercial harvest that took place on the islands for many generations. The history of the island communities has been intertwined with the history of NFS harvest since its inception, when Russians relocated Aleuts from villages on the Aleutian Chain to the previously uninhabited Pribilof Islands to work the harvest.

The Fur Seal Act of 1966 authorized the taking of NFSs by Alaska Natives for subsistence purposes. Under 16 U.S.C. 1153(b), Indians, Aleuts, and Eskimos who live on the Pribilof Islands can take NFSs for subsistence purposes as defined in 16 U.S.C. 1379(f)(2) under such conditions as recommended by the North Pacific Fur Seal Commission and accepted by the Secretary of State pursuant to regulations promulgated by the Secretary.

Following the termination of the commercial harvest, NMFS issued an emergency interim rule on July 8, 1985, to govern the subsistence taking of NFSs for the 1985 season under the authority of Section 105(a) of the Fur Seal Act. A final rule was published on July 9, 1985. The subsistence harvest of NFSs on the Pribilof Islands, Alaska, is governed by regulations found in 50 CFR part 216 subpart F--Taking for Subsistence Purposes. These regulations were published under the authority of the Fur Seal Act, 16 U.S.C. 1151, *et seq.*, and the MMPA, 16 U.S.C. 1361, *et seq.* (see 51 FR 24828, July 9, 1986). The purpose of these regulations was to limit the take of NFSs to a level providing for the subsistence needs of the Pribilof Aleuts using humane harvesting methods, and to restrict taking by sex, age, and season for herd management purposes.

Given this historical and legislative context, the subsistence harvest of NFSs is very different from what is seen with the harvest of SSLs elsewhere and is conducted in the Pribilof Islands as an organized, land-based, group activity. The following description of the harvest is abstracted from the NFS subsistence harvest EIS (Ferraro 2002) and gives a sense of the organization of the harvest and the number of individuals and roles involved, in contrast to what is seen in SSL harvesting. NFS harvesting may be characterized as more of a communal activity, whereas SSL harvesting tends to be pursued by individual hunters or very small groups of hunters. While SSL harvests may ultimately benefit substantial numbers of community residents through distribution and redistribution of the harvest, NFS harvests themselves more directly involve larger numbers of community residents in a more immediate manner.

The structure and conduct of the subsistence harvest established by the regulations is essentially the same as was developed and applied to the commercial harvest, whereby a harvest foreman makes the onsite decisions and supervises the entire harvest event. The specific locations from and frequency by which NFSs can be harvested are specified by the regulations, which permit only the taking of sub-adult male NFSs from haulout areas. Only experienced sealers can participate in the most important elements of the harvest, which are organized and managed by the harvest foreman. Additionally, a certified veterinarian with expertise regarding NFSs is contracted by NMFS to serve as the Humane Observer for the harvest. The Humane Observer works interactively with the harvest operation and foreman regarding the physical parameters and condition of the seals.

If the decision is to proceed, the harvest crew is assembled and the harvest foreman selects those who will go to the haulout area to round up a group of sub-adult males from the herd, which is then slowly driven to the harvest area. The round-up crew, accompanied by the Humane Observer, selects that part of the herd composed mostly of two- to four-year-old males as the harvest group. Females and any male NFSs beyond four years old are excluded from the drive to the harvest area as soon as possible. Pups are very rarely involved in the round-up and drive as they are seldom found on the haulout areas during the harvest season.

Once the drive ends at the harvest area, the animals are left to rest and cool down in a loose group. The harvest foreman stations and directs the “watchboys,” usually ranging in age from 9 to 18 years old, around the group to keep it together. When the harvest foreman and Humane Observer decide that the grouped NFSs are sufficiently rested and cooled, the foreman directs the “pod cutters” to begin separating a small pod of seals from the herd. Two pod cutters, each with a long club inserted into the opening of a square 5-gallon metal coffee container, cut into the herd at sides opposing one another. They run the containers along the ground, which both produces a noise and serves to separate, and effectively cut out a pod of NFSs from the herd. The number of “stunners” (individuals who will actually take the animals as described below) available determines the number in a pod. This disturbance effectively separates out the harvestable seals, and the remaining seals are allowed to return to the haulout areas from which they came.

Once this pod is isolated from the herd, the foreman directs the “stunners” to begin taking the animals down. This is the most important part of the harvest event and thus the stunners are those individuals who are the most experienced and/or proficient in using a hardwood club approximately 5 to 6 feet long to deliver a swift blow to the back of the animal’s head. The skull of an NFS is relatively thin; therefore, such a blow effectively and immediately renders the animal unconscious.

As each NFS is taken down by the stunners, one or more of the most experienced sealers make a quick incision to the chest cavity to disable the diaphragm and the heart, thereby ensuring the animal will not regain consciousness or incur suffering. Once the harvestable NFSs have been taken, the harvest crew proceeds to butcher the carcasses as soon as possible to prevent spoilage. The process is repeated until the subsistence needs are met for that day. The rest of the herd is released into the haulout area from which they came. The meat is distributed to individual subsistence households or frozen for future use by the community. This process is repeated throughout the harvest season.

NFS Populations and Subsistence Efforts

As described in Section 3.2.1.13, NMFS entered into co-management agreements with the Tribal Governments of St. Paul and St. George under Section 119 of the MMPA in 2000 and 2001, respectively. These agreements are specific to the conservation and management of NFSs and SSLs in the Pribilof Islands, with particular attention to the subsistence take and use of these animals. NMFS has worked with both communities to integrate the agreements into one management plan for the purpose of recovering and maintaining SSL and NFS populations to levels that provide for a sustainable subsistence take of these species in the Pribilof Islands region.

To initiate the harvest, NMFS publishes a proposed annual subsistence harvest estimate. The purpose of the notice is to provide an estimate for the annual subsistence need for St. Paul and St. George. To minimize negative effects on the NFS population, the subsistence harvest has been limited to a 47-day harvest season (June 23-August 8), during which only sub-adult male NFSs may be taken. Further, the regulations governing the harvest require that it be conducted and managed in the most non-wasteful manner possible.

These established harvest methods have generally remained unchanged since the adoption of co-management. However, an important change has occurred regarding the annual documentation of each individual harvest event. Prior to the co-management era, a NMFS employee was present in the field at each individual harvest event, in addition to the harvest foreman and Humane Observer, to monitor the conduct of harvest per the regulations, document the number of NFSs taken, and record other information. These functions are now fulfilled by the respective local tribal governments.

Prior to the 1994 subsistence harvest, NMFS, in cooperation with the Tribal Governments of each island, conducted an annual household survey of the local subsistence communities to estimate the number of NFSs required to meet their subsistence needs for that year. NMFS would then publish the proposed estimates in the FR for comment prior to finalizing the number of NFS that could be taken on each island. These estimates were set for each island and consisted of a lower and upper range. In 1994, the manner in which the harvest take ranges were established was changed by setting the ranges for a three-year period rather than annually. In 1996, NMFS requested that the Tribal Government of each island determine the number of NFSs that would be needed by their communities each year for the three-year period 1997 through 1999. The approach was repeated for the period 2000-2002.

3.4.2 Commercial Fishing

Much federally funded research on SSLs and NFSs has, in the past, been directly or indirectly associated with management of commercial fisheries. As discussed in Section 3.2.1.11, during the late 1990s, SSL research activities were intensified as recent scientific findings, litigation, and new legislation focused increasing attention on the ongoing SSL population decline and concern over possible impacts by commercial fisheries in Alaskan waters. In 2001, the measures proposed and analyzed in the *Steller Sea Lion Protection Measures Final Supplemental Environmental Impact Statement* prepared by NMFS Alaska Regional Office directly involved changes in the management of the Alaska groundfish fishery with an aim to minimize impacts of the fishery on SSLs based on information from research on SSLs. The protection measures disperse fishing over time and area to protect against potential competition for SSL prey species near rookeries and important haulouts. The benefits of the measures consist of improvements to SSL populations; excluding commercial fishing leaves more prey for sea lions. The primary cost of the measures is the potential reduction in profits that occurs as boats incur additional costs as they travel to more distant locations and/or experience lower levels of catch in alternative fishing areas.

Section 3.2.1.11 notes that the possibility that the Alaska groundfish fishery might face additional costly restrictions as a result of scientific uncertainty about the decline of SSLs led to increased funding for SSL research. It was hoped that with this funding the fishery could remain open while, simultaneously, more research and protection of SSLs could occur.

To date, the Alaska groundfish fishery has been the only fishery directly affected by SSL protection measures. However, as indicated in Section 3.2.6.2, dozens of commercial fisheries operating in waters off Alaska and the west coasts of Canada and the U.S. are within the geographic range of the SSL and NFS; these fisheries could potentially affect the populations of SSLs and NFSs through competition for prey, direct mortality, or disturbance. This section provides a broad economic overview of the various fisheries that may occur within the project area. Economic data on each fishery are summarized in tables.

3.4.2.1 Alaska, U.S. West Coast and Canadian Commercial Fisheries

This section divides the pertinent fisheries into three general groups based on geography; the Alaska fisheries, U.S. west coast fisheries off Washington, Oregon and California, and Canadian fisheries of the west coast of British Columbia. In general, the State of Alaska, through ADF&G and the Commercial Fisheries Entry Commission (CFEC), maintains fishery statistics for all fisheries that are either primarily managed by the state or are processed onshore. These fisheries include most non-groundfish fisheries. The groundfish fishery is the only fishery in Alaska that both is managed primarily by the federal government and which processes a significant portion of the fish at sea. Because of this, detailed data on groundfish are more easily accessible through federal sources. In particular, this PEIS draws on information provided in the report, “Economic Status of the Groundfish Fisheries off Alaska, 2004” (Hiatt 2005), which was published by NMFS AFSC as part of the “Stock Assessment and Fishery Evaluation Report for the Groundfish Fisheries of the Gulf of Alaska and Bering Sea/Aleutian Islands Area.” Economic data for the U.S. West Coast fisheries are from the Pacific Coast Fisheries Information Network (PacFIN), and for the Canadian west coast fisheries, the data are from Fisheries and Oceans Canada.

Although there is overlap between the SSL and NFS prey species and commercial fisheries in these regions, no linkage has been identified between fisheries impacts to the SSL and NFS and the research alternatives considered in this PEIS.

Tables 3.4-11 to 3.4-13 provide an overview of the ex-vessel value of the major species groups targeted in Alaska, U.S. west coast, and Canadian fisheries. Alaska groundfish accounted for more than half of the total ex-vessel revenue for

Alaska. Ex-vessel value is defined by ADF&G as "the post-season adjusted price per pound for the first purchase of commercial harvest."

Table 3.4-11
Overview of Alaska Fisheries by Management Group in Real Dollars, 2000-2004

Year	Shellfish	Salmon	Herring	Halibut	Groundfish	Total
	Ex-Vessel Value ($Millions Adjusted to 2004 Dollars)					
2000	155.5	268.9	10.5	147.0	652.2	1,234.1
2001	131.5	200.7	11.1	127.0	623.1	1,093.4
2002	156.0	136.1	9.5	135.1	648.9	1,085.6
2003	180.1	172.6	9.1	170.3	626.5	1,158.6
2004	165.4	225.3	13.7	168.7	592.9	1,166.0

Source: CFEC Fishery Statistics, http://www.cfec.state.ak.us/fishery_statistics/earnings.htm.; Hiatt 2005.

Table 3.4-12
Overview of U.S. West Coast Fisheries by Management Group, 2000-2005

Year	Coastal Pelagic	Crab	Groundfish	Highly Migratory	Other	Salmon	Shrimp
	Ex-Vessel Value ($ Millions)						
2000	42.27	77.29	65.12	32.71	35.80	24.34	21.88
2001	32.75	67.75	53.70	31.42	31.13	22.76	17.93
2002	33.26	73.14	44.94	22.17	31.41	27.53	22.52
2003	35.72	131.02	50.61	33.90	27.63	32.64	12.61
2004	32.94	114.44	49.99	33.29	29.79	48.86	12.41
2005	43.63	96.99	56.45	24.06	29.26	37.63	15.74

Source: PacFIN, http://www.psmfc.org/pacfin/data/index-r316.html.

Table 3.4-13
Overview of Canadian West Coast Fisheries by Management Group, 2000-2005

Year	Coastal Pelagic	Crab	Groundfish	Highly Migratory	Other	Salmon	Shrimp
	Ex-Vessel Value (CAN$ Thousands)						
2000	49,831	21,591	92,815	5,619	40,115	52,412	38,289
2001	36,429	36,507	84,869	14,473	38,656	37,143	35,991
2002	37,107	28,166	75,882	8,094	43,188	57,294	22,972
2003	35,487	38,235	85,291	5,906	53,653	48,664	33,362
2004	27,914	47,134	82,884	2,017	44,679	52,622	30,387
2005	32,144	27,433	101,316	3,905	45,072	33,823	43,212

Source: Fisheries and Oceans Canada Commercial Landings, http://www.dfo-mpo.gc.ca/communic/statistics/commercial/landings/seafisheries/index_e.htm.

3.4.3 Alaska Commercial Fisheries

This section divides the pertinent Alaska fisheries into two broad segments: 1) non-groundfish and 2) groundfish. The division is based primarily on the availability of data. In general, the State of Alaska, through ADF&G and the Commercial Fisheries Entry Commission (CFEC), maintains fishery statistics for all fisheries that are either primarily managed by the state or are processed onshore. These fisheries include most non-groundfish fisheries. The groundfish fishery is the only fishery in Alaska that both is managed primarily by the federal government and which processes a significant portion of the fish at sea. Because of this, detailed data on groundfish are more easily accessible through federal sources. In particular, this PEIS draws on information provided in "Economic Status of the Groundfish Fisheries off Alaska, 2004" (Hiatt 2005), which was published by NMFS AFSC as part of the most recent "Stock Assessment and Fishery Evaluation Report for the Groundfish Fisheries of the Gulf of Alaska and Bering Sea/AI Area."

Table 3.4-14 provides an overview of the ex-vessel value of the five major species groups targeted in Alaska's fisheries. Groundfish accounted for more than half of the total ex-vessel revenue. Ex-vessel value is defined by ADF&G as "the post-season adjusted price per pound for the first purchase of commercial harvest."

Table 3.4-14
Overview of Fisheries by Major Species in Real Dollars, 2000-2004

Year	Shellfish	Salmon	Herring	Halibut	Groundfish	Total
	($Millions Adjusted to 2004 Dollars)					
2000	155.5	268.9	10.5	147.0	652.2	1,234.1
2001	131.5	200.7	11.1	127.0	623.1	1,093.4
2002	156.0	136.1	9.5	135.1	648.9	1,085.6
2003	180.1	172.6	9.1	170.3	626.5	1,158.6
2004	165.4	225.3	13.7	168.7	592.9	1,166.0

Source: Hiatt 2005.

3.4.3.1 Non-Groundfish Fisheries

This section summarizes economic information on the non-groundfish fisheries in Alaska. These fisheries include the salmon, herring, halibut, crab, other shellfish, and sablefish fisheries. Table 3.4-15 includes data on total catch and ex-vessel value for the years 2001 to 2004.

Table 3.4-15
Overview of All Non-Groundfish Fisheries by Species, 2001-2004

Species	2001	2002	2003	2004
	Total Catch (Thousands of Pounds)			
Crab	47,342	57,930	57,170	52,841
Halibut	56,651	59,191	58,972	57,983
Herring	84,727	69,541	73,078	70,886
Other shellfish	7,152	8,240	8,754	7,898
Sablefish	32,313	33,192	38,198	39,108
Salmon	689,428	524,177	635,835	697,892
Ex-Vessel Value ($Millions)				
Crab	116.0	142.3	167.8	154.0
Halibut	110.6	127.5	163.4	169.4
Herring	13.0	11.7	11.9	14.0
Other shellfish	8.7	9.6	10.0	11.9
Sablefish	60.6	63.1	80.5	74.2
Salmon	205.1	145.0	193.1	255.0

Source: CFEC Fishery Statistics, http://www.cfec.state.ak.us/fishery_statistics/earnings.htm.

3.4.3.2 Groundfish Fishery

Tables 3.4-16 through 3.4-18 are presented in this section to provide an economic summary of the Alaska groundfish fishery. Data presented include landings and ex-vessel value by major species groups, gear, and fishery area.

Table 3.4-16
Gulf of Alaska Groundfish Catch by Species, Gear and Target Fishery, 2003-2004

Year	Target Fishery	Species											
		Pollock	Sable-fish	Pacific Cod	Arrow-tooth	Flathd. sole	Rex Sole	Flat Deep	Flat Shallow	Rock-fish	Atka Mack.	Other	Total
		(Thousands of Metric Tons, Round Weight)											
2003	**Hook & Line**												
	Sablefish	0.0	13.2	0.1	0.3	0.0	0.0	0.0	0.0	0.9	0.0	0.2	14.7
	Pacific cod	0.0	0.0	12.4	0.0	0.0	-	0.0	0.0	0.0	0.0	0.8	13.3
	Rockfish	-	0.0	0.0	-	-	-	-	-	0.5	-	0.0	0.5
	Halibut	-	0.5	0.4	0.1	0.0	0.0	0.0	0.0	0.4	-	0.4	1.7
	Total	0.1	13.7	13.0	0.3	0.0	0.0	0.0	0.0	1.8	0.0	2.8	31.7
	Pot												
	Pacific cod	0.0	-	20.7	0.0	0.0	-	-	0.0	0.0	0.0	0.4	21.2
	Total	0.0	-	20.7	0.0	0.0	-	-	0.0	0.0	0.0	0.4	21.2
	Trawl												
	Pollock, bottom	3.2	0.0	0.1	0.4	0.1	0.0	0.0	0.0	0.0	-	0.0	3.8
	Pollock, pelagic	46.2	0.0	0.2	0.3	0.1	0.0	-	0.0	0.2	0.0	0.2	47.1
	Pacific cod	0.3	0.0	13.3	1.1	0.2	0.1	0.0	0.6	0.1	0.0	0.3	16.0
	Arrowtooth	0.3	0.3	0.8	15.1	0.4	1.0	0.2	0.1	1.0	0.0	0.3	19.6
	Flathead sole	0.1	0.0	0.3	2.2	0.9	0.1	0.0	0.1	0.1	0.0	0.3	4.2
	Rex sole	0.1	0.1	0.6	5.9	0.4	2.2	0.2	0.0	0.5	0.0	0.5	10.6
	Flatfish, deep	0.0	0.1	0.0	0.2	0.0	0.0	0.3	0.0	0.1	-	0.0	0.8
	Flatfish, shallow	0.1	0.0	1.6	2.2	0.4	0.0	0.0	3.4	0.0	0.0	0.7	8.5
	Rockfish	0.3	1.2	1.7	1.4	0.1	0.2	0.1	0.1	19.7	0.4	0.2	25.4
	Total	50.6	1.8	18.9	29.9	2.5	3.6	0.9	4.6	21.8	0.6	3.2	138.3
	Total												
	Total	50.7	15.5	52.6	30.2	2.5	3.6	0.9	4.6	23.6	0.6	6.4	191.1
2004	**Hook & Line**												
	Sablefish	0.0	14.8	0.1	0.2	0.0	-	0.0	0.0	0.9	0.0	0.4	16.4
	Pacific cod	0.0	0.0	13.1	0.1	0.0	-	0.0	0.0	0.1	0.0	0.9	14.2
	Rockfish	-	0.0	0.0	-	-	-	-	-	0.3	-	-	0.5
	Halibut	0.0	0.8	0.3	0.0	0.0	-	0.0	0.0	0.2	0.0	0.1	1.5
	Total	2.0	15.6	13.5	0.3	0.0	-	0.0	0.0	1.5	0.0	1.8	33.0
	Pot												
	Pacific cod	0.0	-	25.6	0.0	0.0	0.0	-	0.0	0.0	0.0	0.6	26.2
	Total	0.0	-	25.6	0.0	0.0	0.0	-	0.0	0.0	0.0	0.6	26.2
	Trawl												
	Pollock, bottom	9.6	0.0	0.3	0.7	0.2	0.0	0.0	0.0	0.1	0.0	0.1	11.1
	Pollock, pelagic	53.1	0.0	0.2	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.2	53.9
	Sablefish	-	0.1	-	0.0	0.0	0.0	0.0	-	0.0	-	0.0	0.2
	Pacific cod	0.2	0.0	13.5	1.6	0.1	0.1	0.0	0.8	0.3	0.0	0.2	16.8
	Arrowtooth	0.2	0.1	0.5	6.0	0.8	0.2	0.1	0.3	0.1	0.0	0.4	8.5
	Flathead sole	0.0	0.0	0.2	1.5	0.9	0.2	0.0	0.0	0.0	0.0	0.1	3.1
	Rex sole	0.0	0.0	0.2	2.0	0.1	0.7	0.0	0.0	0.3	0.0	0.1	3.5
	Flatfish, deep	0.0	0.1	0.1	0.3	0.0	0.0	0.5	0.0	0.0	-	0.0	1.2
	Flatfish, shallow	0.1	0.0	0.8	0.7	0.2	0.0	0.0	1.8	0.0	0.0	0.5	4.1
	Rockfish	0.4	1.0	1.7	1.8	0.1	0.1	0.1	0.1	19.7	0.7	0.1	25.9
	Total	63.7	1.3	17.6	15.0	2.4	1.5	0.7	3.1	20.6	0.8	2.2	128.8
	Total												
	Total	63.9	16.9	56.7	15.3	2.4	1.5	0.7	3.1	22.1	0.8	4.6	188.0

Note: Totals may include additional categories. The target, determined by AFSC staff, is based on processor, week, processing mode, NMFS area, and gear. These estimates include only catch counted against federal total allowable catch.

Source: Hiatt 2005.

Table 3.4-17
Bering Sea and AI Groundfish Catch by Species, Gear and Target Fishery, 2003-2004

Year	Target Fishery	Species: Pollock	Sable-fish	Pacific Cod	Arrow-tooth	Flathd. sole	Rock Sole	Turbot	Yellow-fin	Flat Other	Rock-fish	Atka Mack.	Other	Total
	(Thousands of Metric Tons, Round Weight)													
2003	**Hook & Line**													
	Sablefish	0.0	0.7	0.0	0.1	0.0	-	0.6	-	0.0	0.1	0.0	0.1	1.6
	Pacific Cod	7.1	0.1	107.9	1.3	0.4	0.0	0.2	0.6	0.1	0.1	0.0	16.7	134.6
	Turbot	0.0	0.1	0.0	0.2	0.0	0.0	1.6	-	0.0	0.1	0.0	0.2	2.2
	Halibut	0.0	0.2	0.1	0.1	0.0	0.0	0.2	0.0	0.0	0.1	0.0	0.3	1.1
	Total	7.1	1.2	108.1	1.6	0.4	0.0	2.5	0.6	0.1	0.4	0.0	17.4	139.6
	Pot													
	Sablefish	0.0	0.7	0.0	0.1	0.0	0.0	0.1	-	0.0	0.0	0.0	0.0	0.9
	Pacific Cod	0.0	0.0	22.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.2	0.4	22.7
	Total	0.0	0.7	22.0	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.2	0.4	23.6
	Trawl													
	Pollock, bottom	14.1	0.0	0.2	0.1	0.1	0.1	0.0	0.1	0.0	0.3	0.4	0.3	15.6
	Pollock, pelagic	1,440.3	0.0	5.8	0.6	1.6	1.3	0.0	0.1	0.2	0.8	0.4	1.4	1,452.6
	Pacific Cod	9.8	0.1	61.3	4.9	1.5	6.1	0.1	1.1	1.3	0.5	4.9	3.1	94.7
	Arrowtooth	0.2	0.0	0.1	1.2	0.1	0.0	0.2	0.0	0.2	0.1	0.0	0.1	2.4
	Flathead sole	3.0	0.0	1.8	2.1	6.5	1.2	0.1	2.5	0.7	0.1	0.0	1.0	18.9
	Rock sole	5.0	0.0	3.4	0.4	0.8	19.5	0.0	6.6	1.2	0.0	0.0	1.0	38.0
	Turbot	0.1	0.0	0.0	0.2	0.1	0.0	0.2	0.0	0.0	0.0	-	0.0	0.7
	Yellowfin	11.8	-	4.7	1.1	2.9	8.5	0.0	69.8	9.0	0.0	0.0	3.2	111.0
	Other flatfish	0.1	0.0	0.1	0.5	0.0	0.0	0.0	0.0	0.2	0.0	0.1	0.0	1.0
	Rockfish	0.5	0.0	0.3	0.5	0.0	0.0	0.2	-	0.0	11.1	0.7	0.1	13.5
	Atka mackerel	0.5	0.0	1.9	0.3	0.0	0.2	0.1	0.0	0.0	7.4	51.6	0.5	62.6
	Total	1,485.5	0.2	79.7	11.8	13.8	37.0	0.9	80.3	12.9	20.4	58.2	11.0	1,811.8
	Total													
	Total	1,492.7	2.1	209.8	13.6	14.3	37.0	3.5	81.0	13.0	20.8	58.4	28.8	1,975.0

Table 3.4-17 (continued)
Bering Sea and AI Groundfish Catch by Species, Gear and Target Fishery, 2003-2004

Year	Target Fishery	Species												
		Pollock	Sable-fish	Pacific Cod	Arrow-tooth	Flathd. sole	Rock Sole	Turbot	Yellow-fin	Flat Other	Rock-fish	Atka Mack.	Other	Total
		(Thousands of Metric Tons, Round Weight)												
2004	Hook & Line													
	Sablefish	-	0.6	0.0	0.0	-	-	0.1	-	-	0.1	0.0	0.0	0.8
	Pacific Cod	5.3	0.0	112.8	1.4	0.6	0.0	0.2	0.6	0.2	0.2	0.0	18.6	140.0
	Turbot	0.0	0.1	0.0	0.2	0.0	0.0	1.2	-	0.0	0.1	0.0	0.1	1.7
	Halibut	0.0	0.2	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.3	0.7
	Total	5.4	0.9	113.0	1.6	0.6	0.0	1.5	0.6	0.2	0.4	0.0	19.1	143.3
	Pot													
	Sablefish	0.0	0.8	0.0	0.1	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.9
	Pacific Cod	0.0	0.0	17.2	0.0	0.0	0.0	-	0.1	0.0	0.0	0.1	0.3	17.7
	Total	0.0	0.8	17.2	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.5	18.9
	Trawl													
	Pollock, bottom	17.4	0.0	0.2	0.1	0.1	0.3	0.0	0.2	0.2	0.1	0.6	0.3	19.5
	Pollock, pelagic	1,418.3	0.0	6.2	0.5	2.0	2.3	0.0	0.7	0.3	0.4	0.4	1.8	1,433.0
	Sablefish	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.1
	Pacific Cod	13.7	0.1	62.1	8.0	2.8	9.2	0.1	1.8	2.4	0.5	4.7	3.4	108.9
	Arrowtooth	0.5	0.1	0.2	1.6	0.1	0.0	0.1	0.0	0.3	0.1	0.4	0.1	3.4
	Flathead sole	5.3	0.0	2.8	3.8	9.7	2.1	0.2	2.4	0.7	0.1	0.0	1.8	29.0
	Rock sole	8.9	0.0	5.6	0.3	0.9	24.3	0.0	3.9	1.9	0.0	0.0	0.8	46.8
	Turbot	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	-	0.0	0.3
	Yellowfin	10.4	0.0	3.6	0.3	1.1	10.1	0.0	65.6	6.3	0.0	0.0	1.6	99.0
	Other flatfish	0.6	0.0	0.2	0.9	0.1	0.1	0.0	0.0	0.3	0.0	0.1	0.1	2.6
	Rockfish	0.3	0.0	0.2	0.4	0.0	0.0	0.1	-	0.0	9.0	0.4	0.1	10.4
	Atka mackerel	0.5	0.0	2.4	0.4	0.0	0.2	0.1	0.0	0.1	7.1	53.6	0.7	65.2
	Total	1,476.1	0.3	83.5	16.5	16.8	48.6	0.7	74.7	12.7	17.3	60.3	10.9	1,818.4
	Total													
	Total	1,481.4	2.0	213.8	18.2	17.4	48.7	2.2	75.4	12.8	17.7	60.5	30.5	1,980.6

Note: Totals may include additional categories. The target, determined by AFSC staff, is based on processor, week, processing mode, NMFS area, and gear. These estimates include only catch counted against federal total allowable catch.

Source: Hiatt 2005.

Table 3.4-18
Ex-Vessel Value of Groundfish Fishery by Area, Vessel Category, Gear and Species, 2000-2004

Species	Year	Gulf of Alaska			Bering Sea/Aleutian Islands			All Alaska		
		Catcher vessels	Catcher processors	Total	Catcher vessels	Catcher processors	Total	Catcher vessels	Catcher processors	Total
		($Millions)								
All Gears										
Atka mackerel	2000	0.0	0.0	0.0	0.0	9.4	9.4	0.0	9.5	9.5
	2001		0.0	0.0	0.0	21.0	21.0	0.0	21.1	21.1
	2002	0.0	0.0	0.0	0.1	11.1	11.1	0.1	11.1	11.2
	2003	0.0	0.1	0.1	0.1	9.7	9.8	0.1	9.8	9.9
	2004	0.0	0.1	0.1	0.2	12.2	12.3	0.2	12.3	12.5
Flatfish	2000	2.8	1.6	4.4	1.3	36.2	37.5	4.1	37.8	41.9
	2001	2.3	1.4	3.6	0.6	27.1	27.7	2.9	28.4	31.3
	2002	2.0	1.5	3.5	0.5	33.5	34.0	2.5	35.0	37.5
	2003	1.4	2.2	3.6	0.6	32.1	32.7	1.9	34.4	36.3
	2004	1.4	0.6	2.0	0.7	39.2	39.9	2.1	39.8	41.9
Pacific cod	2000	37.5	6.6	44.1	33.0	83.9	116.9	70.5	90.4	161.0
	2001	24.9	5.6	30.4	17.8	78.7	96.4	42.6	84.2	126.9
	2002	39.4	5.8	45.2	20.4	70.2	90.6	59.8	76.0	135.8
	2003	27.5	5.1	32.6	34.3	89.2	123.5	61.8	94.2	156.1
	2004	27.5	3.8	31.3	24.0	84.1	108.0	51.5	87.8	139.3
Pollock	2000	20.2	0.1	20.2	155.1	122.8	277.9	175.3	122.8	298.1
	2001	19.1	0.0	19.1	177.0	138.8	315.8	196.1	138.8	334.9
	2002	11.9	0.0	12.0	197.5	149.4	347.0	209.5	149.5	358.9
	2003	10.3	0.1	10.4	181.3	120.7	302.0	191.5	120.8	312.4
	2004	12.1	0.0	12.2	185.5	149.6	335.1	197.7	149.6	347.3
Rockfish	2000	4.9	2.9	7.9	0.1	3.0	3.1	5.0	5.9	11.0
	2001	3.3	2.2	5.5	0.2	2.6	2.8	3.5	4.8	8.3
	2002	4.4	3.1	7.5	0.2	3.0	3.3	4.6	6.2	10.8
	2003	4.8	3.1	7.9	0.2	3.8	4.0	5.0	6.9	11.8
	2004	4.7	3.7	8.5	0.2	3.8	4.0	4.9	7.5	12.4
Sablefish	2000	60.3	9.0	69.2	3.0	3.6	6.6	63.2	12.6	75.8
	2001	47.9	7.4	55.2	4.5	2.2	6.7	52.3	9.6	61.9
	2002	48.6	8.9	57.5	4.5	2.4	6.9	53.0	11.3	64.4
	2003	62.4	9.8	72.2	6.4	2.6	9.0	68.8	12.4	81.2
	2004	60.2	9.1	69.2	1.9	1.9	3.8	62.1	11.0	73.1
All species	2000	125.9	20.1	146.0	192.5	259.1	451.5	318.4	279.2	597.6
	2001	97.5	16.5	114.1	200.1	270.5	470.6	297.6	287.0	584.6
	2002	106.5	19.5	126.0	223.2	269.8	493.0	329.6	289.3	619.0
	2003	107.1	20.7	127.7	222.9	258.7	481.6	330.0	279.3	609.3
	2004	106.2	17.5	123.7	213.1	293.5	506.6	319.2	311.0	630.2
Hook and line										
Flatfish	2000	0.5	0.0	0.5	0.1	3.1	3.2	0.5	3.1	3.7
	2001		0.0	0.0	0.1	1.2	1.3	0.1	1.2	1.3
	2002		0.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0
	2003		0.0	0.0		0.9	0.9		0.9	0.9
	2004		0.0	0.0		0.7	0.7		0.7	0.7
Pacific cod	2000	5.9	4.3	10.2	0.6	65.3	65.9	6.5	69.6	76.2
	2001	5.1	2.9	8.0	0.9	63.0	63.8	5.9	65.8	71.8
	2002	22.2	5.0	27.1	3.0	54.4	57.4	25.2	59.3	84.5
	2003	4.7	4.1	8.8	0.4	67.3	67.8	5.1	71.5	76.5
	2004	5.4	2.9	8.3	0.5	63.5	64.0	5.8	66.4	72.2

Table 3.4-18 (continued)
Ex-Vessel Value of Groundfish Fishery by Area, Vessel Category, Gear and Species, 2000-2004

Species	Year	Gulf of Alaska			Bering Sea/Aleutian Islands			All Alaska		
		Catcher vessels	Catcher processors	Total	Catcher vessels	Catcher processors	Total	Catcher vessels	Catcher processors	Total
		($Millions)								
Hook and line										
Rockfish	2000	2.2	0.2	2.4	0.1	0.3	0.4	2.3	0.5	2.8
	2001	1.9	0.2	2.1	0.2	0.2	0.4	2.1	0.4	2.5
	2002	2.0	0.2	2.1	0.2	0.2	0.3	2.1	0.3	2.5
	2003	1.6	0.3	1.8	0.1	0.2	0.3	1.7	0.5	2.2
	2004	1.7	0.2	2.0	0.1	0.2	0.3	1.8	0.4	2.2
Sablefish	2000	59.1	7.1	66.2	3.0	3.1	6.0	62.1	10.1	72.2
	2001	46.9	6.0	52.9	4.4	1.5	6.0	51.3	7.5	58.8
	2002	47.6	6.6	54.2	4.4	1.8	6.3	52.0	8.4	60.5
	2003	60.5	8.0	68.5	3.4	2.3	5.7	63.9	10.3	74.2
	2004	57.6	7.5	65.1	1.9	1.5	3.4	59.5	9.0	68.5
All Species	2000	69.4	11.6	81.0	3.8	72.8	76.5	73.2	84.3	157.5
	2001	53.9	9.0	62.9	5.6	67.2	72.7	59.4	76.2	135.6
	2002	71.7	11.8	83.5	7.7	58.7	66.4	79.4	70.5	149.9
	2003	67.2	12.5	79.6	3.9	72.2	76.1	71.1	84.7	155.7
	2004	64.8	10.7	75.5	2.4	69.5	71.9	67.2	80.2	147.4
Pot										
Pacific cod	2000	14.9	0.8	15.7	10.4	1.7	12.2	25.3	2.5	27.8
	2001	8.4	1.0	9.4	7.0	1.7	8.7	15.5	2.7	18.2
	2002	9.6	0.3	9.9	5.9	1.0	6.9	15.5	1.3	16.8
	2003	8.2	0.1	8.3	12.1	1.0	13.0	20.3	1.0	21.3
	2004	13.9	0.2	14.0	8.0	1.8	9.8	21.9	2.0	23.8
Trawl										
Atka mackerel	2000	0.0	0.0	0.0	0.0	9.4	9.4	0.0	9.5	9.5
	2001		0.0	0.0	0.0	21.0	21.0	0.0	21.0	21.0
	2002	0.0	0.0	0.0	0.1	11.1	11.1	0.1	11.1	11.2
	2003	0.0	0.1	0.1	0.1	9.7	9.8	0.1	9.8	9.9
	2004	0.0	0.1	0.1	0.2	12.2	12.3	0.2	12.3	12.5
Flatfish	2000	2.4	1.6	4.0	1.2	33.1	34.3	3.6	34.7	38.3
	2001	2.3	1.4	3.6	0.5	25.9	26.4	2.8	27.2	30.0
	2002	2.0	1.5	3.5	0.4	32.6	33.0	2.5	34.1	36.5
	2003	1.4	2.2	3.6	0.6	31.3	31.9	1.9	33.5	35.5
	2004	1.4	0.6	2.0	0.7	38.5	39.2	2.1	39.1	41.2
Pacific cod	2000	16.8	1.4	18.2	21.9	16.8	38.7	38.7	18.3	57.0
	2001	11.3	1.7	13.0	9.9	14.0	23.9	21.2	15.7	36.9
	2002	7.6	0.5	8.1	11.5	14.8	26.3	19.0	15.4	34.4
	2003	14.6	0.9	15.5	21.8	20.9	42.7	36.5	21.7	58.2
	2004	8.3	0.7	9.0	15.5	18.7	34.2	23.8	19.4	43.2
Pollock	2000	18.5	0.1	18.5	155.1	121.8	277.0	173.6	121.9	295.5
	2001	19.1	0.0	19.1	177.0	137.7	314.7	196.1	137.7	333.8
	2002	11.9	0.0	12.0	197.5	148.1	345.7	209.5	148.2	357.6
	2003	10.3	0.1	10.3	181.3	119.6	300.9	191.5	119.7	311.2
	2004	12.1	0.0	12.2	185.5	148.5	334.0	197.7	148.6	346.2
Rockfish	2000	2.7	2.7	5.4	0.0	2.7	2.7	2.7	5.5	8.2
	2001	1.4	2.0	3.5	0.0	2.4	2.4	1.5	4.4	5.9
	2002	2.4	3.0	5.4	0.1	2.9	2.9	2.5	5.8	8.3
	2003	3.2	2.8	6.0	0.0	3.6	3.6	3.3	6.4	9.7
	2004	3.0	3.5	6.5	0.1	3.6	3.7	3.1	7.1	10.2

Table 3.4-18 (continued)
Ex-Vessel Value of Groundfish Fishery by Area, Vessel Category, Gear and Species, 2000-2004

Species	Year	Gulf of Alaska			Bering Sea/Aleutian Islands			All Alaska		
		Catcher vessels	Catcher processors	Total	Catcher vessels	Catcher processors	Total	Catcher vessels	Catcher processors	Total
		($Millions)								
Trawl										
Sablefish	2000	1.2	1.9	3.0	0.0	0.6	0.6	1.2	2.5	3.6
	2001	1.0	1.4	2.4	0.0	0.7	0.7	1.0	2.1	3.1
	2002	1.0	2.4	3.3	0.0	0.5	0.6	1.0	2.9	3.9
	2003	1.9	1.8	3.7	0.0	0.3	0.3	1.9	2.1	4.0
	2004	2.6	1.6	4.1	0.0	0.4	0.4	2.6	2.0	4.6
All species	2000	41.6	7.7	49.3	178.3	184.6	362.8	219.8	192.3	412.1
	2001	35.2	6.5	41.7	187.5	201.6	389.1	222.7	208.1	430.8
	2002	25.0	7.4	32.4	209.6	210.1	419.7	234.6	217.6	452.1
	2003	31.7	8.1	39.8	203.9	185.5	389.4	235.6	193.6	429.2
	2004	27.4	6.7	34.1	202.1	222.2	424.3	229.5	228.8	458.4

Note: These estimates include only catch counted against federal total allowable catch. Ex-vessel value is calculated using prices in Hiatt (2005). All fish species includes additional species categories. The value added by at-sea processing is not included in these estimates of ex-vessel value.
Source Hiatt 2005.

3.4.3.3 U.S. West Coast Fisheries

This section summarizes economic information on the U.S. West Coast fisheries. Tables 3.4-19 through 3.4-27 include information on the total landed catch and ex-vessel value for the years 2000 to 2005. All data are from the Pacific Coast Fisheries Information Network (PacFIN).

Table 3.4-19
Overview of U.S. West Coast Fisheries by Management Group, 2000-2005

Year	Coastal Pelagic	Crab	Groundfish	Highly Migratory	Other	Salmon	Shrimp
	Ex-Vessel Value ($ Millions)						
2000	42.27	77.29	65.12	32.71	35.80	24.34	21.88
2001	32.75	67.75	53.70	31.42	31.13	22.76	17.93
2002	33.26	73.14	44.94	22.17	31.41	27.53	22.52
2003	35.72	131.02	50.61	33.90	27.63	32.64	12.61
2004	32.94	114.44	49.99	33.29	29.79	48.86	12.41
2005	43.63	96.99	56.45	24.06	29.26	37.63	15.74
(Millions of Pounds, Round Weight)							
2000	499	37	279	32	26	22	37
2001	432	34	235	33	24	38	42
2002	404	42	170	29	26	45	59
2003	277	82	189	44	22	43	33
2004	317	69	277	37	22	43	22
2005	348	62	304	23	21	27	26

Source: PacFIN, http://www.psmfc.org/pacfin/data/index-r316.html.

Table 3.4-20
Catch and Ex-Vessel Value of Groundfish Processed at Sea, 2000-2005

Year	Millions of Pounds, Round Weight	Ex-Vessel Value ($ Millions)
2000	267	106.74
2001	222	95.27
2002	187	78.33
2003	190	81.70
2004	265	103.35
2005	333	126.50

Source: PacFIN, http://www.psmfc.org/pacfin/data/index-r316.html.

Table 3.4-21
Pelagic Catch by Gear Group, 2000-2005

Year	Shrimp Trawls	Troll Gear	Net Gear except Trawl	Shrimp Trawls	Misc.	Hook and Line Gear Except Troll
	(Thousands of Pounds, Round Weight)					
2000	626	646	496,512	1	191	426
2001	1,381	300	430,219	0	*	132
2002	22	1	404,101	1	*	46
2003	170	2	277,078	1	132	33
2004	315	2	316,078	0	*	122
2005	219	0	347,702	*	*	34

Note: * No data available.
Source: PacFIN, http://www.psmfc.org/pacfin/data/index-r316.html.

Table 3.4-22
Crab Catch by Gear Group, 2000-2005

Year	Trawls except Shrimp Trawls	Pot and Trap Gear	Net Gear except Trawl	Shrimp Trawls	Misc.	Hook and Line Gear Except Troll
	(Thousands of Pounds, Round Weight)					
2000	1	36,573	9	3	19	8
2001	0	33,604	16	6	19	0
2002	6	42,394	32	2	34	1
2003	2	81,660	37	1	19	*
2004	0	68,039	26	2	29	0
2005	0	61,683	14	0	27	0

Note: * No data available.
Source: PacFIN, http://www.psmfc.org/pacfin/data/index-r316.html.

Table 3.4-23
Groundfish Catch by Gear Group, 2000-2005

Year	Trawls except Shrimp Trawls	Troll Gear	Pot and Trap Gear	Net Gear except Trawl	Shrimp Trawls	Misc.	Hook and Line Gear Except Troll
	(Thousands of Pounds, Round Weight)						
2000	266,170	78	2,135	245	685	*	10,089
2001	223,632	82	1,736	227	535	1	9,151
2002	160,296	50	1,220	151	197	6	7,937
2003	177,310	53	1,914	186	69	0	8,667
2004	265,822	88	1,865	149	52	*	8,790
2005	292,154	97	2,255	128	35	*	9,200

Note: * No data available.
Source: PacFIN, http://www.psmfc.org/pacfin/data/index-r316.html.

Table 3.4-24
Highly Migratory Species Catch by Gear Group, 2000-2005

Year	Trawls except Shrimp Trawls	Troll Gear	Net Gear except Trawl	Misc.	Hook and Line Gear Except Troll
	(Thousands of Pounds, Round Weight)				
2000	3	17,771	7,247	199	6,662
2001	0	22,159	3,920	116	6,411
2002	0	17,217	3,285	200	7,896
2003	1	34,272	3,295	236	6,461
2004	1	30,190	2,550	154	3,847
2005	3	19,398	3,242	170	630

Source: PacFIN, http://www.psmfc.org/pacfin/data/index-r316.html.

Table 3.4-25
Other Species Catch by Gear Group, 2000-2005

Year	Trawls except Shrimp Trawls	Troll Gear	Pot and Trap Gear	Net Gear except Trawl	Shrimp Trawls	Misc.	Hook and Line Gear Except Troll
	(Thousands of Pounds, Round Weight)						
2000	582	47	1,219	4,318	86	16,781	3,108
2001	818	66	1,016	3,632	126	14,930	3,310
2002	882	61	1,595	3,880	114	15,666	3,568
2003	746	60	1,853	4,221	193	11,756	2,737
2004	651	78	1,505	3,255	168	12,914	3,040
2005	1,096	77	2,331	2,766	108	12,154	2,632

Source: PacFIN, http://www.psmfc.org/pacfin/data/index-r316.html.

Table 3.4-26
Salmon Catch by Gear Group, 2000-2005

Year	Trawls except Shrimp Trawls	Troll Gear	Net Gear except Trawl	Hook and Line Gear Except Troll
	(Thousands of Pounds, Round Weight)			
2000	15	8,084	13,683	14
2001	12	7,295	30,185	13
2002	6	11,140	33,962	116
2003	4	13,167	29,632	1
2004	28	12,463	30,526	66
2005	31	9,416	18,006	18

Note: * No data available.
Source: PacFIN, http://www.psmfc.org/pacfin/data/index-r316.html
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Table 3.4-27
Shrimp Catch by Gear Group, 2000-2005

Year	Trawls except Shrimp Trawls	Pot and Trap Gear	Net Gear except Trawl	Shrimp Trawls	Misc.
	(Thousands of Pounds, Round Weight)				
2000	1,024	502	0	34,094	191
2001	1,068	527	1,017	39,161	217
2002	836	547	0	56,569	206
2003	613	582	0	31,111	224
2004	748	662	*	19,850	241
2005	642	665	*	24,009	211

Note: * No data available.
Source: PacFIN, http://www.psmfc.org/pacfin/data/index-r316.html.

3.4.3.4 Canadian West Coast Fisheries

This section summarizes economic information on Canadian West Coast fisheries. Table 3.4-28 includes information on the total landed catch and ex-vessel value for the years 2000 to 2005. All data are from Fisheries and Oceans Canada.

Table 3.4-28
Overview of Canadian West Coast Fisheries by Management Group, 2000-2005

Year	Coastal Pelagic	Crab	Groundfish	Highly Migratory	Other	Salmon	Shrimp
	Ex-Vessel Value (CAN$ Thousands)						
2000	49,831	21,591	92,815	5,619	40,115	52,412	38,289
2001	36,429	36,507	84,869	14,473	38,656	37,143	35,991
2002	37,107	28,166	75,882	8,094	43,188	57,294	22,972
2003	35,487	38,235	85,291	5,906	53,653	48,664	33,362
2004	27,914	47,134	82,884	2,017	44,679	52,622	30,387
2005	32,144	27,433	101,316	3,905	45,072	33,823	43,212
(Thousands of Pounds, Round Weight)							
2000	30,424	2,999	71,917	2,390	6,938	19,496	4,346
2001	24,389	5,767	110,628	3,652	6,571	24,729	4,379
2002	26,338	4,187	104,816	3,656	7,433	33,269	3,712
2003	28,848	7,075	120,554	2,718	7,737	38,551	3,497
2004	23,848	9,462	115,050	570	9,907	25,613	2,690
2005	28,779	5,294	147,430	1,039	9,647	27,043	2,862

Source: Fisheries and Oceans Canada Commercial Landings, http://www.dfo-mpo.gc.ca/communic/statistics/commercial/landings/seafisheries/index_e.htm.

3.5 Coastal Communities

Coastal communities associated with or near SSL and NFS research activities are varied and far-flung. For example, within Alaska alone, terrestrial survey sites for SSLs range from islands in the far western Aleutians to the U.S./Canadian border at the southern end of the southeast Alaska panhandle, an east-west distance of about 2,150 miles, equivalent to the distance from the Pacific coast of San Diego, California, to the Atlantic coast of Charleston, South Carolina. Along a north-south axis, SSL survey sites range nearly 1,800 miles from the northern reaches of the GOA to the northern California coast. Terrestrial survey sites for NFSs are more limited in number but are found on the Pribilof Islands and Bogoslof Island in the Bering Sea and the Channel Islands off the California coast, a geographic span of approximately 2,800 miles. Along these vast reaches of ocean and coast, communities vary from small villages to large metropolitan areas, but the number of research sites is limited and relatively few of the sites are immediately adjacent to communities or within their immediate resource use ranges. Also, community impacts associated with SSL and NFS research activities are more likely in some types of communities than others, such as small, relatively isolated communities.

Communities may experience impacts from SSL and NFS research activities in a number of ways. These include (1) direct interactions with communities in the course of permitted research-related activities, (2) interactions with community-based commercial fishing activities, (3) interactions with community-based SSL and NFS subsistence activities, and (4) environmental justice impacts. (Communities may also experience interactive impacts based on several different types of impacts occurring simultaneously.)

3.5.1 Direct Interactions with Communities During Research-Related Activities

Direct interactions, in the context of SSL and NFS research by permitted scientists and their staff, encompass four main types of interactions: ecological impacts, economic activities, educational/training activities, and sociocultural interactions that may generate their own type of social impacts. Ecological impacts involve the perceived effects of research on animals by local community members, as well as the displacement of subsistence hunting activities by research. In the case of SSL and NFS, however, research and subsistence activities are sufficiently dispersed to such a degree that displacement impacts were mentioned by neither researchers nor community members during the interview process detailed below. The remaining pertinent interactions are summarized by type in this section.

3.5.1.1 Background/Approach

Information, especially quantitative or specific community/spatial information, on how researchers interact with communities, necessary for this analysis, was not readily available and was recognized as a data gap to be addressed. To understand how scientists interact with local community members, a series of telephone interviews were conducted with permitted researchers, research team members, and local community leaders. The starting point for these interviews began with contacting researchers associated with four major research institutions/governmental entities: the ADF&G, the AFSC, the ASLC, and the University of British Columbia. To gather a wide range of experiences, however, 43 researchers representing 25 different institutions were contacted by email or phone for an interview. A total of 17 interviews were conducted with SSL and/or NFS researchers about how their research-related activities affected local communities. The purpose of these interviews was not to provide analysts with a statistically valid sample for quantitative analysis. Instead, these interviews were conducted in an attempt to capture the general nature, direction, and magnitude of interactions in broad terms. This information aids in understanding the types of potential community and social impacts. To gain a more holistic perspective, interviews were also done with local community members likely to interact with SSL and NFS researchers during their fieldwork. As explained below, locals in the Pribilof Islands are more likely to experience direct contact with visiting researchers, and three local community members in this area were chosen for interviews based on their previous interest in the EIS process.

An interview protocol featuring open-ended questions was used to guide the telephone interview. These questions covered several topical areas as outlined below.

- Questions started with a request for a general description of overall interaction during fieldwork and following this “grand tour” question, respondents were asked a number of more specific questions.
- The first few specific questions concerned economic-related activities, including economic expenditures in the communities, such as employment (e.g., hiring field assistants from the community) and private sector income (e.g., chartering vessels from community-based entities), among others. It was expected that these types of impacts would be relatively more important in communities with a small economic base than in larger communities with greater economic inputs.
- Interactions not directly economic in nature, such as educational or training programs (e.g., contributions to school curricula or research internship programs for local residents) were also explored through a series of open-ended questions. As with economic activities, the relative importance of these impacts was

expected to be magnified in small, rural communities compared to communities with greater diversity of educational and training opportunities.

- Interviewees were also queried about researcher interactions with subsistence hunters of SSL and NFS. These relationships were explored through a series of questions aimed at illuminating the reasoning behind cooperation strategies, as well as the possible benefits of interaction between subsistence hunters and research staff.
- Finally, a general question was asked of respondents to recall their most memorable interaction with a member of a local community. This question was posed in an attempt to explore themes and issues possibly missed in previous, more structured questions and to allow respondents to explore what types of interactions were more meaningful to them.

Analysis of the information gathered through the interviews suggests that, in general, there are distinctions between SSL and NFS research activities that entail quite different types of community interaction between research staff and local community members. This difference in interaction can be largely attributed to the wide geographic range of SSL and the specific research strategies employed by SSL researchers. SSL research usually involves the chartering of a vessel in the more (relatively) demographically and economically diversified communities of Seward, Kodiak, Dutch Harbor, and Anchorage. Research is then done at sea, miles away from any community. For the majority of these researchers, time for community interaction is limited, at most, to a day of staging at the dock. The nature of interaction is generally economic in nature, with researchers purchasing minor supplies, car rentals, or a few meals at local restaurants.

The nature of interaction between NFS researchers and local community members, on the other hand, is generally quite involved. Because NFSs that are the primary subjects of research reside near the small, isolated communities of St. Paul and St. George, the presence of outside research staff is immediately noticed. Additionally, because NFS research is done largely in rookeries near the communities of St. Paul and St. George, researchers are not isolated from community members during active research. For the majority of these researchers, community interaction can and does happen at all times of the day. The nature of the interaction generally ranges from regular minor economic activity (e.g., purchasing small items at the local store) to interaction not directly economic in nature (e.g., educational outreach, training programs).

3.5.1.2 Economics

Economic interactions between SSL researchers and local community members in the larger communities of Seward, Kodiak, Dutch Harbor, Anchorage, and Juneau generally take the form of vessel charters, with minor economic interaction surrounding the staging process. Contracts for charters are awarded to vessel owners, who in turn supply the research staff with transportation to sea and lodging. Whether or not the vessel is owned locally is generally of little practical consequence to the SSL researchers interviewed. In terms of provisioning, meals are either included in the contract and are provided by the vessel, or food is brought along on the voyage. For some research trips, particularly those spent mostly at sea or in remote locations, bringing or shipping food is seen as the only logical, cost-effective choice. If a store is nearby, however, and meals are not included in the charter, provisions are sometimes purchased in local stores by SSL researchers.

Vessel support services, such as any necessary repairs to the vessel, are covered by the chartered company. Repair and replacement of scientific equipment, when possible, are usually done in the nearest, largest community. Before boarding the charter, SSL researchers in these communities sometimes eat meals at the airport or nearby diners. Some respondents spoke of purchasing small snacks or minor supplies, like batteries or gloves, in the store before embarking on the chartered vessel. In larger cities like Anchorage, the majority of supplies are purchased from local businesses with only specialty scientific equipment shipped to the staging point. A short hotel stay by researchers is also not uncommon if the chartered vessel is not immediately available for boarding upon arrival. Once the SSL researchers board the vessel, however, they are generally self-sustaining, with a number of respondents detailing their efforts to bring back-up equipment and supplies in an effort to maximize research time on the open sea. A few respondents spoke about hiring a small number of locals on a temporary basis to assist with aerial surveying or handling animals for measurement.

Economic interactions between SSL and NFS researchers and local community members in smaller communities, particularly St. George and St. Paul, do not generally involve chartered vessels. Economic activity in these communities usually takes the form of regular, small purchases at the local store. These local purchases act as a way for a small number of NFS and SSL researchers to incorporate themselves into the local community at least to some degree and may facilitate that building of interpersonal relationships. One researcher called his conscious decision to buy as much as possible locally as, "giving something back." Other researchers, however, find the hours of the local stores inconvenient and bring as many supplies as possible with them to these small communities.

In the Pribilof Islands, researchers generally lodge in government housing, although one mentioned renting space from the local government or church during the busy season. Repair and replacement of research equipment are largely done by local community members. NFS researchers, in particular, spoke about hiring local community members on a short-term basis to assist in the weighing and measuring of animals during the field season. The hiring of field technicians from the local community was recalled by both SSL and NFS researchers who spend a majority of their field season living in small communities like St. George and St. Paul.

3.5.1.3 Educational/Training

Non-economic interactions between SSL researchers and locals in the larger, more economically and demographically diverse communities are generally informal meetings "on the pier" before embarking on the charter for research at sea. Based on descriptions from interview respondents, conversations usually concern topics such as the weather or the research agenda. Both of these topics of conversation are not considered idle "small-talk" by local community members, and researchers generally describe these conversations as lively, memorable, and largely supportive of the research on SSLs. These conversations act as an informal exchange of information between researchers and locals, with information from both parties impacting the lives of the other. For the locals, whether or not they are interested in the local ecosystem for subsistence, sport, or economic livelihood, many people who take the time to inquire as to the nature of research gain a deeper, more scientific, understanding (or corroboration) of anecdotal events. For the researcher, information from local community members can inform theses, provide appropriate geographic areas for future research, or provide a window into rare animal behavior. Researchers who took the time for these informal talks before going to sea spoke of being particularly interested in historical information about animal density, movement patterns, human/animal interaction, and other aspects of local and traditional knowledge (such as discussed in Sections 3.2.1.10 and 3.2.2.9) in reference to the animals studied.

Interview respondents also talked about their willingness to be interviewed by different media outlets, including local newspapers and local radio stations, about their research and its larger implications. Respondents were also quick to add that their research is regularly presented at academic conferences and printed in academic publications. Some of these presentations and publications are available on departmental websites for public viewing. One respondent even detailed a password-protected website detailing his research, available only to people from the community in which he worked. Finally, research is sometimes presented by SSL researchers to large collections of local people in public meetings. The format and tone of these public meetings vary, from a formal presentation of data and results, to an informal dialog concerning SSL and their behavior. Respondents said that these meetings were generally well attended and that the information exchange was appreciated by people in the community. Other SSL researchers said that time and budgetary constraints precluded them from giving any formal presentations to large collections of community members. These researchers were careful to add, however, that the results of their research were nevertheless publicly available.

For the majority of SSL researchers using chartered vessels and doing much of their research at sea, educational outreach to students and training was mainly focused on building the skill-sets of non-local college students. A small minority of SSL researchers, however, reported taking on interns and volunteers from the local community to assist with less specialized aspects of research. Volunteer opportunities included, among other things, the possibility to identify individual seals and behaviors from observation stations.

Non-economic interaction between SSL and NFS researchers and locals in smaller, more isolated communities manifests itself as the same kind of interactions present in larger communities, but with higher frequency. Researchers working in small communities, specifically St. George and St. Paul, spoke of daily informal interactions with community members. Because many of the researchers interviewed have been working in the Pribilof Islands for years, many of them spoke of easy and friendly relationships with local community members. For many researchers, informal conversations with locals concerning their research are fruitful in many of the ways previously outlined: Researchers gain historical and temporal knowledge otherwise unavailable to them, and locals gain a deeper scientific understanding of animal behavior and ecology that reinforces or corroborates traditional knowledge. Many researchers interviewed expressed a sense of duty to explain their research as carefully as possible to local community members in smaller communities with high Alaska Native populations because, as people who rely on SSL and NFS for subsistence, researchers are directly affecting the food supply.

Formal presentations to large collections of local community members seemed to be more frequently cited in interviews with SSL and NFS researchers who did much of their work in smaller communities. These presentations regularly outline the nature of the research and its implications for the daily lives of people living around, and subsisting on, SSL and NFS. In St. George and St. Paul, these presentations are relatively uncommon, but community leaders believe that presentations could be easily arranged in conjunction with tribal co-management representatives. As was the case with SSL researchers who charter vessels, SSL and NFS researchers who work in smaller communities present their research at academic conferences, annual meetings, and in academic publications. Many also expressed their willingness to participate in interviews with television, radio, and print media in an attempt to share their research with as many people as possible. This openness has its benefits as well, suggested by one respondent who was identified by a local community member from his appearance on the Discovery Channel. This identification as a television personality, he believed, could have led to partial legitimization (eventually leading to a sense of trust) in the eyes of local community members.

Because SSL and NFS research in the Pribilof Islands takes place mainly on land with small crew sizes, a number of people from the local community are brought on to assist with research in these areas. Volunteers and interns are largely either subsistence hunters or local students. A number of researchers talked at length about the importance of including children in their work, and events during research that involved children were regularly recounted as being highly memorable. Researchers involved students for a variety of reasons, including a conscious attempt to incorporate children from the local community in biological research in an attempt to foster scientific curiosity. This experience, a few respondents believed, could eventually lead to Alaska Native SSL and NFS research specialists. Additionally, some respondents believed that reaching out to children in the community, and exposing them to the work of biologists and ecologists, would help reduce the historical tension between researchers and locals. Finally, the inclusion of local students in the research provides children the opportunity to enter rookeries and closely interact with NFS in a manner otherwise not possible (or otherwise not legal). Some respondents believe that this interaction provides children an opportunity to engage with NFS in a more holistic manner, providing this with direct experience of NFS biology and ecology to compliment the traditional accounts of how important these animals have been for the Pribilof Islands Aleuts.

3.5.1.4 Sociocultural

As noted during recent (August 2006) public scoping for this PEIS, social impacts to communities may occur through researchers "just showing up" in more remote communities in a culturally inappropriate manner. Local residents perceive it as culturally inappropriate when researchers come to work/research in or near a community without giving what is seen as adequate notice and without providing full disclosure of research intent or otherwise giving an opportunity for a type of informed consent for research cooperation desired by local residents and governmental (including tribal) entities. This type of impact is perhaps more likely in rural Alaska Native communities where cultural privacy is typically more highly valued than in the larger, more diverse communities such as Seward or Kodiak, where much of the staging for large research efforts is based. The smaller communities may be more vulnerable to potential adverse outcomes of research-related activities through multiple ties to local resources. As a result of recent efforts to strengthen local participation some rural Alaska Native communities (such as St. George and St. Paul) have institutional entities in place that provide for varying degrees of resource co-management that can serve to channel interactions with outside researchers and represent local interests in those interactions more effectively than can be done in larger, non-Native communities. Interviews with local community members in the Pribilof Islands suggest that these arrangements have been relatively successful, and instances of culturally insensitive researchers arriving to do research are getting rarer. Public scoping comments would suggest that integration of local traditional knowledge would benefit both communities and the research program itself, as would a protocol for handling interactions with communities that encompasses ethical guidelines for such interactions.

3.5.2 Interactions with Community-Based Commercial Fishing Activities

As noted in other sections, SSL and NFS research may be directly or indirectly related to commercial fishing activities, but the nature of these interactions has not been established. Understanding the nature of the interactions between SSL and NFS research and commercial fishing activities would allow an analytic focus on particular species or fisheries by gear type in particular geographic areas. Depending on the nature of these interactions, a greater or lesser set of communities would be involved, as commercial fishing-related activity takes place over a great deal of Alaska, and involves vessels (and processing entities) from multiple states. While parallel information is not readily available for fisheries that take place off of the coasts of Washington, Oregon, and California, harvest information on potentially relevant North Pacific fisheries that take place off of Alaska for recent years (2000-2004) has been developed on the state level (linked to the state of vessel ownership), by gear and by species, and is portrayed in Figure 3.5-1. As shown in this figure, interactive impacts accruing to commercial fishing activities off of Alaska could result in potential impacts well beyond Alaska itself. Information by species and gear types for this same period has been developed on a community-level basis for Alaska communities. Figure 3.5-2 illustrates the distribution, among Alaska regions, of total annual average revenue derived from commercial fishery harvesting activities for individual communities. Similar information is available by species group and gear type for these communities as well. Figure 3.5-3 illustrates the distribution of fishing effort by community as measured by individual permit activity. Similar information broken out by species group and gear type by community has also been developed.

3.5.3 Interactions with SSL and NFS Community-Based Subsistence Activities

A range of interactions between SSL and NFS research activities and communities engaged in SSL and NFS subsistence activities are possible. The type or extent of potential impacts of SSL and NFS research on communities is based on the nature of the specific research activities. As shown in Figure 3.5-4, the communities that engage in SSL subsistence harvest are far-flung, with NFS subsistence harvest highly concentrated in the Pribilof Islands. It should be noted that SSL subsistence harvesting and research exists in close proximity to NFS subsistence harvesting and research in the Pribilof Islands, although the scale of SSL research in this geographic region is smaller than NFS research of the same type. A complete listing of the communities with reported SSL

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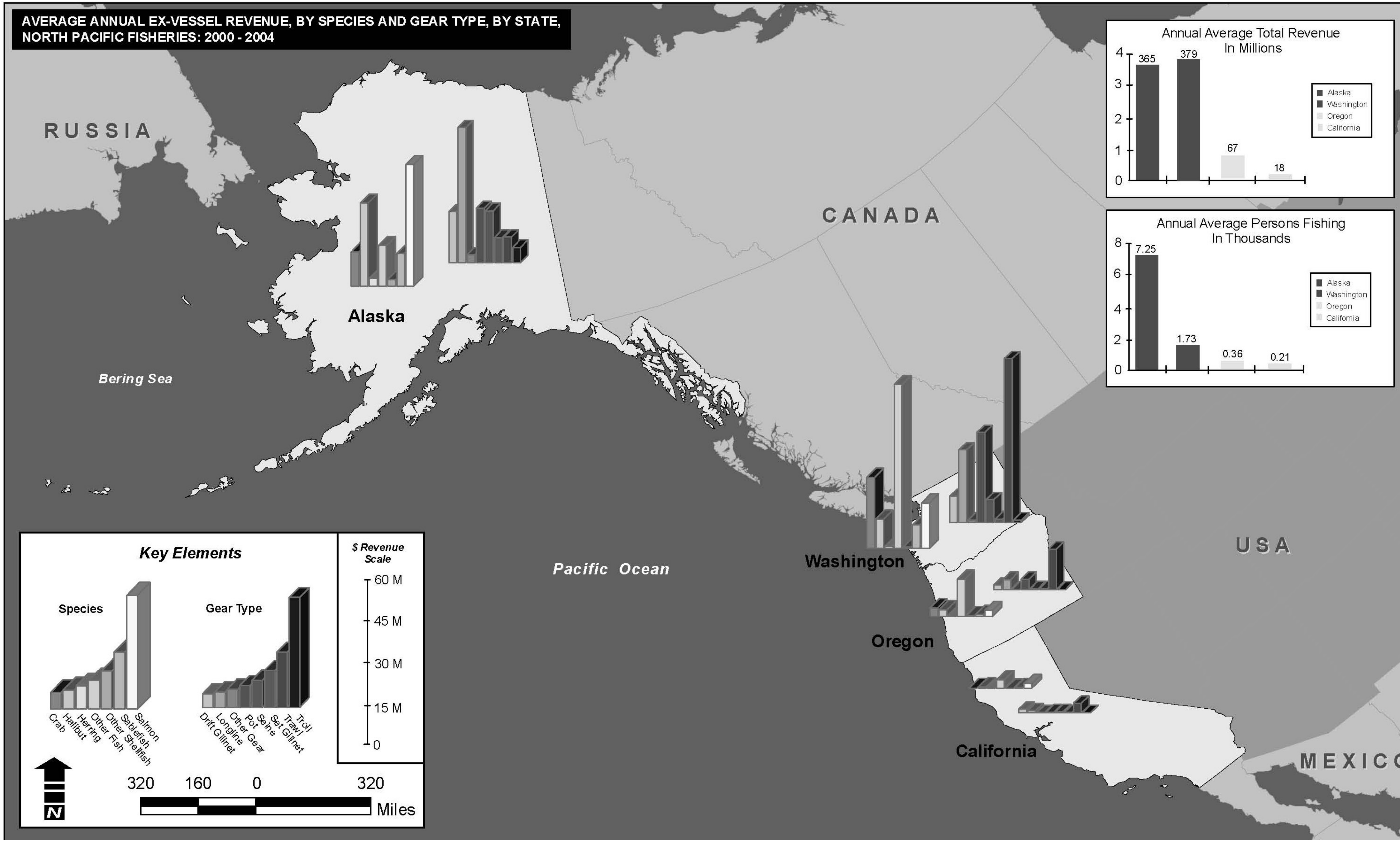

Figure 3.5-1 State Fisheries

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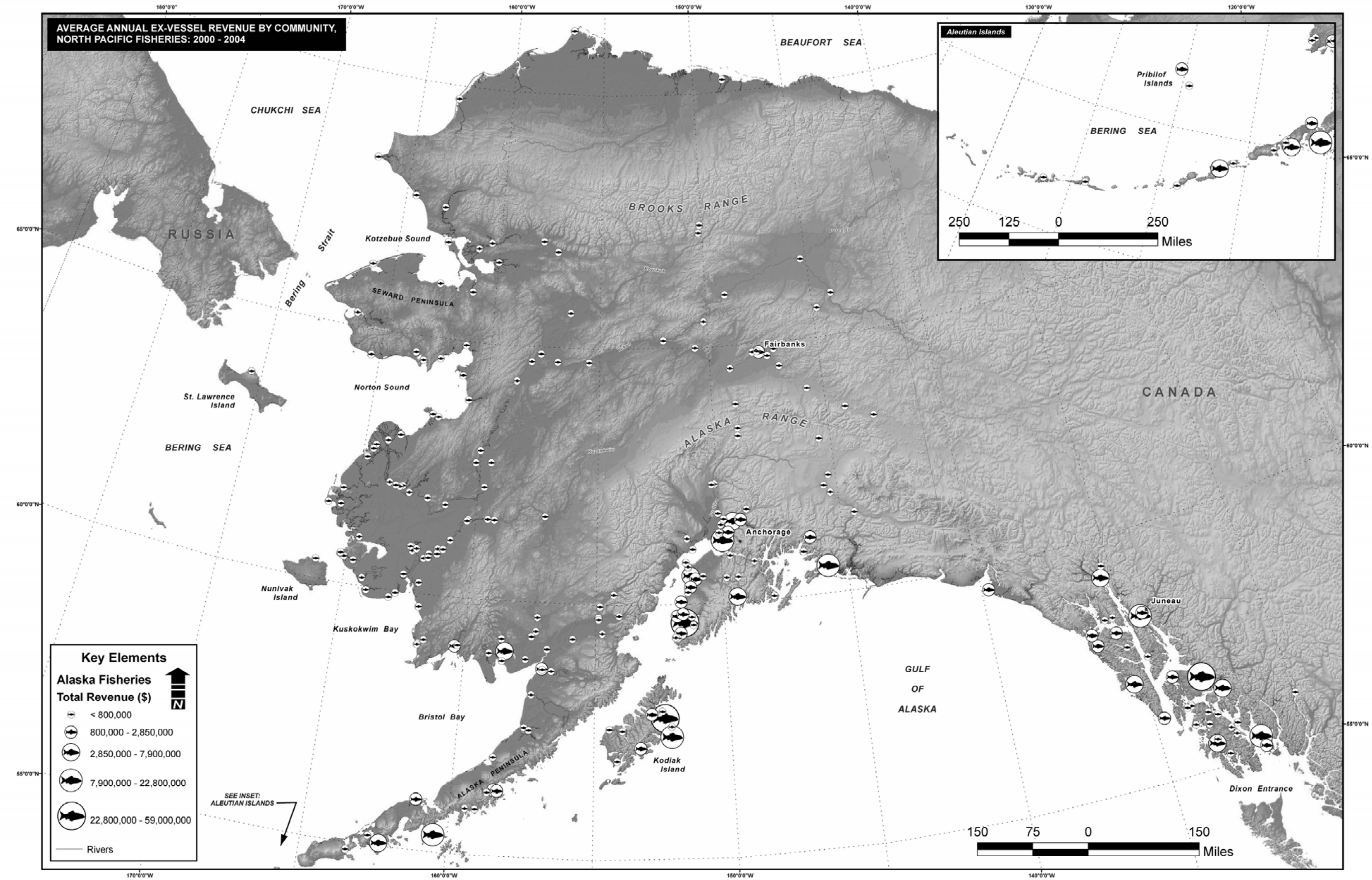

Figure 3.5-2 Alaska Fisheries Revenue

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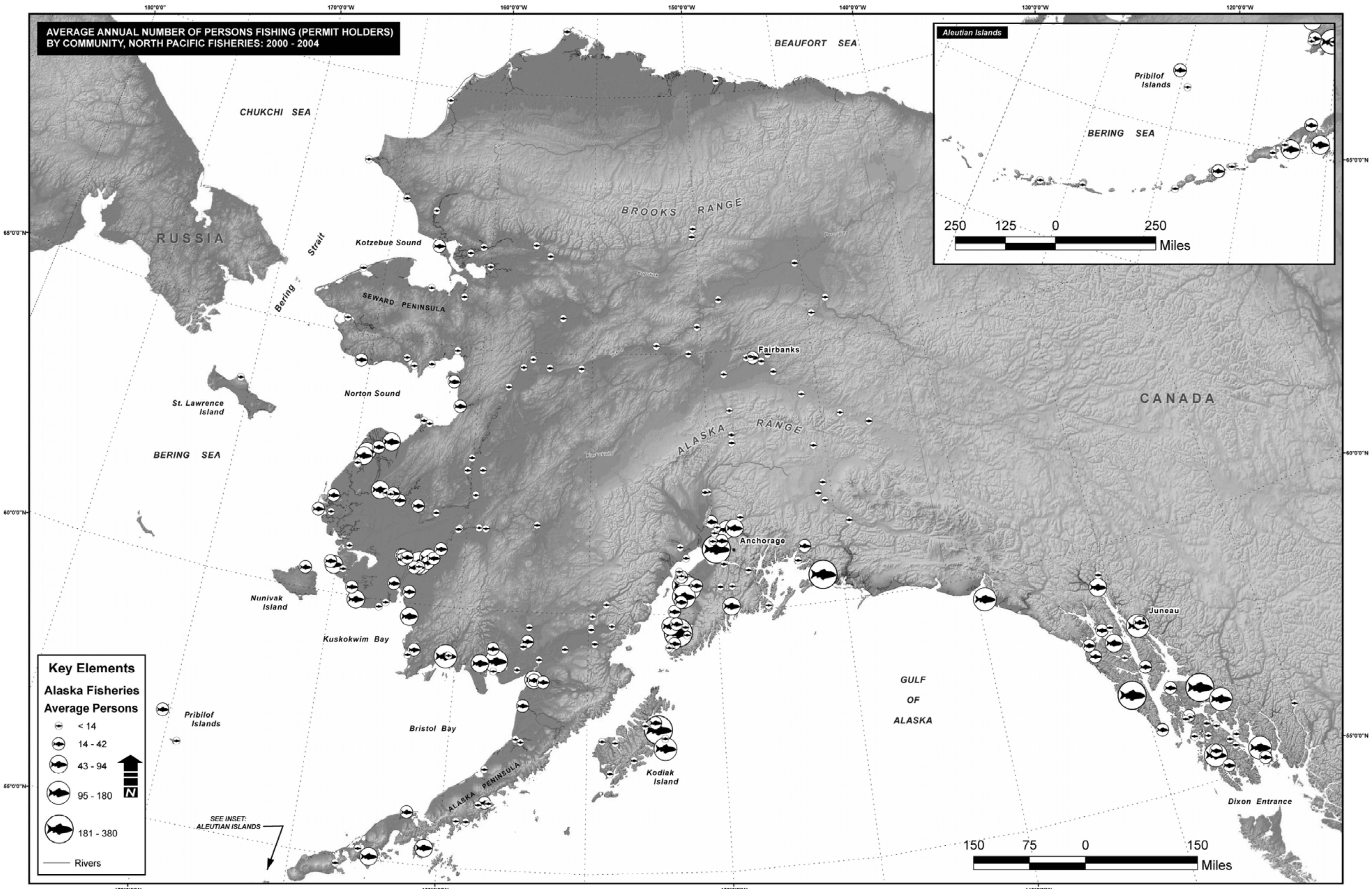

Figure 3.5-3 Alaska Fisheries

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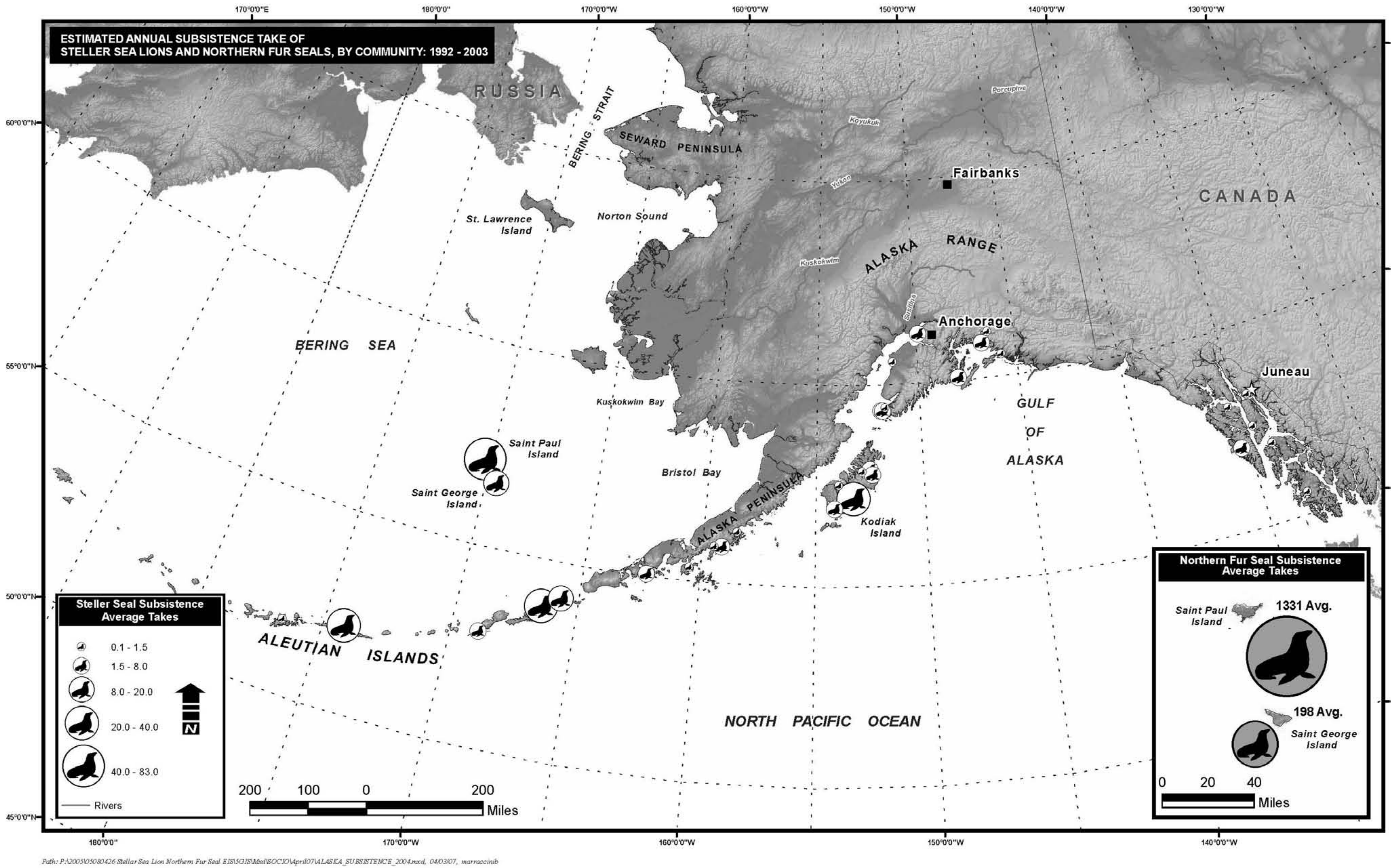

Figure 3.5-4 Alaska Subsistence

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and NFS subsistence take in recent years is provided in the subsistence harvesting section (Section 3.4.1) of this document. As noted in that discussion, interactions between SSL and NFS research activities and subsistence activities may be of a number of different types, ranging from mutually beneficial exchange of information on a regular basis to unplanned episodic interactions that have adverse outcomes for either research or subsistence activities or both. Interviews with researchers, however, portrayed many interactions with subsistence hunters as cooperative. This was especially true of NFS research in the Pribilof Islands where subsistence hunters regularly provide organs and other tissue samples from their traditional take to researchers for investigations concerning animal disease and toxicology. The general perception of this cooperative relationship by researchers is that subsistence hunters, through assisting with research, are taking an even more active role in the protection and stewardship of their surrounding ecosystem. Some researchers admitted, however, that their relationships with subsistence hunters are tenser than other local community members with whom they interact.

3.5.4 Environmental Justice

The following identification of affected populations is required under Executive Order 12898, Environmental Justice (59 CFR 7629). Under Executive Order 12898, demographic information is utilized to determine whether or not minority populations, low-income populations, or Native Americans are present in the area potentially affected by the proposed project. If so, a determination must be made whether or not implementation of the proposed project may cause disproportionately high and adverse human health or environmental impacts on those populations. The analysis of impacts is found in Section 4.9.4.

The CEQ defines the term "minority" as persons from any of the following U.S. Census categories for race: Black/African American; Asian; Native Hawaiian or Other Pacific Islander; and American Indian or Alaska Native. Additionally, for the purposes of this analysis, "minority" also includes all other nonwhite racial categories that were added to census definitions in the most recent census, such as "some other race" and "two or more races." The CEQ also mandates that persons identified through the U.S. Census as ethnically Hispanic, regardless of race, should be included in minority counts. The term "Hispanic" is an ethnic marker, suggestive of a common linguistic and cultural history associated largely with Spanish colonialism in the New World. Ethnic categorization on the U.S. Census overlaps with (that is, is not mutually exclusive from) racial categorization, so persons of any or all races may identify themselves as Hispanic. For the purposes of environmental justice analysis, all persons except for "white, non-Hispanic" are considered "minority." The Interagency Federal Working Group on Environmental Justice guidance states that a "minority population" may be present in an area if the minority percentage in the area of interest is "meaningfully greater" than the minority population of the general population (CEQ 1997).

For the purposes of this demographic analysis, minority populations and low-income populations in the Pribilof Islands are characterized and contrasted with the general (larger) population of Alaska. This analysis focuses on the communities of St. George and St. Paul based upon the above discussion, which suggests that these communities may experience the greatest impact due to their rural nature, limited local economies, and closest ties to localized research-related activities. Interviews with permitted researchers and staff suggest that communities outside the Pribilof Islands, specifically communities that participate in SSL subsistence harvesting, do not come into extended, direct contact with research staff due to the nature of SSL research methods. In fact, no researcher interviewed recollected interrupting SSL subsistence activities during their research. Additionally, because SSL research generally requires a larger seaport, researchers engaged in studying SSL do not regularly engage with smaller, rural, economically limited communities for any extended period of time. Due to the brief and relatively minor interactions between SSL researchers and communities near key SSL research areas, these communities were eliminated from further consideration under this Environmental Justice analysis.

Table 3.5-1 illustrates the racial and ethnic composition of the potentially affected communities of St. George and St. Paul, as well as Alaska as a whole. The proportions of minority populations in St. George and St. Paul are 92.1 percent and 87.0 percent, respectively. These proportions are substantially higher than the state of Alaska, which has a minority population of 32.4 percent. The communities of St. George and St. Paul have predominately Alaska Native populations, with otherwise little demographic diversity. In these two communities, whites are the next largest proportion, comprising 7.9 percent of the total population of St. George and 13.0 percent of the total population of St. Paul.

Table 3.5-2 illustrates the proportion of people with income considered below poverty in the potentially affected communities of St. George and St. Paul, as well as Alaska as a whole. The proportions of people with income below poverty in St. George and St. Paul are 7.9 and 11.9 percent, respectively. These proportions are similar to the proportion of people in Alaska with income below poverty, which is 9.4 percent.

Table 3.5-1
Study Area Race and Ethnicity, 2000

2000	St. George	St. Paul	State of Alaska
Total Population	152	532	626,932
White	**7.9%** (12)	**13.0%** (69)	**69.3%** (434,534)
Black or African American	**0.0%** (0)	**0.0%** (0)	**3.5%** (21,787)
American Indian and Alaska Native	**92.1%** 140	**85.9%** (457)	**15.6%** (98,043)
Asian	**0.0%** (0)	**0.0%** (0)	**4.0%** (25,116)
Native Hawaiian and Other Pacific Islander	**0.0%** (0)	**0.6%** (3)	**0.5%** (3,309)
Some Other Race / Two or More Races	**0.0%** (0)	**0.6%** (3)	**7.0%** (44,143)
Hispanic or Latino	**0.0%** (0)	**0.0%** (0)	**4.1%** (25,852)
Total Minority	**92.1%** (140)	**87.0%** (463)	**32.4%** (203,144)

Source: U.S. Bureau of Census 2000

Table 3.5-2
Study Area Income Below Poverty Level, 1999

1999	St. George	St. Paul	State of Alaska
Total Population	139*	555*	612,961
Income Below Poverty Level	**7.9%** (11)	**11.9%** (66)	**9.4%** (57,602)

Note: * 1999 total population is an estimate based off of total and proportion of people with income below poverty level
Source: U.S. Bureau of Census 2000

3.6 Economic Impacts of Federally Funded Research

This section describes the economic impacts of federally funded SSL and NFS research. First, an overview of the levels and recipients of SSL and NFS research funding is provided. Next, a methodology is developed, based on a review of literature, for estimating the regional economic impacts of SSL and NFS research expenditures. Measuring the economic impact of direct expenditures captures the direct, indirect, and induced effects of SSL and NFS research funding flowing into states from federal sources. Lastly, this section describes possible economic benefits derived from the output of SSL and NFS research.

3.6.1 Overview of Levels and Recipients of SSL and NFS Research Funds

The federal government supplies the majority of the funding for SSL and NFS research, and the economic effects of SSL and NFS research depend largely on how much money is appropriated by the U.S. Congress for the research either through earmarks or through the NOAA budget. Table 3.6-1 provides an overview of federal funding levels for SSL research and management by FY. As discussed in Section 3.2.1.11, a dramatic increase in funding between 2000 and 2001 led to an intensification of SSL research activities. This increase in SSL research funding was the result of a direct U.S. Congress appropriation. The possibility that Alaska groundfish fisheries might face costly restrictions as a result of scientific uncertainty about the decline of SSL led to increased funding for research. It was hoped that with this funding the fisheries could remain open while, simultaneously, more research and protection of SSLs could occur.

Table 3.6-1
Funding for SSL Research and Management

	(Millions of Dollars)							
National Marine Fisheries Service National Marine Mammal Laboratory	1.95	7.85	17.65	5.85	4.61	9.35	2.20	49.46
Alaska Department of Fish and Game	1.10	2.50	2.49	2.00	2.00	3.20	1.54	14.83
North Pacific University Marine Mammal Research Consortium	0.80	0.80	3.50	2.50	2.50	2.50	1.95	14.55
Alaska SeaLife Center	1.00	6.00	5.00	5.00	6.00	7.00	4.94	34.94
University of Alaska Fairbanks	0	1.00	1.00	1.00	1.00	1.50	0.97	6.47
North Pacific Fishery Management Council	0	2.00	2.00	2.00	2.00	2.00	1.00	11.00
National Oceanic and Atmospheric Administration Office of Oceanic and Atmospheric Research	0	6.00	6.00	0	0	0	0	12.00
National Oceanic and Atmospheric Administration National Ocean Service	0	2.00	2.00	0	0	0	0	4.00
Steller Sea Lion Research Initiative	0	15.00	0	0	0	0	0	15.00
Alaska Fisheries Development Foundation	NA	0	0.50	1.00	1.00	0	0	2.50
Prince William Sound Science Center	NA	0	0	0	1.00	1.00	0	2.00
Total	4.85	43.15	40.15	19.35	20.11	26.55	12.60	166.75

Note: NA – Data unavailable
Source: NMFS Alaska Regional Office 2006

As shown in Table 3.6-1, the Congressional funds were directed to several organizations, both federal and non-federal, that are involved in SSL research. In addition, a new competitive federal grants program, the SSL RI, was administered through the NMFS Alaska Regional Office in Juneau. While federal entities could not compete directly for these grant funds, they could be identified as collaborative partners. In 2001, grant awards for one to three-year projects were made to universities inside and outside of Alaska, the State of Alaska, and non-profit organizations.

The North Pacific Universities Marine Mammal Research Consortium was formed with four participating institutions: the University of Alaska, the University of British Columbia, the University of Washington, and Oregon State University. Funding for the Consortium's SSL and NFS research program has been obtained from the North Pacific Marine Science Foundation. These funds are distributed among other entities, as well as among the four participating institutions.

As shown in Table 3.6-1, funding for SSL research peaked in 2001 and 2002. Funding levels since that time have fluctuated, but there has been an overall downward trend. SSL research funding is not expected to reach the 2001/2002 levels again in the foreseeable future. The budget for SSL research since 2001 has been the largest for a U.S. endangered species (Holmes *et al.* 2006). It has been argued that this investment in SSL research and management is prudent given the economic importance of the commercial fisheries potentially at stake (e.g., Hogarth, 2005); however, some researchers have expressed concern about the high level of federal funding for research on a single species at a time when research funds for many other endangered species are non-existent (Dalton 2005).

The sharp decline in funding for SSL research in FY 2006 was due to the reduced budget for NOAA (Bengtson 2006; DeMaster 2006). The decline in funding led some recipient institutions to scale back research activities. For example, at the ASLC there was a prioritization of research activities that led to employment cuts—five out of the approximately 35 positions supported by SSL federal funds were lost (Atkinson 2006). The ADF&G was able to continue a mark-resight program initiated in 2001 to provide estimates of age-specific survival and reproductive rates; however, research on the foraging ecology of SSL had to be scaled back (Rea 2006). At NMML the funding cuts led to a reduction in field activities, and a planned increase in contract and temporary positions at the facility was cancelled (Bengtson 2006; DeMaster 2006).

Currently, funding dedicated for NFS research is only a small fraction of the funding for SSL research. NFSs were the subject of much early research owing to the species' historic economic importance; as Scott *et al.* (2006:2) note, "The intensive research conducted on northern fur seals involve budgets that could only have been sustained for a species of high commercial value." Commercial harvests of the species ended in the United States in 1984, with the expiration of the Interim Convention on Conservation of North Pacific Fur Seals. The lapse of the Convention significantly reduced research funding into the causes of the fur seal decline and limited the subsequent scope of the broad NFS research program approved by the North Pacific Fur Seal Commission (Gentry 1998 cited in NMFS 2006a). As noted in Chapter 2, however, funding levels for NFS research have recently increased. The improvement is due, at least in part, to uncertainty about the role of climate change, food limitation, interactions with commercial fisheries, and predation in recent declines in NFS populations in the Pribilof Islands. Since 2004, for example, the North Pacific Research Board has awarded $1.04 million for studies investigating the causes of the population decline. Recipients of these funds include the University of Alaska Fairbanks, NMFS AFSC, ASLC, University of Washington, and North Pacific Universities Marine Mammal Research Consortium.

3.6.2 Economic Impact of SSL and NFS Research Expenditures and Output

Federally funded research on SSLs and NFSs results in a variety of economic impacts. Research expenditures are the most tangible sources of impacts of research activity on the local economy. Research-related spending not only generates jobs and income in the entities that are recipients of the research funds, it can have a "ripple" economic effect throughout a region.

In addition, it may be appropriate to focus on the economic value of the research output as well as on the regional impact of research expenditures. Scientific and technological advances from basic and applied research can produce economic benefits for society that may or may not be readily translated into dollar values. This section examines the potential economic impact of both the expenditures and output of SSL and NFS research activities.

3.6.2.1 Regional Economic Impact of Research Expenditures

Expenditures toward SSL and NFS research directly support the functions of the institutions carrying out the research. In the case of universities, research funds support faculty investigators, student assistants and others directly involved in the research activity. The administration of research projects and various research-supporting activities generate additional permanent and temporary positions within the universities. In the case of other institutions, such as the NMFS NMML, research money is a primary source for funding the employment of in-house researchers, supporting staff, and other workers. SSL and NFS research funds have also directly created employment opportunities outside the institutional setting. For example, the Alaska Sea Otter and Steller Sea Lion Commission, in partnership with six Alaska coastal communities developed and implemented a traditional knowledge of SSL health and abundance survey. The Commission provided funding to the local governments, which then hired community surveyors.

In addition to the direct employment created by research activities, SSL and NFS research funding can benefit a large variety of businesses in the private economy by providing funding recipients with procurement budgets that allow them to purchase research-related equipment, supplies and services (e.g., computer components and other high-tech equipment, professional and maintenance services, travel services, aircraft and vessel charters, food for animals, field camp supplies, and printing and photographic services). The periodic convening of researchers at research symposia and workshops can also benefit businesses in the service sector, such as hotels and restaurants. As indicated in Section 3.2.1.12, there have been 23 meetings, workshops, and symposia held over the last six years that focused on SSL and NFS research coordination and collaboration. Also, revenue, employment and income are generated in the economy by businesses that use "products" from SSL and NFS research as inputs for the production of goods and services. For example, the SSLs on public display at the ASLC, a marine research aquarium, are a tourist attraction that helps support the tourism industry in Seward, Alaska. Lastly, the majority of the wages and salaries of researchers and other research-related workers circulate back into the local economy through purchases of local goods and services, thereby providing a foundation for other jobs in the retail and service sectors.

These direct, indirect, and induced economic impacts of research spending can be measured in terms of total number of jobs created, payroll produced, and business sales generated within a region using a regional economic impact model based on input-output relationships. Of course, if the scope of the economic impact analysis is the entire U.S. rather than an individual region, federally supported research is then merely a transfer of money—not an injection. Most studies of the economic impacts of research expenditures estimate the impacts of money flowing from outside a region into the region's economy. In other words, federally funded research can be viewed as an economic "base" enterprise that sells its output to customers outside the region and brings new dollars into the region in the process (Goldsmith and Cravez 2004). In this analysis, the focus is the impact of SSL and NFS research on state economies, particularly the states in which the entities receiving federal SSL and NFS research funds are located and where the researchers live and work.

To estimate the economic impacts of external SSL and NFS research funding in different states, one could measure how many research positions, purchases, or the like were supported by the investment and what indirect and induced effects are attributable to the funding. This analysis would be exceedingly costly and time-consuming because it would require custom studies for each research project to determine its impact. Alternatively, there is sufficient evidence on the economic impact of federally funded research in general to estimate the economic impact of research on SSLs and NFSs at the state level. Table 3.6-2 summarizes studies conducted in Alaska and Washington that document the benefits of university research using input-output type models. The study of the "multiplier" effects related to research at the University of Alaska Anchorage reported an overall output multiplier for spending on wages and goods and services of 1.5, meaning that every dollar of direct research expenditures by the university generated an additional $0.50 in indirect and induced spending in the state. The output multiplier calculated for the University of Washington is 2.2. In general, output multipliers for Washington and other states with large, integrated economies are larger than those for states with less developed economies, such as Alaska, because businesses and households make a larger share of their purchases within the state. Multipliers from the U.S. Department of Commerce, Bureau of Economic Analysis, Regional Input-Output Modeling System reveal that multipliers for impacts in private sector research and development and, separately, professional services, are similar to those reported in Table 3.6-2. This finding strengthens the assumption that the impacts of university-based research are similar to those of federally funded research conducted at private or federal facilities.

Table 3.6-2
Summary of Literature Review of Regional Economic Impacts of University Research

Source	University/Affected State or Region	Output Multiplier to Calculate the Overall Economic Impact
Goldsmith and Cravez (2004)	University of Alaska Anchorage/Alaska	1.5
University of Washington (2002)[1]	University of Washington/Washington	2.2

Note: [1]Examined the economic impact of all university spending, not just research-related expenditures.

To estimate the total economic output (wages and sales of goods and services) generated by SSL and NFS research activities across broader statewide economies, research expenditures inside and outside Alaska were estimated for FY 2006 (Table 3.6-3). The distribution of research expenditures accounted for research dollars that "leaked" out of a state when purchases were made out-of-state. For example, researchers from institutions outside of Alaska may have procured airplane transportation or vessel support services from Alaska-based entities in the course of conducting field work. Not allowing for out-of-state expenditures would lead to an underestimation of economic impacts in Alaska. In FY 2006, the North Pacific Marine Science Foundation budgeted $1.04 million (53%) of its $1.95 million SSL research funds to be spent in Alaska (Carey 2006a). That same FY, total SSL research funding for the NMML in Seattle was $2.20 million, of which $1.47 million (67%) was spent in Alaska (Carey 2006b). In both cases, the SSL research funds not spent in Alaska is primarily in salaries. This distribution of research expenses is generally what would be expected for institutions whose SSL research largely consists of field studies conducted out-of-state. Studies of research expenditure patterns by Charney and Pavlakovich-Kochi (2003) and Goldsmith and Cravez (2004) reported that about half of university research budgets is paid out in wages and benefits. In all of the input-output studies reviewed for this analysis, wages and salaries are assumed to be spent locally.

Table 3.6-3
Distribution of SSL and NFS Research Expenditures Inside and Outside of Alaska, FY 2006

State	Research Expenditures (Millions of Dollars)[1]
Alaska	10.09
Outside of Alaska	2.51

Note: [1]In constructing this table, an adjustment was made for out-of-state expenditures.

The University of Alaska Anchorage output multiplier in Table 3.6-2 was used to estimate the economic effect of SSL and NFS research spending on the Alaska economy in terms of the combined direct, indirect, and induced impacts; the University of Washington output multiplier was used to estimate the total economic effect of SSL and NFS research spending on the regional economy outside of Alaska. The results are summarized in Table 3.6-4. The estimated total spending generated by SSL research expenditures in FY 2006 was $15.1 million in Alaska and $5.5 million outside of Alaska.

Table 3.6-4
Total Economic Impact of SSL and NFS Research Expenditures Inside and Outside of Alaska, FY 2006

State	Total Spending Generated by Research Expenditures (Millions of Dollars)
Alaska	15.1
Outside of Alaska	5.5

3.6.2.2 Economic Impact of Research Output

While employment and output multipliers related to research expenditures are a good starting point for understanding the impact of SSL and NFS research, they do not necessarily tell the complete story. Federally funded research can result in new products, productivity gains, and other benefits to society. To understand this broader set of impacts, analysts need to consider the additional economic growth that is generated by the outcome of the research, and not just the ripple effects of the initial expenditures. For example, some research investments, such as those made in engineering, communication systems and biomedical technology, lead to innovative products and processes, licensing agreements, patents, and other tangible benefits. The economic returns from the commercialization of new scientific or technological advances assume two forms: 1) profits to the individual innovator (or shareholders of a corporation), along with higher wages and compensation for workers, and 2) benefits to the economy channeled through the adoption of new products and processes by other firms (National Research Council Committee on Science, Engineering, and Public Policy 1992). The latter also includes benefits to consumers through a wider range of product choices that better satisfy human needs. The value of this research output can be compared to the initial research investment to determine the return on investment, and the rate of return can be compared to the rate of return provided through alternative investments.

However, not all research spending is equally productive, and the benefits of some research can not be readily expressed in monetary terms because the outputs are not traded in observable markets. In the case of research on SSLs and NFSs, the purpose of the research, as stated in the 2006 SSL Draft Recovery Plan and the 2006 NFS Draft Conservation Plan, is to promote the recovery of the species' populations to levels appropriate to justify removal from ESA listings and to delineate reasonable actions to protect the depleted species under the MMPA (see *NMFS Steller Sea Lion and Northern Fur Seal Research EIS Public Scoping Report*). Public preferences for providing this protection for SSLs and NFSs are primarily the result of the non-consumptive value people attribute to such protection (Lew 2005). Because the protection of wildlife, such as NFSs and SSLs, is not a "commodity" traded in observable markets, standard market-based approaches to estimate its economic value cannot be applied. As a result, studies that attempt to estimate these values must rely on survey-based non-market valuation methods, which involve asking individuals to reveal their preferences or values for non-market "goods," such as the protection of species, through their responses to questions in hypothetical market situations. A positive preference for protection of a species is expressed as a "willingness to pay" for it. This willingness to pay exists because the protection of SSLs, NFSs, and other wildlife contributes to human welfare, where "welfare" is broadly defined to reflect the overall happiness or satisfaction of an individual or group of individuals (National Research Council 2004).

A survey-based non-market valuation method called the contingent valuation method (CVM) has been used to provide an empirical point estimate of the total economic value attributable to the protection (and enhancement) of the western SSL stock, including economic value that has no market or commercial basis (Giraud and Valcic 2004; Giraud *et al.* 2002). This study constructed and administered a questionnaire survey that included a closed-ended CVM question formatted similarly to a typical public goods referendum. Specifically, the survey described a hypothetical expanded federal SSL recovery program that would double research funding and increase the restrictions of commercial fishing around the critical habitat of the western stock of SSL in the GOA, Bering Sea and North Pacific Ocean. The survey noted potential impacts to Alaskan coastal communities that depend on the fishing industry as well as potential benefits from the expanded program. However, the survey explicitly stated that biologists are unsure why the sea lion populations have been declining and gave no guarantee that the expanded program would ensure species recovery.

This information was followed by the question, "If the Expanded Federal Steller Sea Lion Recovery Program was the only issue on the next ballot and it would cost your household $X in additional federal taxes every year for the next Y year(s), would you vote in favor of it?" The dollar amount and payment duration were filled in by the analysts prior to administering the questionnaire. By varying the printed dollar amount across the sample of respondents, the voter referendum format allowed the analysts to statistically trace out a demand-like relationship between the probability of a "yes" response and the dollar amount. The researchers have not yet investigated temporal elasticity of 'willingness to pay' estimates, and only a one-year payment duration was analyzed.

The survey was administered to a sample of households in three study areas: 1) the Alaskan boroughs that contain SSL critical habitat, 2) the entire state of Alaska, and 3) the entire U.S. Because the benefits of preserving federally listed threatened and endangered species are national in scope, both the value per household and number of households to aggregate over should include all U.S. households (Loomis and White 1996).

The SSL CVM study found that the value of an expanded recovery program for the species in the U.S. sample was positive and substantial. The estimated mean one-time payment was $100.22 per household. If the average value per household is adjusted to account for non-responses with the assumption that they represented a zero willingness-to-pay, the mean benefit is $61.13. With 101,562,700 households throughout the nation, and a $61.13 value per household, willingness-to-pay totals about $6.2 billion for the expanded federal protection program for the western stock of the SSL. The 95 percent confidence interval is from $5.8 billion to $16.17 billion. This economic value estimate of an expanded recovery program may be conservative, because the valuation responses were treated as household responses rather than as individual responses. Treating the responses as individual responses would increase benefits substantially.

The results of CVM are often highly sensitive to what people believe they are being asked to value, as well as the context that is described in the survey. Given the vague outcome of the SSL protection program described in the above CVM study, what respondents were evaluating is somewhat uncertain. A more definitive value of the SSL might have been obtained if a link had been established between an expanded protection program and a well-defined discrete outcome, such as a specific probability that the western SSL population would recover. NMFS is currently conducting a study to collect information that can provide additional insights into public values for protecting SSLs (Lew 2005). This study will employ a survey-based non-market valuation method that adopts a choice experiment, or stated choice, approach for eliciting economic values for SSLs. The final survey implementation will follow Office of Management and Budget approval. NMFS will use stated choice data collected through the survey to estimate a preference function for explaining choices between protection programs that differ in the levels of population sizes, ESA-listing status, geographic distribution, and costs. This estimated function will provide NMFS and the NPFMC with information on public preferences and values for alternative SSL protection programs, and how several factors affect these values (Lew 2005).

Economists acknowledge that, in general, questions of validity, bias, and reliability persist in the use of CVM and other survey-based non-market valuation methods used to evaluate environmental assets. In 1992, NOAA commissioned a blue ribbon panel to advise the agency on the use of CVM for measuring non-use values (Arrow *et al.* 1993). The panel concluded that CVM studies can produce estimates reliable enough to be the starting point for a judicial or administrative determination of natural resource damages, including loss of non-use values, as long as certain sampling and survey design guidelines are followed. Critique of the methodology employed by Giraud and Valcic (2004) and Giraud *et al.* (2002) to evaluate the benefits of an expanded program to preserve the SSL is beyond the scope of this analysis, but the use by these analysts of a willingness-to-pay and a dichotomous choice format is consistent with guidelines set forth by Arrow *et al.* (1993). Nevertheless, CVM and other survey-based non-market valuation methods depend on asking people questions, as opposed to observing their actual behavior, which is a source of considerable controversy among economists, policy makers, and others. The conceptual, empirical, and practical problems associated with developing dollar estimates of economic value on the basis of how people respond to hypothetical questions about hypothetical market situations are a continuing source of debate.

Apart from debates about the technical acceptability of survey-based non-market valuation methods with respect to their validity and reliability, there are criticisms of the basic principles underlying the economic valuation of at-risk species. A number of these criticisms contend that non-market valuation methods are inherently inadequate because they are based only on the preferences of the current generation and neglect the ethical issue of the inter-generational allocation of natural endowments. For example, Berrens *et al.* (1998) note that irreversible species or ecosystem losses involve inter-generational equity issues because they constrict the choice sets of future generations. Preserving species where positive net benefits are to be earned is obviously a good idea, but preserving species only when doing so meets economic efficiency criteria may place future generations in a disadvantaged position (Bishop 1993).

Other critics focus on the fact that economic valuations are rooted in anthropocentric or human-centered benefits, that is, these valuations rest on the basic assumption that value derives from what people find useful. However, some would argue that human uses and the values to which they give rise are not deserving of any special consideration when it comes to a decision on whether or not to preserve a species (Albers *et al.* 1996). This non-anthropocentric or biocentric viewpoint assumes that all living things have value even if no human being thinks so (National Research Council 2004). According to one interpretation of this notion of non-anthropocentric intrinsic value, non-human species have moral interests or rights unto themselves (Callicott 1986; Nash 1989; Regan 1986; Stone 1974). This reference to morals, rights, and duties implies an ethic that rejects the assumption that humans even have a choice regarding whether or not to protect a particular species or ecosystem; rather, it is seen as an obligation (National Research Council 2004; Mazzotta and Kline 1995). These arguments are inconsistent with the economic principle of trade-offs between money and wildlife species because they present individuals with the moral imperative that we ought to preserve plants and animals (Stevens *et al.* 1991). As Costanza *et al.* (1997) and Pearce and Moran (1994) note, concerns about the preferences of future generations or ideas of intrinsic value translate the valuation of environmental assets into a set of dimensions outside the realm of economics.

How prevalent such ethically motivated values are among members of the U.S. general public is difficult to gauge. According to Herzog and Dorr (2000), much of the research on attitudes toward non-human species has been conducted with non-representative samples. They note, however, that some relevant surveys have been conducted by commercial polling organizations using large probability samples of Americans. An example provided by Herzog and Dorr is the 1994 survey the *Times Mirror* commissioned Princeton Survey Research Associates to conduct to assess the views of Americans toward a variety of social causes. Of those sampled in the survey, 23 percent had a "very favorable" attitude toward the animal rights movement, 42 percent had a "mostly favorable" attitude, 21 percent had a "mostly unfavorable" view and 9 percent had a "very unfavorable" view of the movement.

More recently, a Gallup poll found that 96 percent of Americans say that animals deserve at least some protection from harm and exploitation, while just 3 percent say animals do not need protection "since they are just animals" (Moore 2003). 25 percent of Americans say that animals deserve "the exact same rights as people to be free from harm and exploitation." However, among those who support the same rights for animals as people, 44 percent oppose banning medical research on laboratory animals and 55 percent oppose banning all types of hunting. The substantial numbers of people who oppose proposals to limit the harm and exploitation of animals—despite saying they want the same rights for animals that people have to be free from harm and exploitation—suggest that the issue of animal rights may be more complex than some initially expected (Moore 2003). Clearly, additional in-depth public surveys are needed before we can better understand people's motivations for supporting efforts to protect species such as the SSL and the NFS.

Finally, it is important to note that it may not be necessary that a given management or research policy have positive or negative implications for the survival of an entire SSL or NFS population in order for a segment of the American public to be affected. Some individuals may hold a positive value for avoiding losses of part of a species' population even if recovery is fairly rapid (Bishop and Welsh 1992) - witness the opposition by some members of the public to the 1999 gray whale (*Eschrichtius robustus*) hunt by the Makah people of the Pacific Northwest, despite the fact that NMFS deemed the eastern North Pacific gray whale stock to be in good condition and capable of withstanding a restricted harvest. It is likely that for some opponents to the whale hunt the harvest of even a single whale is one too many because of the value of the special qualities they ascribe to a living whale or because the killing of a whale conflicts with their ethical principles. Similarly, if a given management or research policy has adverse consequences for individual SSLs or NFSs, but not for populations of these species as a whole, it is likely that some individuals would experience a loss of welfare, which, as noted previously, is a measure of an individual's relative happiness or satisfaction, or would feel moral unease.

In summary, the desired output of SSL and NFS research is to improve the survival or recovery of the species in the wild. The one existing survey effort to understand the economic value of SSL indicates that this enhanced protection has positive and substantial societal value. Additionally, there may be value associated with the protection of the SSL and the NFS that lies outside the categories of value subject to economic investigation.

3.7 Grant and Permitting Process

3.7.1 Granting Process

NMFS administers a broad range of financial assistance and program partnership activities directed at supporting the core mission of NMFS. Grant awards are made to universities, state agencies, and public or private sector non-profit organizations to fund activities pertaining to the research and management of fisheries, marine mammals, and habitat conservation. Some grant awards are discretionary, based upon compliance with existing defined NMFS program goals and objectives. Other grant awards are directed by Congress, with grant funds "earmarked" in the federal budget for specific activities. Grants for research on ESA listed species are subject to ESA section 7 (a)(2), which states that federal agencies will insure that any action authorized, funded, or carried out by the agency is not likely to jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of critical habitat.

Funding for research activities on SSLs and NFSs has been derived from a variety of sources over the years, including federal, state, and private institutions. Prior to their listing under the ESA in 1990 and for most of the 1990s, federal funding for SSL research through NMFS was less than one million dollars per year, with a majority of funds supporting census work (Ferrero and Fritz 2002). As the population continued to decline into the late 1990s, a series of legal and scientific challenges led NMFS to place restrictions on the commercial fishing industry to help alleviate the population decline, even though there was no scientific consensus on how effective such restrictions would be as conservation measures. In response, the U.S. Congress dramatically increased funding for SSL research in 2001 and directed NMFS to disburse funds for a diversity of research projects through several research agencies plus a new federal grants program, the Steller Sea Lion Research Initiative (SSLRI), administered through the NMFS Alaska Region Office in Juneau.

The SSLRI required prospective grant recipients to submit proposals based on a specified set of research and eligibility criteria (NMFS 2001a). Funding could be in the form of outright grants or cooperative agreements, depending on whether or not agencies were directly involved in the research, and matching funds from other sources were not required. The SSLRI application package contained standard NOAA budgetary control forms and guidelines. The solicitation notice described the priorities for the types of research that would be funded and the evaluation criteria for awards. The evaluations included consultation with NMFS scientists and other experts on the scientific merits of the proposed research as well as on the capability of the researchers to effectively carry out their proposal. Proposed budgets were also evaluated for reasonableness of cost estimates and adequacy for fulfilling the research objectives. Proposals were also evaluated by a Constituency Panel that included representatives from the fishing industry, Alaska coastal communities, and other qualified personnel selected by the NMFS Alaska Region Administrator. NMFS Program Office compiled the technical, budgetary, and constituency evaluation rankings and made recommendations for funding. The Alaska Region Administrator, in consultation with the NOAA Assistant Administrator for Fisheries, determined which projects should be funded based on these recommendations and on the need to avoid duplication with existing agency research efforts. Final funding amounts were based on negotiations between NMFS and the recipient and were subject to an additional review by the NOAA Grants Management Division. Since the SSLRI program, all grants have been

Congressionally directed with named recipients and amounts. Despite this, each of these grants still undergoes three merit reviews and negative findings are dealt with prior to the award.

The Alaska Region Grants Program Office has also distributed some SSL research funds through the Saltonstall-Kennedy competitive grants program, a program designed to provide financial assistance for research and development projects to strengthen the U.S. fishing industry. However, that program has not distributed grants since FY 2003 due to lack of funding in the federal budget.

Information on how to apply for grants from NMFS is available on the NOAA Grants Program website: http://www.ago.noaa.gov/grants/pdf/. This site includes links to numerous forms that may be applicable to different research projects. Additional information on the types of research grants that are currently available can also be found on the Alaska Region Grants Office website: http://www.fakr.noaa.gov/omi/grants/.

3.7.2 Permitting Process

Information on what types of activities require permits, who may apply for permits, and permit application instructions are currently available from the NMFS Permits Division, Office of Protected Resources (F/PRI) website: http://www.nmfs.gov/pr/. As the one requesting an exemption to a take moratorium, the applicant must demonstrate that permit issuance would not be detrimental to protected species (i.e., will not disadvantage, jeopardize, or otherwise adversely affect a protected species). Accordingly, the MMPA, ESA, and NMFS implementing regulations establish information requirements for permit applicants. When NMFS F/PR1 receives an application, its permit scientists first review it to make sure all required information has been supplied. If an application is incomplete, F/PR1 contacts the applicant and requests the missing information. The permit process cannot proceed further until F/PR1 has a complete application. If an applicant currently holds a permit to take marine mammals, or has held a permit in the past, the new application will not be processed until all reports required to date under such permits have been submitted.

When the application is considered complete, the Office Director makes an initial determination regarding the appropriate level of review required under the National Environmental Policy Act (NEPA). The Office Director may consult with the Marine Mammal Commission (MMC) during this initial NEPA determination as appropriate. If the proposed action qualifies for Categorical Exclusion under rules implementing NEPA, the application process continues with the next step. If the Office Director determines that an EA or an EIS is required, the appropriate document must be completed before the application process continues.

The next two steps occur simultaneously: F/PR1 sends the application out for scientific review and publishes a Notice of Receipt in the FR to begin a mandatory 30-day public review and comment period. The Office Director may extend this comment period and hold public hearings on the application at his/her discretion. Reviewers include appropriate NMFS scientists, the Marine Mammal Commission and its Committee of Scientific Advisors on Marine Mammals, other appropriate federal agencies, NMFS Enforcement, and, for ESA-listed species, NMFS Endangered Species Division. The application may also be sent to appropriate independent experts at the discretion of the Office Director. The reviewers have a period of at least 45 days or longer (as established by the Office Director) to submit their comments on the application. If no comments are received in that time, it is assumed that there are no objections to issuance of the permit. After considering the comments and recommendations of all reviewers, the Office Director will reassess the level of NEPA review required by the proposed project. If that determination requires a more extensive environmental assessment than was indicated in the initial NEPA review (e.g., from a Categorical Exclusion to an EA or from an EA with FONSI to an EIS), the new NEPA review must be completed before the permit process can continue. If no new NEPA analysis is required, the process continues as described below.

Within 30 days of the close of the public hearing or, if no public hearing is held, within 30 days of the close of the public comment period, the Office Director will issue or deny a special exception permit. The decision to issue or deny a permit will be based upon:

- All relevant issuance criteria set forth at Sec. 216.34;
- All purpose-specific issuance criteria as appropriate set forth at Sec. 216.41, Sec. 216.42, and Sec. 216.43;
- All comments received or views solicited on the permit application; and
- Any other information or data that the Office Director deems relevant.

If the permit is issued, the holder must date and sign the permit and return a copy of the original to the Office Director. The permit shall be effective upon the permit holder's signing of the permit. In signing the permit, the holder agrees to abide by all terms and conditions set forth in the permit and acknowledges that the authority to conduct certain activities specified in the permit is conditional and subject to authorization by the Office Director. If the permit is denied, the Office Director shall provide the applicant with an explanation for the denial. The applicant or any party opposed to a permit may seek judicial review of the terms and conditions of such permit or of a decision to deny such permit. Review may be obtained by filing a petition for review with the appropriate U.S. District Court as provided for by law.

3.7.3 Permit Amendments

Scientific research permits may be amended by the Office Director. Requests for amendments to permits should be submitted in writing to the Chief of NMFS F/PR1, and should address all applicable sections of these instructions, including a detailed description of the proposed changes. Amendment requests involving an increase in number, changes of location or species, or more intrusive activities are subject to a 30-day public review and are granted or denied at the discretion of the Office Director. Amendment requests must be endorsed and signed by the principal investigator named in the permit. Less intrusive activity or minor changes not involving numbers, species, or locations may be authorized at the discretion of the Office Director without public review.

3.7.4 Permitted Versus Actual Number of Takes

Several factors of the granting and permitting processes lead to a situation where the requested number of takes by researchers, and therefore the numbers of takes authorized on their permits, are almost always greater than the numbers of takes they report after their research is complete. These factors include differences in timing between the grant cycles and the permit process, uncertainties about future logistical and personnel considerations, and uncertainties about field conditions.

Researchers receive funding for their work from a variety of sources in addition to grants administered by NMFS. Many of these sources of funding are highly competitive and may cover only parts of an overall research plan (duration or scope of activities). Researchers seeking funding from state or federal sources are also dependent on annual legislative budget processes that determine how much money is available for their work. The level of funding for all research each year is therefore highly variable and uncertain for specific projects. In addition, funding may only be available on a year to year basis while a permit may cover activities for up to five years. Because the permit process requires a great deal of effort and time to complete, many researchers try to secure funding for projects before they attempt to get a permit. However, the entire scope of research activities in a five-year research plan is very unlikely to have full funding in place by the time a permit is pursued. Researchers therefore request a permit to do the entire scope of research they would like to do in their permits and then try to secure some of the funding after they have the permit. Because requests for permit amendments or new permits require a substantial amount of time and energy to secure, researchers often feel it is better to apply for the maximum amount of work they would hope to do over a five year period (i.e., the maximum number of takes) in their original permit applications. Failure to win competitive grants in the future, legislative budget cuts, or other funding shortfalls therefore lead to a decreased research effort than what is authorized in permits.

Another uncertainty factor is the future availability of logistical support (aircraft, marine vessels, specialized equipment) and qualified personnel for fieldwork. Most research procedures require specialized equipment and trained personnel to accomplish. Arranging for logistical support and staff for fieldwork in very remote areas can be very challenging, especially if sources of funding or the issuance of the permit itself are uncertain ahead of time. Last minute efforts to organize a field season are rarely successful. A variety of financial and personal factors may therefore lead to a reduced research effort than anticipated in the permit.

Another major source of uncertainty involves the logistical difficulty in actually doing wildlife research in remote areas. In their permit applications, researchers are encouraged to estimate the maximum number of animals that would be exposed to the given activity. For survey and monitoring types of activities, the number of animals that would be exposed to potential disturbance depends on how many animals will be in a particular place at a particular time. The distribution and abundance of animals at the rookeries and haulouts exhibits substantial variation over the years and even throughout a day. Researchers generally estimate how many animals they may affect in different locations based on information in stock assessment reports and previous experience and then add a “buffer” to this maximum number of animals to make sure they do not exceed the permit allowance should the actual number of animals encountered be greater than predicted. Field conditions such as high winds, poor visibility, or rough seas may also prevent researchers from conducting planned activities at specific locations. Capture techniques are also highly dependent on field conditions and the skill of the people involved, especially for larger animals. Successful captures are often more of an art than a foregone conclusion.

In the annual reports submitted to NMFS by each permit holder, the actual numbers of takes as a result of the research activities are provided. Table 3.7-1 summarizes the total number of permitted versus actual number of annual takes for four permits (ASLC #881-1668, ADFG #358-1564, ADFG #358-1769, and NMML # 782-1532). For aerial, vessel, or ground surveys, researchers consider a “take” when the animals exhibit signs of disturbance (i.e., vocalizations and movements or departure from the haul-out site). As illustrated in the table, the actual number of takes rarely, if ever, exceeds the permitted number of takes.

Table 3.7-1
Comparison of Permitted vs. Actual Takes for Four Permits

Activity	Age Class	Number of Animals Taken/Year		Difference in Numbers of Takes	Actual Takes as a Percentage of Permitted Takes
		Permitted	Actual		
1a. Aerial Survey (breeding season)	pups	30,000	0	-30,000	0.0%
	non-pups	105,000	0	-105,000	0.0%
1b. Aerial Survey (non-breeding season)	all ages	25,000	0	-25,000	0.0%
1c. Aerial Survey (monthly regional)	all ages	35,000	1,065	-33,935	3.0%
2. Ground counts (may include incidental scat collection)	pups	23,100	3,080	-20,020	13.3%
	non-pups	40,200	5,809	-34,391	14.5%
3. Incidental disturbance during scat collection, capture/sampling, or observational activities	all	42,850	27,984	-14,866	65.3%
4. Collect carcasses/parts	all	unlimited	13	NA	NA
5. Receive tissue samples from subsistence harvested SSL	all	unlimited	6	NA	NA
6. Behavioral and demographic observation on rookeries	all	unlimited		NA	NA
7. Accidental mortality	all	35	5	-30	14.3%
8. Capture/Restraint	>5 days to 2 mos	2,560	1,304	-1,256	50.9%
	> 2 mos to 3 yrs	1,190	169	-1,021	14.2%
	> 3 yrs	120	0	-120	0.0%
8a. Blood collection	newborn to 2 mos	1,910	231	-1,679	12.1%
	2 mos to 3 yrs	934	90	-844	9.6%
	> 3 yrs	60	0	-60	0.0%
8b. Muscle biopsy	>4 mos to 3 yrs	180	95	-85	52.8%
	>3 yrs	30	0	-30	0.0%
8c. Skin biopsy	>5 days to 2 mos	780	414	-366	53.1%
	> 2 mos to 3 yrs	780	115	-665	14.7%
	> 3 yrs	60	0	-60	0.0%
8d. Blubber biopsy	>5 days to 2 mos	100	0	-100	0.0%
	> 2 mos to 3 yrs	934	145	-789	15.5%
	> 3 yrs	60	9	-51	15.0%
8e. Fecal loops/culture swabs, skin and mucousal swabs	>5 days to 2 mos	1,010	131	-879	13.0%
	> 2 mos to 3 yrs	934	134	-800	14.3%
	> 3 yrs	40	0	-40	0.0%
8f. Tooth extraction (1 tooth over life of animal)	6 mos to 3 yrs	720	4	-716	0.6%
	>3 yrs	40	0	-40	0.0%
8g. Collect vibrissae, hair and nails	>5 days to 2 mos	40	0	-40	0.0%
	> 2 mos to 3 yrs	820	166	-654	20.2%
	> 3 yrs	20	0	-20	0.0%

Table 3.7-1 (continued)
Comparison of Permitted vs. Actual Takes for Four Permits

Activity	Age Class	Number of Animals Taken/Year		Difference in Numbers of Takes	Actual Takes as a Percentage of Permitted Takes
		Permitted	Actual		
8h. Flipper tag	>5 days to 2 mos	2,560	60	-2,500	2.3%
	> 2 mos to 3 yrs	800	26	-774	3.3%
8i. Hot brand (only 1 brand over life of animal)	>5 days to 2 mos	1,860	1,036	-824	55.7%
	> 2 mos to 3 yrs	720	104	-616	14.4%
	> 3 yrs	30	0	-30	0.0%
8j. Attachment of scientific instruments	>5 days to 2 mos	130	0	-130	0.0%
	> 2 mos to 3 yrs	315	68	-247	21.6%
	> 3 yrs	30	0	-30	0.0%
8k. Bioelectric impedance analysis	> 2 mos to 3 yrs	854	106	-748	12.4%
	> 3 yrs	30	0	-30	0.0%
8l. Inject stable isotopes and collect serial blood samples	> 2 mos to 3 yrs	300	36	-264	12.0%
8m. Inject Evans blue dye	> 2 mos to 3 yrs	720	10	-710	1.4%
8n. Enema or stomach intubation	>5 days to 2 mos	700	0	-700	0.0%
	> 2 mos to 3 yrs	720	107	-613	14.9%
	> 3 yrs	30	0	-30	0.0%
8o. Portable metabolic chamber measurements	> 2 mos to 3 yrs	500	45	-455	9.0%
	> 3 yrs	30	0	-30	0.0%
8p. Ultrasonic imaging	> 2 mos to 3 yrs	434	42	-392	9.7%
	> 3 yrs	30	0	-30	0.0%
8q. Deuterated water	> 2 mos to 3 yrs	554	87	-467	15.7%
9. Transport and temporary maintenance at ASLC, flipper tag and external data logger	> 1 yrs to 3 yrs	16	8	-8	50.0%
9a. Controlled fasting (includes pre/post D2O and 3 pre-fast and 3 post-fast blubber biopsies)	> 1 yrs to 3 yrs	4	4	0	100.0%
9b. ACTH challenge (includes serial blood samples over 2 hour period)	> 1 yrs to 3 yrs	4	4	0	100.0%

3.7.5 Other Permits Needed for Research

In addition to obtaining research permits from F/PR1, researchers may also need to obtain special use permits for working on and near state, federal, and Native lands. NMFS requires research applicants to obtain and abide by all applicable permits as a condition of doing research and receiving grants. The following is a partial list of permits that may be required, depending on the nature and location of research activities:

- Animal and Plant Health Inspection Service (APHIS) run by the U.S. Department of Agriculture (USDA) has responsibility under the Animal Welfare Act (AWA) for captive warm-blooded animals, including marine mammals, and has established regulations and standards for animal care, including "Specifications for the Humane Handling, Care, Treatment, and Transportation of Marine Mammals (9 CFR Ch 1, Subpart E)." Most U.S. facilities maintaining marine mammals are required to be licensed or registered by APHIS.
- The Native village governments of St. Paul and St. George control access to the rookeries and haulouts on the Pribilof Islands. Many other Alaska coastline areas are owned by Native corporations or have been claimed for conveyance under the Alaska National Interest Lands Conservation Act (ANILCA). Research that takes place on Native lands typically requires a special use permit from one or more Native organizations.
- Military clearance (U.S. Navy) is required for access to Adak, Shemya, Amchitka, and Attu islands in the Aleutian Chain.
- U.S. Coast Guard permits are required for operating marine vessels in U.S. waters, with certification for types of use and numbers of passengers on a vessel-specific basis. They also issue permits for working around lighthouses that they maintain.
- A special use permit is required from the USFWS for work on national wildlife refuges, including the AMNWR.
- The Alaska Department of Natural Resources (ADNR), Division of Mining, Land, and Water requires a land use permit for working/camping on state lands longer than 14 days or if more substantial structures are erected.
- A permit might be required by the ADF&G if the use will take place in a state game refuge or special use area (SUA), which include tidelands and submerged lands adjacent to national parks, refuges, and reserves, such as the Alaska Maritime National Wildlife Refuge, the Kenai Fjords National Park coastline, Resurrection Bay, Lake Clark National Park coastline, Marmot Island (eastern half), and Togiak coastline.
- The National Park Service (NPS) has a national research permit and reporting system that is park specific and project specific.
- The respective departments of state lands and parks for Washington, Oregon, and California also have special land use permits that may apply on their lands. These state agency land use permits are oriented toward reviewing consumptive uses rather than temporary camps in remote places. All are project and area specific.

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 Methodology

This chapter describes the predicted consequences, or potential effects, on the physical, biological, and human environment from implementing the alternatives described in Chapter 2. The chapter begins by defining frequently used terms (Section 4.1.1), describes the project area (Section 4.2), and explains how incomplete or unavailable information is dealt with in this document (Section 4.3). Section 4.4 describes the steps used for determining the level of impact and the criteria used to evaluate impacts, Section 4.5 provides an overview of the approach to cumulative effects assessment. Section 4.6 presents resources not carried forward for further analysis, while Section 4.7 characterizes elements common to all alternatives. Sections 4.8 and 4.9 provide analyses of impacts to the biological environment and to the social and economic environment, respectively, from each of the alternatives. Section 4.10 discusses economic impacts from federally funded research on Steller sea lions (SSLs) and Northern fur seals (NFSs).

4.1.1 Definition of Terms

The following terms are used throughout this document to discuss impacts:

- **Direct Impacts** – caused by the action and occurring at the same time and place. (40 CFR § 1508.8).
- **Indirect Impacts** – defined as effects "caused by an action and are later in time or farther removed in distance but are still reasonably likely. Indirect impacts may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems" (40 CFR 1508.8). Indirect impacts are caused by the project, but do not occur at the same time or place as the direct impacts.
- **Cumulative Impacts** – additive or interactive effects that would result from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions (40 CFR 1508.7). Interactive impacts may be either *countervailing* – where the net cumulative impact is less than the sum of the individual impacts or *synergistic* – where the net cumulative impact is greater than the sum of the individual impacts. Focusing this Environmental Impact Statement (EIS) on reasonably foreseeable cumulative impact issues, rather than on speculative impact relationships, is critical to the success of the analysis. Direct impacts pertain to the proposed action and alternatives only, while cumulative impacts pertain to the additive or interactive effects that would result from the incremental impact of the proposed action and alternatives when added to other past, present, and reasonably foreseeable future actions. Section 4.4 describes steps involved in the cumulative impact assessment.
- **Reasonably Foreseeable Future Actions** – this term is used in concert with the Council on Environmental Quality (CEQ) definitions of indirect and cumulative impacts, but the term itself is not further defined. Most regulations that refer to "reasonably foreseeable" do not define the meaning of the words, but do provide guidance on the term. For this analysis, reasonably foreseeable future actions (RFFAs) or impacts are those that are likely (or reasonably certain) to occur, and although they may be uncertain, they are not purely speculative. Typically, they are based on documents such as existing plans, permit applications, or announcements.

4.2 Project Area and Scope for Analysis

The spatial scope of the effects analysis is the entire geographic range of SSLs and NFSs in the Bering Sea and the North Pacific Ocean off Alaska, Washington, Oregon, and California. When this spatial scope is not applicable to a given resource, a relevant geographic sub-area is defined in the analysis.

Evaluation of cumulative effects requires an analysis of the potential direct and indirect effects of the proposed research alternatives, in combination with other past and present actions and RFFAs. The time frame or temporal scope for the past and present effects analysis was defined as the period over which the populations of SSLs and NFSs began to decline to the present. Although collection of this population trend data began in the 1960s, relevant data may also be available from an earlier time period (i.e., effects of the commercial harvest of NFSs from 1786-1984). For some resources, relevant data may not have been available until more recently. For each resource, the time frame for past/present effects is defined in the Summary of Lingering Past Effects located under the corresponding cumulative effects section. RFFAs considered in the cumulative effects analysis consist of projects, actions, or developments that can be projected, with a reasonable degree of confidence, to occur over the next 10 years (from 2007 to 2017) and that are likely to affect the resources described.

4.3 Incomplete and Unavailable Information

The CEQ guidelines require that:

"When an agency is evaluating reasonably foreseeable significant adverse effects on the human environment in an environmental impact statement and there is incomplete or unavailable information, the agency shall always make clear that such information is lacking (40 CFR 1502.22)."

In the event that there is relevant information, but "the overall costs of obtaining it are exorbitant or the means to obtain it are not known" (40 CFR 1502.22), the regulations instruct that the following should be included:

- A statement that such information is unavailable
- A statement of the relevance of such information to evaluate reasonably foreseeable significant adverse impacts
- A summary of existing information that is relevant to evaluating the adverse impacts
- The agency's evaluation of adverse impacts based on generally accepted scientific methods

In the analysis, this EIS identifies those areas where information is unavailable to support a thorough evaluation of the environmental consequences of the alternatives. In particular, the intent of the mortality assessment tables described in more detail in Section 4.8.1, is to provide a framework for assessing the effects of research. The initial estimates of direct and indirect effects are based on the professional judgment of highly experienced researchers at National Marine Mammal Laboratory (NMML) who have worked directly with these species for several decades. Efforts have been made to obtain all relevant information; however, where data gaps still exist, the implication is that these areas qualify for the CEQ guidelines above.

4.4 Steps for Determining Level of Impact

The National Environmental Policy Act (NEPA) requires federal agencies to prepare an EIS for any action that may significantly affect the quality of the human environment. The CEQ regulations implementing NEPA state that an EIS should discuss the significance, or level of impact, of the direct and indirect impacts of the proposed alternatives (40 CFR 1502.16), and that significance is determined by considering both the context in which the action will occur and the intensity of the action (40 CFR 1508.27). Context and intensity are often further broken down into components for impact evaluation. The context is comprised of the extent of the effect (geographic extent or extent within a species, ecosystem, or region) and any special conditions, such as endangered species status or other legal status. The intensity of an impact is the result of its magnitude and duration. Actions may have both adverse and beneficial effects on a particular resource. A component of both the context and the intensity of an impact is the likelihood of its occurrence.

The combination of context and intensity is used to determine the level of impact on each type of resource. The first step is to examine the mechanisms by which the proposed action could affect the particular resource. For each type of effect, the analysts develop a set of criteria to distinguish between major, moderate, minor, or negligible impacts. The analysts then use these impact criteria to rank the expected magnitude, extent, duration, and likelihood of each type of effect under each alternative.

The tables provide a guideline for the analysts to place the effects of the alternatives in an appropriate context and to draw conclusions about the level of impact. However, the distinctions made in the criteria tables may not be completely relevant for each resource and each type of effect, so they should not be seen as a recipe that must be followed precisely in all cases. The criteria used to assess the effects of the alternatives vary for the different types of resources analyzed (Tables 4.4-1 through 4.4-3). The impact criteria tables use terms and thresholds that are quantitative for a few components and qualitative for other components. The terms used in the qualitative thresholds are somewhat vague and relative, necessarily requiring the analyst to make a judgment about where a particular effect falls in the continuum from “negligible” to “major”. The following descriptions of the terms used in the criteria tables are intended to help the reader understand the distinctions made in the analyses.

The magnitude or intensity of effects on biological resources is generally assessed in terms relative to the population rather than the individual. The rationale for using Potential Biological Removal (PBR) as a metric for mortality effects on SSLs and NFSs is described in Section 2.5. In summary, the Marine Mammal Protection Act (MMPA), as reauthorized in 1994, defined PBR as, "...the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population." PBR was intended to serve as an upper limit guideline for fishery-related mortality for each species.

The MMPA also provides some rationale for establishing certain numerical thresholds for the magnitude of mortality relative to PBR in the SSL and NFS impact criteria tables (Table 4.4-1). Section 118 of the MMPA requires NMFS to classify fisheries according to their relative levels of mortality for each marine mammal stock (16 U.S.C. 1387 (c)(1)). Fisheries that cause mortality of a marine mammal stock totaling 10 percent of PBR or less are classified as Category III fisheries and are not required to register with NMFS or obtain authorizations for incidental take (50 CFR 229.2). In addition, the MMPA established a requirement that the level of incidental mortality and serious injury of marine mammals in fisheries be reduced to “insignificant levels approaching a zero rate”, which is commonly referred to as the Zero Mortality Rate Goal (ZMRG). To implement the MMPA, NMFS defined the insignificance threshold for fisheries related mortality, the ZMRG, as being 10 percent of PBR for the stock of marine mammals (69 FR 43338). To be consistent with the thresholds in these regulatory criteria, research-related mortality less than or equal to 10 percent of PBR will be considered “negligible” in the following analysis of the alternatives.

Fisheries that cause mortality equal to or exceeding 50 percent of PBR for a marine mammal stock are classified as Category I fisheries and are required to register with NMFS, follow a take reduction plan, and may be required to carry marine mammal observers on board to monitor take. Following the logic of this threshold for fishery related regulations, research related mortality more than or equal to 50 percent of PBR will be considered “major” in the following analysis of the alternatives. There are no comparable thresholds used in the fishery regulations to distinguish between “minor” and “moderate” levels of mortality. For the purposes of this NEPA analysis, these thresholds will be evenly divided between the 10 percent (negligible) and 50 percent (major) thresholds. Thus, research related mortality between 10 percent and 30 percent of PBR will be considered “minor” and mortality equal to or more than 30 percent and less than 50 percent of PBR will be considered “moderate” in the following analysis of the alternatives (Table 4.4-1).

For species other than SSL and NFS, the magnitude of effects on the population is based on the potential mechanisms for effects on reproduction or survival and the spatial overlap of SSL and NFS research activities with the species considered. These species include:

- ESA Listed Species
    - Transient killer whales (Section 4.8.3)
    - Whales (humpback, blue, bowhead, fin, right, Sei, and sperm; Section 4.8.4)
    - Sea otters (Section 4.8.4)

- Marine mammals (Section 4.8.5)
  - California sea lion
- Sea birds (Section 4.8.6)

The geographic extent component is intended to estimate the distribution of effects relative to the population or non-biological resource as a whole. For SSLs, NMFS has defined a number of sub-regions for population census and stock assessment purposes that provide convenient units for analyses (see Section 3.2.1). For eastern Pacific NFS, the breeding population is concentrated in a few locations, so the appropriate geographic distinction is at the rookery level. The breeding population of the San Miguel NFS is restricted to a single island, so any actions in that location could potentially affect the entire population. The appropriate terms for the distribution of effects are further defined relative to the particular species or resource in their respective analyses.

The duration or frequency component provides the context of time. “Short-term” refers to a temporary effect that lasts from a few minutes to a few days and the affected animals or resource revert back to a “normal” condition. “Long-term” refers to more permanent effects that may last for years or from which the affected animals or resource never revert back to a “normal” condition. Moderate is somewhere in between. Intermittent or infrequent effects are those that only occur a couple times a year or less. “Frequent” refers to effects that occur on a regular or repeated basis each year. Other elements of the temporal context of effects, such as whether the effects occur primarily during a sensitive or critical part of the year, are described in the analyses for each species or resource.

The likelihood component serves to assess whether the potential effects are plausible or just speculative. “Likely” effects are those that could arise from reasonable or demonstrated mechanisms and the probability of those mechanisms arising from the alternatives is greater than 50 percent. This does not imply that the analysts will perform a formal probability calculation but, in their professional judgment, the probability of the effect occurring is more likely than not.

4.4.1 Impact Criteria for Steller Sea Lions and Northern Fur Seals

Table 4.4-1 indicates the general types of effects on SSLs and NFSs that are assessed in this NEPA analysis. This table summarizes the criteria for determining the level of impact based on the magnitude, extent, duration and likelihood of occurrence. Sections 4.8.1 and 4.8.2 describe the anticipated direct and indirect effects for each alternative on these species by evaluating each type of risk and the scope of research activity.

It should be noted that there is an important difference between the use of the terms “major”, “moderate”, “minor”, and “negligible” to describe mortality effects in a NEPA context (i.e. to distinguish the differences in impacts among alternatives) and how those terms might be used in a less technical context (i.e. that a “major” impact could cause a population to decline). The NEPA context used in the following analysis is defined in terms of the potential mortality for each alternative relative to PBR. As stated earlier (section 2.5), PBR is a precautionary or conservative measure of human-caused mortality that could be expected to affect a population’s ability to recover from a depleted state or to remain at a sustainable level. The PBR calculation contains provisions to account for uncertainty in population estimates and protects a larger fraction of annual productivity for depleted stocks through a recovery factor (Fr). For endangered populations such as the western DPS of SSLs, Fr is set at 0.1, so that 90 percent of the endangered population’s annual net production is reserved for recovery of the population. NMFS has calculated that keeping human-caused mortality at or below PBR calculated with a recovery factor of 0.1 would increase the recovery time of endangered marine mammals by no more than 10 percent (Wade 1998). For the threatened eastern DPS of SSLs, Fr is set to 0.75 because the population has been growing consistently for over 20 years. For the depleted Eastern Pacific stock of NFS, Fr is set at 0.5 so that 50 percent of the population’s annual net production is reserved for recovery. Because the calculation of PBR contains a recovery factor for these stocks, mortality levels that exceeded PBR would not necessarily cause a population to decline but could slow the rate of recovery. A mortality level above PBR would therefore be considered “major” in this NEPA analysis even though it would not necessarily cause the population to decline.

Table 4.4-1
Criteria for Determining Impact Level for Effects on SSL and NFS

Type of Effect	Impact Component	Impact Level: Major	Moderate	Minor	Negligible
Direct and indirect mortality due to research (see mortality assessment tables under each alternative)	Magnitude or Intensity	Total mortality assessment equal to or more than 50% of PBR	Total mortality assessment equal to or more than 30% and less than 50% of PBR	Total mortality assessment between 30%-10% of PBR	Total mortality assessment less than or equal to 10% of PBR
	Geographic Extent	Effects distributed across range of population	Effects distributed among several subregions or rookeries	Effects limited to one subregion or rookery	No measurable effects
	Duration or Frequency	Long-term and/or frequent	Moderate and frequent or long-term and intermittent	Short-term or moderate and intermittent or infrequent	No measurable effects
	Likelihood	Likely	Likely	Not likely	Not likely
Direct and indirect sub-lethal effects due to research	Magnitude or Intensity	Enough to cause measurable change in reproductive success	Equivocal change in reproductive success	Mechanisms for effects but productivity similar to baseline	No mechanisms for reproductive effects
	Geographic Extent	Effects distributed across range of stock	Effects distributed among several subregions or rookeries	Effects limited to one subregion or rookery	No measurable effects
	Duration or Frequency	Chronic and long-term	Moderately frequent or intermittent	Periodic, temporary, or short-term	No measurable effects
	Likelihood	Likely	Likely	Not likely	Not likely
Beneficial contribution toward conservation objectives	Magnitude or Intensity	Addresses all conservation objectives in Recovery or Conservation Plan	Addresses most conservation objectives in Recovery or Conservation Plan	Addresses a few conservation objectives in Recovery or Conservation Plan	Addresses no conservation objectives in Recovery or Conservation Plan
	Geographic Extent	Research pertinent for local and population-wide management needs	Research pertinent for local and subregion management needs	Research pertinent for local management needs only	Provides no information for management
	Duration or Frequency	Provides immediate and long-term information needs	Provides periodic and long-term information needs	Provides periodic and short-term information needs	Provides no information for management
	Likelihood	Likely	Likely	Not likely	Not likely

4.4.2 Impact Criteria for Other Biological Resources

Table 4.4-2 indicates the types of effects of SSL and NFS research and grant-related activities on other biological resources (other than SSLs or NFSs) that are assessed in this NEPA analysis. These effects are primarily related to disturbance associated with research activities, although some habitat damage can also occur. This table summarizes the criteria for determining the level of impact based on the magnitude, extent, duration and likelihood of occurrence. Sections 4.8.3 through 4.8.6 summarize the anticipated direct and indirect effects under each alternative for other biological resources.

Table 4.4-2
Criteria for Determining Impact Level for Effects on Fish and Wildlife

Type of Effect	Impact Component	Impact Level			
		Major	**Moderate**	**Minor**	**Negligible**
Reduced survival or reproductive success	Magnitude or Intensity	Causes population change in most of project area	Causes population change in part of project area	No measurable population change	No mechanisms for population change
	Geographic Extent	Affects less than 25% of population in project area	Affects 25% - 10% of population in project area	Affects less than 10% of population in project area	No measurable effects
	Duration or Frequency	Long-term and/or frequent	Moderate and frequent or long-term and intermittent	Short-term or moderate and intermittent or infrequent	No measurable effects
	Likelihood	Likely	Likely	Not likely	Not likely
Disturbance	Magnitude or Intensity	Enough to cause shift in regional distribution	Noticeable change in localized distribution	Distribution similar to baseline	No measurable effects
	Geographic Extent	Affects less than 25% of population in project area	Affects 25% - 10% of population in project area	Affects less than 10% of population in project area	No measurable effects
	Duration or Frequency	Chronic and long-term	Moderately frequent or intermittent	Periodic, temporary, or short-term	No measurable effects
	Likelihood	Likely	Likely	Not likely	Not likely

4.4.3 Impact Criteria for Socioeconomic Resources

Table 4.4-3 summarizes the mechanisms by which effects of SSL and NFS research and grant-related activities on the social and economic environment can be measured, and the criteria for determining the level of impact based on the magnitude, extent, duration and likelihood of occurrence. These effects are primarily related to subsistence characteristics, commercial fishing activities, coastal communities, research institutions and independent researchers, and public interest in the protection of SSLs and NFSs. Section 4.9 summarizes the anticipated direct and indirect effects under each alternative for these resources.

Table 4.4-3
Criteria for Determining Impact Level for Effects on Socioeconomic Resources

Type of Effect	Impact Component	Impact Level			
		Major	Moderate	Minor	Negligible
Effects on subsistence	Magnitude or Intensity	Year-round change in subsistence use patterns	Seasonal change in subsistence use patterns	Shift within seasonal subsistence use patterns	No measurable effects
	Geographic Extent	Effects realized throughout the project area	Effects realized in numerous locations	Effects realized at few locations	No measurable effects
	Duration or Frequency	Chronic and long-term	Moderate and frequent or long-term and intermittent	Periodic, temporary, or short-term	No measurable effects
	Likelihood	Likely	Likely	Not likely	Not likely
Effects on coastal communities	Magnitude or Intensity	Less than 10% increase or decrease in employment, population, or tourism levels	5% - 10% increase or decrease in employment, population, or tourism levels	No changes in employment, population, or tourism levels	No measurable effect
	Geographic Extent	Affects state employment, population, or tourism levels	Affects regional employment, population, or tourism levels	Affects local employment, population, or tourism levels	No measurable effect
	Duration or Frequency	Long-term and/or frequent	Moderate and frequent or long-term and intermittent	Periodic, temporary, or short-term	No measurable effect
	Likelihood	Likely	Likely	Not likely	Not likely
Effects on research institutions and independent researchers	Magnitude or Intensity	Less than 25% increase or decrease in funding, employment, or ability to support management obligations	5% - 25% increase or decrease in funding, employment, or ability to support management obligations	No changes in funding, employment, or ability to support management obligations	No measurable effects
	Geographic Extent	Affects researchers throughout project area	Affects researchers regionally or in limited numbers of institutions	Affects researchers in only one institution	No measurable effects
	Duration or Frequency	Long-term and/or frequent	Moderately frequent or intermittent	Periodic, temporary, or short-term	No measurable effects
	Likelihood	Likely	Somewhat likely	Not likely	Not likely
Effects on members of the public who value the protection of the SSL and NFS	Magnitude or Intensity	Major increase or decrease in welfare	Moderate increase or decrease in welfare	Minor changes in welfare	No measurable effects
	Geographic Extent	Affects some members of the public throughout project area	Affects some members of the public in a specific region	Affects a small, localized segment of the public	No measurable effects
	Duration or Frequency	Long-term and/or frequent	Moderately frequent or intermittent	Periodic, temporary, or short-term	No measurable effects
	Likelihood	Likely	Somewhat likely	Not likely	Not likely

4.5 Steps for Identifying Cumulative Effects

To meet the requirements of NEPA, an EIS must include an analysis of the potential cumulative effects of a proposed action and its alternatives and consider those cumulative effects when determining environmental impacts. The CEQ guidelines for evaluating cumulative effects state that "…the most devastating environmental effects may result not from the direct effects of a particular action but from the combination of individually minor effects of multiple actions over time" (CEQ 1997).

The CEQ regulations for implementing NEPA define cumulative effects as:

> "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7).

For this Draft EIS (DEIS), assessment of cumulative effects requires an analysis of the potential direct and indirect effects of the proposed research alternatives, in combination with other past, present, or RFFAs potentially affecting SSLs, NFSs, and other biological, physical, and socioeconomic resources. The intent of this analysis is to capture the total effects of many actions over time that would be missed by evaluating each action individually, and to assess the relative contribution of the proposed action and its alternatives to cumulative effects. The cumulative effects assessment then describes the additive and synergistic result of the research alternatives as they potentially interact with actions external to the proposed actions. The ultimate goal of identifying potential cumulative effects is to provide for informed decisions that consider the total effects (direct, indirect, and cumulative) of the research alternatives.

The methodology used for cumulative effects analysis in this DEIS is similar to that followed in the Alaska Groundfish Fisheries Programmatic Supplemental EIS (PSEIS) (NMFS 2004a), the SSL Protection Measures SEIS (NMFS 2001a), and the Setting the Annual Subsistence Harvest of NFS on the Pribilof Islands EIS (NMFS 2005a). It consists of the following steps:

- *Identify issues, characteristics, and trends within the affected environment that are relevant to assessing cumulative effects of the research alternatives* – include lingering effects from past activities, and demonstrate how they have contributed to the current baseline for each resource. This information is summarized in Chapter 3.
- *Describe the potential direct and indirect effects of the research alternatives.* This information is presented in detail in Chapter 4, and is summarized in Section 4.11.
- *Define the spatial (geographic) and temporal (time) frame for the analysis*. This timeframe may vary between resources depending on the historical data available and the relevance of past events to the current baseline. The "reasonably foreseeable future" has been established as the next 10 years (through 2017) for the purposes of this DEIS.
- *Identify past, present, and reasonably foreseeable external actions such as other types of human activities and natural phenomena that could have additive or synergistic effects* – summarize past and present actions, within the defined temporal and spatial timeframes, and also identify any RFFAs that could have additive or synergistic effects on identified resources. The cumulative effects analysis uses the specific direct and indirect effects of each resource alternative and combines them with these identified past, present, and reasonably foreseeable effects of the identified external actions.
- *Use cumulative effects tables to screen all of the direct indirect effects, when combined with the effects of external actions, to capture those synergistic and incremental effects that are potentially cumulative in nature* – both adverse and beneficial effects of external factors are assessed and then evaluated in combination with the direct and indirect effects to determine if there are cumulative effects.

- *Evaluate the impact of the potential cumulative effects using the criteria established for direct and indirect effects and assess the relative contribution of the action alternatives to cumulative effects.*
- *Discuss rationale for determining the impact rating, citing evidence from the peer-reviewed literature, and quantitative information where available* – the term unknown can be used where there is not enough information to determine an impact level.

The advantages of this approach are that it closely follows 1997 CEQ guidance, employs an orderly and explicit procedure, and provides the reader with the information necessary to make an informed and independent judgment concerning the validity of the conclusions.

4.5.1 Relevant Past and Present Actions within the Project Area

Relevant past and present actions are those that have influenced the current condition of the resource. For the purposes of this DEIS, past and present actions include both human-controlled events, such as subsistence harvest and commercial fisheries, and natural events, such as predation and climate change.

The past actions applicable to the cumulative effect analysis have been either presented in Chapter 3 or previously reviewed in Chapter 4 of the Alaska Groundfish Draft Programmatic SEIS (NMFS 2004a), SSL Protection Measures SEIS (NMFS 2001a), and the Setting the Annual Subsistence Harvest of NFS on the Pribilof Islands EIS (NMFS 2005a). The cumulative effects analysis relies heavily on the descriptions presented in those documents. Additional past actions were identified using agency documentation, NEPA documentation, reports and resource studies, peer-reviewed literature, and best professional judgment. Table 4.5-1 lists relevant past and present actions, and where descriptions of those actions can be located.

4.5.2 Reasonably Foreseeable Future Actions

Reasonably foreseeable future actions (RFFAs) are those that have already been or are in the process of being funded, permitted, described in fishery or coastal zone management plans, included as priorities in government planning documents, or are likely to occur or continue based on traditional or past patterns of activity. Judgments concerning the probability of future impacts must be informed rather than based on speculation. RFFAs to be considered must also fall into the temporal and geographic scope described in Section 4.2.

Reasonably foreseeable future human-controlled and natural actions were screened for their relevance to the alternatives proposed in this DEIS. Due to the large geographic scope of this analysis, the identification of RFFAs was conducted on a broad scale, although some specific RFFAs were considered where applicable. The following list presents the actions to be considered in the cumulative effects analysis, and Table 4.5-1 compares those actions with past and present actions:

- *Commercial fisheries:* Federal and state (AK, WA, OR, and CA) fisheries operate according to the designated Fishery Management Plan (FMP). State and federally regulated fisheries in the project area are administered by the North Pacific fishery Management Council (NPFMC) and the Pacific Fishery Management Council (PFMC). The NPFMC oversees management of groundfish in the U.S. Exclusive Economic Zone (EEZ) off Alaska; however, the State of Alaska primarily manages the state's salmon, crab and herring fisheries. The PFMC has developed FMPs for salmon, groundfish and coastal pelagic species in the U.S. EEZ off the coasts of California, Oregon, and Washington. The NPFMC and PFMC also make recommendations for Pacific halibut harvest regulations to the International Pacific Halibut Commission (IPHC).
- *Scientific research:* Activities related to the scientific research of other marine mammals, fish, birds, marine predator-prey relationships, and the physical environment are likely to continue.
- *Global and industrial pollutants:* Oil pollution in the marine environment can occur from road runoff, bilge cleaning and ship maintenance, natural seeps, oil tanker spills, and offshore drilling. High-volume seafood processing could result in the discharge of oil and grease. Other marine pollution and debris can

occur due to industrial activities, waste disposal, and atmospheric deposition. Marine species may accumulate ocean contaminants, such as polychlorinated biphenyls (PCBs) and polyaromatic hydrocarbons (PAHs).

- *Subsistence activities:* Subsistence harvest activities of both SSLs and NFSs by Alaska Natives who dwell on the North Pacific Ocean or Arctic Ocean coasts of Alaska are likely to continue at present levels as described in Chapter 3. Subsistence harvest of SSLs and NFSs in the Pribilof Islands will remain consistent with the co-management agreements between NMFS and the tribal governments of St. Paul (2000) and St. George (2001).
- *Commercial shipping:* The west coast supports a large commercial shipping industry, which results in regular vessel traffic through coastal marine environments.
- *Invasive species:* The introduction of non-native species into the marine environment can occur through ballast water transfer and could potentially disrupt the marine food web structure. Introduction of non-native terrestrial species, such as rats and fox, on islands is a continuing problem in many areas. Eradication programs for these species have been conducted in some areas and there are plans to expand these programs in the Aleutian Islands (AI).
- *Other economic development:* Cruises, whale and wildlife viewing tours, and fishing charters are likely to continue. Military activity, such as the Kodiak Launch Complex, is likely to continue. The Kodiak Launch Complex is located at Narrow Cape, Kodiak Island, Alaska, and provides launch facilities for private and government organizations. Coastal development including port expansions and the construction of docks and facilities within the project area are likely to occur as needs for marine support services and shipping capacity increase. The development of on-land infrastructure on the Pribilof Islands has been proposed to create economic opportunities, including boat harbors, airports, dock facilities, and multi-species seafood processing plants.
- *Climate variability:* Short-term changes in the ocean climate are likely to continue on a scale similar to those presently occurring, as described in Chapter 3. Evidence is emerging that human-induced global climate change is linked to the warming of air and ocean temperatures and shifts in global and regional weather patterns. Other relevant physical and chemical effects of climate change include alteration of deep-ocean circulation patterns, ocean stratification and chemical composition, the frequency and duration of naturally occurring El Niño – Southern Oscillation (ENSO) events, and ocean biodiversity and ecosystems.
- *Mortality:* Disease, parasites and predation will continue to result in mortality of marine mammals, fish, and birds. Factors such as exposure to contaminants, decreased genetic diversity, and increased stress can lead to reduced fitness and increase susceptibility to mortality from disease and predation.

Table 4.5-1
Past, Present, and RFFAs Considered in the Impact Analyses

	Past and Present	Reference (within this DEIS, unless otherwise noted)	Reasonably foreseeable
Human-Caused Events			
Commercial fisheries	• Foreign groundfish fisheries • Joint venture fisheries • International Pacific Halibut Commission (IPHC) halibut longline fishery • Federal groundfish fisheries • Federal crab fishery • State (AK, WA, OR, and CA) nearshore fisheries (including salmon and herring)	• Sections 3.2.1.6; 3.2.2.5; 3.2.8	• IPHC halibut longline fishery • Fishery Management Plans (FMPs) for federal groundfish, swordfish, and halibut/angle shark fisheries • FMPs for federal crab fishery • FMP for state (AK, WA, OR, and CA) fisheries
Scientific research	• Biological (including other marine species) • Oceanographic • Geophysical/chemical	• Section 3.2	• Biological (other marine species) • Oceanographic • Geophysical/chemical
Global and industrial pollutants	• Marine spills and pollution • Marine debris • Bioaccumulation	• Sections 3.2.1.8; 3.2.2.7	• Marine spills and pollution • Marine debris • Bioaccumulation
Subsistence activities	• Marine mammal harvest	• Sections 3.2.1.6; 3.2.2.5; 3.4.1	• Marine mammal harvest
Commercial harvest	• Commercial whaling • Commercial sealing	• Sections 3.2.2.5; 3.2.8	None
Commercial shipping	• Vessel traffic and fuel	• Section 3.2.1.9	• Vessel traffic and fuel
Invasive species	• Introduction of non-native species	• Section G.8.2, Draft Conservation Plan for the Eastern Pacific Stock of NFS (NMFS 2006)	• Introduction of non-native species • Eradication programs
Other development	• Military activity • Coastal and infrastructure development • Tourism	• Section 3.2.1.9	• Military activity • Coastal and infrastructure development • Tourism
Natural Events			
Climate variability	• Regime shift/Pacific decadal oscillation/ENSO • Global warming	• Sections 3.2.8; 3.3.5; 3.3.6	• Pacific decadal oscillation/ENSO • Global warming
Mortality	• Predation • Disease and parasites	• Sections 3.2.1.7; 3.2.1.8; 3.2.2.6; 3.2.2.7; 3.2.3	• Predation • Disease and parasites

4.6 Resources and Characteristics Not Carried Forward for Analysis Under Environmental Consequences

CEQ regulations require NMFS to focus attention on important issues and avoid extraneous material in this impact statement (40 CFR 1502.15). The CEQ regulations for implementing NEPA define “direct effects” as effects that are caused by the action and occur at the same time and place (40 CFR 1508.8(a)). The CEQ regulations for implementing NEPA define “indirect effects” as effects that are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable (40 CFR 1508.8(b)). Agencies must consider only those indirect effects that are "reasonably foreseeable." They need not consider potential effects that are highly speculative or indefinite (*Kleppe v. Sierra Club*, 427 U.S. 390, 402 (1976)). The First Circuit Court set a three-part test to determine whether a particular set of indirect effects was too indefinite or speculative to be considered: 1) With what confidence can one say that the impacts are likely to occur?; 2) Can one describe them “now” with sufficient specificity to make their consideration useful?; and 3) If the decision maker does not take them into account “now,” will the decision maker be able to take account of them before the agency is so firmly committed to the project that further environmental knowledge, as a practical matter, will prove irrelevant to the government's decision? (*Sierra Club v. Marsh,* 729 F.2d 868 [1st Cir. 1985]). Based on these three criteria, several of the resources and factors described in Chapter 3 may contribute to cumulative effects, but would themselves not be affected measurably by any of the alternatives for SSL and NFS research, and thus additional analysis would not be useful to the decision makers or public. As described in Section 2.6, SSL and NFS research activities could be categorized as follows: aerial surveys; vessel surveys; ground surveys; scat collection; behavioral and demographic observations and remote monitoring; capture and restraint; morphometric/ physiological measurements and tissue sampling; permanent and temporary marking; external attachment of instruments; insertion/implantation of instruments; transport and temporary captivity; and incidental mortality. None of these activities would have a measurable affect on the resources described below. The following subsections present each resource or factor not carried forward for detailed analysis.

4.6.1 Fish and Essential Fish Habitat

As described in Chapter 3, the fish resource includes Essential Fish Habitat (EFH) and fish species. Research activities using vessels can disturb EFH while anchoring or beaching small landing craft, although the habitat would be expected to recover. This potential effect would be localized, temporary, and therefore negligible across all alternatives. While the information obtained from SSL research has been used in the past to develop fisheries management measures to limit total allowable catch (TAC) in SSL critical habitat and exclusion areas round SSL rookeries, the research activities on SSL and NFS themselves do not affect fish or EFH. Because there would be negligible impact from access and no mechanisms for potential impacts of the research alternatives on EFH and fish species, further detailed analysis under each alternative would not be expected to influence the decision to be made, and therefore fish and EFH are not carried forward.

4.6.2 Invertebrates and Sea Turtles

Invertebrates and sea turtles are included with other marine species described in Chapter 3. Research activities on SSLs and NFSs are not expected to have any effect on invertebrates and have not been identified as an ongoing problem for sea turtles. Because impacts to other marine species are not expected, and if any were to occur, would not differ among alternatives, other marine species are not carried forward for detailed analysis.

4.6.3 Special Coastal Lands and Waters Designations

Some existing and proposed research would occur on or near lands and waters under special designations. This would include the Alaska Maritime National Wildlife Refuge (AMNWR), Aleut archeological sites, World War II historical sites, Channel Islands National Park, Channel Islands National Marine Sanctuary, and critical habitat for SSLs and several salmon and steelhead species. Because of the designations, certain research activities would require permits and/or approvals for access to these areas. However, none of the proposed research activities, for any of the alternatives, would be expected to affect the designations. Therefore, these designations are not carried forward for detailed analysis.

4.6.4 North Pacific Ocean, Bering Sea, and Gulf of Alaska Ecosystems, Substrate, Temperature and Nutrient Regimes, Climatic Regime Shifts and Distant Forcing Parameters

None of the research alternatives would be expected to have any measurable effects on the substrate, temperature and nutrient regimes, or overall ecosystems of the North Pacific Ocean, Bering Sea, or Gulf of Alaska. Similarly, no measurable effects on climatic regime shifts or ENSO events (distant forcing parameters) are anticipated from any of the alternatives. None of the activities described under any of the alternative policies would have any measurable affects on these resources. Therefore, detailed analysis under each alternative is not warranted.

4.6.5 Commercial Fishing

As discussed in Chapter 3, much federally funded research on SSLs and NFSs has, in the past, been directly or indirectly associated with management of commercial fisheries in Alaska. The measures proposed and analyzed in the *2001 Steller Sea Lion Protection Measures Final Supplemental Environmental Impact Statement,* prepared by NMFS Alaska Region, involved direct changes in the management of the Alaska groundfish fisheries, with an aim to avoid or minimize impacts of the fisheries on SSLs based on information from research on SSLs.

However, none of the alternative policies for continuing SSL and NFS research would have a direct, indirect, or cumulative effect on commercial fisheries. The possible additional scientific information on SSLs and NFSs resulting from the issuance of new grants, permits, or authorizations, or the possible lack of scientific information resulting from the absence of new grants, permits, or authorizations, would in itself have no direct effect on commercial fisheries. Rather, future regulatory actions or protective measures to alter commercial fishing in order to further protect SSLs or NFSs could directly affect commercial fishing activities and would require a separate NEPA analysis.

The indirect effects on commercial fishing of the alternative policies for continuing SSL and NFS research are too speculative for inclusion in this EIS. Under any of the alternative policies for continuing SSL and NFS research, the probability that additional regulations or protective measures for SSLs or NFSs that could affect commercial fisheries will be implemented in the future is unknown. Future regulations or protective measures for SSLs or NFSs and their effects on commercial fisheries cannot be sufficiently described and specified at this time to allow for useful evaluation. Again, potential effects of new policies for protecting SSLs and NFSs on commercial fisheries would be evaluated in a separate Environmental Assessment (EA) or EIS as they would constitute a change in fisheries management, not SSL or NFS research.

According to NMFS cumulative effects guidance, if there are no direct or indirect impacts from alternatives to some or all of the resources in the affected environment, a cumulative effects analysis for those resources would not be necessary. It has been determined above that none of the alternative policies for continuing SSL and NFS research would have direct or indirect effects on commercial fisheries; therefore, analysis of cumulative effects on commercial fisheries is unnecessary.

4.7 Elements Common to All Alternatives

4.7.1 Duration of Permits

The maximum period of any permit issued for scientific research on SSLs and NFSs, or any major amendment to an existing permit, is five years from the effective date of the permit issuance or major amendment. This five-year period may be extended by a minor amendment up to 12 months beyond that established in the original permit (50 CFR part 216.39).

4.7.2 Coordination

4.7.2.1 Coordination between Grants Office and Permits Division

NMFS administers a research program that awards research grants and issues permits pursuant to the MMPA and ESA for the purpose of facilitating research on SSLs and NFSs. The grants program is administered through the Grants Program Office of the NMFS, Alaska Region, and permits are issued by the Office of Protected Resources, Permits Division, in Silver Spring, Maryland. Each office has its own application, review, and decision process, which function independently. A discussion of these processes is provided in Section 3.7. The overlap between these two offices, regarding granting and permitting SSL and NFS research, is limited to a requirement of the Grants Program Office that the grantee provide proof that the necessary permits have been obtained. This proof must be provided to the Grants Program Office prior to grant expenditure.

4.7.2.2 Coordination among Researchers and with NMFS

The increased interest in SSL and NFS research, and the substantial increase in funding of SSL research, has highlighted the need to coordinate research projects in order to reduce both complications in the field and the duplication of efforts. The strategies used by researchers and NMFS to coordinate SSL and NFS research are described in Section 3.2.1.12 and include various meetings, workshops, and symposia used to facilitate the exchange of information necessary to improve research methods, management techniques and/or species recovery plans. These coordination efforts are likely to continue under all alternatives.

Coordination between NMFS and individual researchers also occurs, and will continue to occur under all alternatives, upon NMFS receipt of grant and permit applications. The Grants Program Office and the Office of Protected Resources, Permits Division, review their respective applications for completeness and communicate with applicants regarding needed changes to the applications. Incomplete applications are determined via internal technical reviews, and a review of consistency with application requirements. For SSL and NFS research permits, applications must be consistent with the ESA and MMPA. Permits for the research of any ESA-listed marine mammal must be justified by the likelihood of contributing to the species' recovery and must be reasonably likely to achieve the objectives of the MMPA. Through regulations, NMFS requires that applications for permits for research on marine mammals listed as depleted, threatened, or endangered show how the results of the proposed research would directly benefit that species, or would fulfill a critically important research need, by demonstrating how research would contribute to fulfilling a research need or recovery objective identified in the species' recovery or conservation plan.

4.7.2.3 Coordination Required Under Co-Management Agreements

NMFS entered into co-management agreements with the St. George Traditional Council and the Traditional Council of St. Paul for the purpose of coordinating the efforts to conserve SSL and NFS populations, maintain a sustainable harvest for traditional uses, and promote and continue specific NFS and SSL research. Co-Management Councils were established to meet regularly and develop annual management plans, monitoring programs, and research programs for St. George Island; to annually review the contents, performance, and responsibilities in the agreement; to review and assess progress towards implementation of the agreement; to identify challenges to achieving the purpose of the agreement; to recommend solutions to any identified challenges; to identify future courses of action; and to review applicable laws and regulations governing the subsistence take and use of fur seals and sea lions for the purpose of making recommendations for appropriate change to NMFS.

NMFS and each traditional council will also assist each other in seeking funding from a variety of sources to support research and management projects of mutual benefit regarding NFSs and SSLs. Each traditional council will submit a yearly budget to NMFS to fulfill specific responsibilities stated in the corresponding Co-Management Agreement, for each fiscal year the Agreement is in effect.

4.7.2.4 Coordination between Researchers and Rural Communities

Much of the coordination between rural communities and researchers occurs as a result of research activities where subsistence-harvested animal tissues are shared with researchers who have specific permits to use such samples. There is currently one active permit (a second was vacated by the May 2006 court order [*The Humane Society of the United States v. Department of Commerce,* 05-1392-ESH, D.D.C.]) to use tissue samples from subsistence-harvested SSLs. Subpart G of MMPA (50 CFR 216.74) states:

> Pribilovians who engage in the harvest of seals are required to cooperate with scientists engaged in fur seal research on the Pribilof Islands who may need assistance in recording tag or other data and collecting tissue or other fur seal samples for research purposes. In addition, Pribilovians who take fur seals for subsistence uses must, consistent with 5 CFR 1320.7(k)(3), cooperate with the NMFS representatives on the Pribilof Islands who are responsible for compiling the following

information on a daily basis: (a) The number of seals taken each day in the subsistence harvest, (b) The extent of the utilization of fur seals taken, and (c) Other information determined by the Assistant Administrator to be necessary for determining the subsistence needs of the Pribilovians or for making determinations under §215.32(e).

Thus, Pribilof Islands community residents who engage in the harvest of seals cooperate with scientists engaged in fur seal research. Subsistence hunters report to NMFS when there is evidence that a harvested animal may have been one that was tagged or marked for research. This helps researchers track the life history of animals that have been taken through subsistence. Some researchers may also hire local residents to assist them with animal counts.

4.7.3 Reporting Requirements

4.7.3.1 Grants Office Reporting Requirements

Grantees are required to complete programmatic reports, which are for semi-annual reporting periods, as well as a final report. Reports are due 30 days after the end of each reporting period, with the exception of final reports, which are due 90 days after the grant ends. The financial reports include the SF-269 or SF-269a, Financial Status Report, and the SF-272, Federal Cash Transactions Report. The Financial Status Reports are due 30 days after the end of each reporting period, with the exception of final reports, which are due 90 days after the project expires. The Federal Cash Transaction Reports may be required monthly if the grant or cooperative agreement is for more than $1,000,000. Those reports are due 15 days after the reporting period, semi-annual reports are due 30 days after the end of the reporting period, and the final reports are due 90 days from the end of the project period. If funds are not being expended, the grantee is required to complete a financial report with explanation.

4.7.3.2 Permits Division Reporting Requirements

A requirement of MMPA permits for research, as stated in 50 CFR part 216.38, is that permit holders must submit to NMFS annual, final, and special reports in accordance with the requirements established in the permit, and any reporting format established by the Office Director. Researchers operating under NMFS grants and permits may be required to allow NMFS or NOAA personnel to observe their activities and inspect any facilities or records related to permitted or funded activities. Annual and final reports for permits shall include a summary of all research or enhancement objectives, hypotheses, and testing (including methodology); a summary of the results and the manner in which such results relate to the research or enhancement objectives; an assessment of whether or not and how the scientific research or enhancement activity contributed to the achievement of any recovery objectives established for the species or stock; an indication of where and when the research findings will be published or otherwise made available to the public or scientific community, or a description of the contribution of the enhancement program and future recommendations; and a description of the disposition of any marine mammal parts, including an identification of the part as required in 50 CFR part 216.37(a)(4) and the manner of disposition.

Annual permit reports are due 90 days from completion of the last field season during the calendar year or, if the research is not conducted during a defined field season, 90 days after the anniversary date of issuance of the permit. Final permit reports are due 180 days from the date of permit expiration. Requirements for special reports vary, but all SSL and NFS research permits require the holder to submit "serious injury and mortality incident" reports that must include a complete description of the events and identification of steps that will be taken to reduce the potential for additional research-related mortality. These special reports are due within two weeks of the incident. Failure to submit complete and accurate reports required under a permit may result in suspension, revocation, or modification of the subject permit, as well as delays in processing future permit applications.

4.7.4 Mitigation and Conditions of Grants, Permits, and Authorizations

Researchers who apply to take protected species (i.e., threatened or endangered under ESA and MMPA) for scientific and/or enhancement purposes must abide by certain general terms and conditions. These terms and conditions are based on the requirements necessitated by the statutes. Explanations and descriptions of how mitigation measures would be incorporated into the research plans must be included in the permit applications. Incorporation of permit terms and conditions helps to mitigate possible adverse impacts precipitated by research. Not complying with terms and conditions constitutes a violation and is grounds for permit modification, suspension, or revocation, and for enforcement action. All permits for research on marine mammals contain the following types of permit terms and conditions, which must be complied with 1) duration of permit; 2) number and kind(s) of protected species, location(s) and manner of taking; (3) qualifications, responsibilities, and designation of personnel; (4) possession of permit; (5) reports; (6) notification and coordination; (7) observers and inspections; (8) modification, suspension, and revocation; (9) penalties and permit sanctions; and (10) acceptance of permit.

There are also a number of special conditions specific to research on SSLs and NFSs, which must be adhered to. These special conditions for SSL and NFS research permits are contained within the terms associated with condition number two: number and kind(s) of protected species, location(s) and manner of taking. The following will further detail both the general and special terms and conditions for all SSL and NFS research permits.

Duration of Permit

- The permit expires on the date indicated (not to exceed five years past the date of issuance), is non-renewable, and may only be extended by the Director of NMFS Office of Protected Resources.
- All permitted activities must be suspended in the event of a serious injury or mortality and the permit holder must contact the Chief of NMFS Permits, Conservation and Education Division (Permits Division), by phone within two business days. Activities may be authorized to resume after a review of the incident report.
- If the authorized take (which under the MMPA means to harass, hunt, capture, collect, or kill, or attempt to harass, hunt, capture, collect, or kill any marine mammal) is exceeded, research activities must cease and the Permits Division Chief must be notified by phone as soon as possible, but not later than two business days. The permit holder must submit a written incident report, and resumption of permitted activities is contingent upon review of the report and compliance with permit terms and conditions.

Number and Kind(s) of Protected Species, Location(s) and Manner of Taking

- A table outlining the number of protected species authorized to be taken and the locations, manner, and time period in which they may be taken, must be included in the permit application and will be included in the permit. The actual number of takes must be provided in the annual report.
- Visual images of or related to the research may be collected as needed, provided that collection of images does not result in takes of protected species.
- Nonessential images or audio recordings may be allowed, but only with permission of the Permits Division Chief.
- Researchers must comply with specific restrictions related to taking (i.e., time, location, and manner), as specified in special conditions for SSL and NFS research permits. These special conditions are:
    - Except where disturbance during pupping season is expressly authorized, researchers must not conduct any rookery activities until after peak pupping season, and use personnel (i.e., biologists, veterinarians, or physiologists) experienced in sampling techniques in order to complete work as quickly as possible;

- Cease all research-related procedures if an animal is showing signs of acute or protracted alarm (i.e., constant muscle tensions or abnormal respiration) that may lead to serious injury or death;
- Use disposable instruments (i.e., needles or biopsy punches) to the maximum extent practicable;
- For blood sampling, do not exceed three attempts (needle insertions) per site per animal, and not more than 1.0 ml blood per kg body mass per capture event;
- Responsible steps will be taken by researchers to identify pups of lactating females before attempting to immobilize a lactating female;
- If research activities result in an orphaned pup, or one with a seriously injured mother, the orphaned pup will be humanely provided for (i.e., placed in a rehabilitation facility or, if necessary, euthanized); and
- To the maximum extent practicable, without further disturbance of the rookery/haulout, researchers shall conduct post-handling monitoring of animals captured or sampled, for signs or injury or stress.

Qualifications, Responsibilities, and Designation of Personnel

- All researchers must be listed and categorized as either Principal Investigator, Co-Investigator, Research Assistant, or Permit Holder.
- Only personnel identified in the permit may perform activities, which must be commensurate with their qualifications and responsibilities.
- Research Assistants cannot conduct permitted activities in the absence of the Principal Investigator or a Co-Investigator.
- Personnel who require a state or federal license in order to conduct certain activities authorized under the permit (i.e., veterinarians or pilots) must be licensed when undertaking said activities.
- Any changes to the list of personnel described in the permit must be detailed in a written request to the Permits Division Chief. These changes will then be formally approved or denied.

Possession of Permit

- The permit cannot be transferred or assigned to any other person or institution.
- The permit holder, and any other persons operating under the permit, must possess a copy of the permit when: engaged in a permitted activity; a protected species is in transit; and during any other time when any protected species is taken or imported under the auspices of the permit.
- A duplicate of the permit must be attached to any container, package, enclosure, or other means of containment that contains a protected species, or part(s) of, for storage, transit, supervision, or care.

Reports

- The permit holder must submit annual, final, and incident reports, as well as any papers or publications that result from the research, to the Permits Division Chief.
- Written incident reports related to serious injury and/or mortality events, or an exceedance of authorized takes, must be submitted to the Permits Division Chief. These reports must describe the events that occurred, as well as what measures are being taken to prevent the occurrence of similar incidents in the future.
- An annual report must be submitted to the Permits Division Chief at an agreed upon date for each year the permit is valid. Also, a final report must be submitted to the Permits Division Chief within 180 days of the permit expiration date, or if research finishes prior to permit expiration, within 180 days of completion of research.
- The annual report must include the species, activities, numbers, age class/gender, number of times each activity was performed, and locations of takes in tabular form, as well as a narrative of the results of research.

- Research results must be published, or otherwise made available to the scientific community, in a reasonable period of time.

Notification and Coordination

- The permit holder must provide written notification of planned field activities to the appropriate NMFS Assistant Regional Administrator(s) for Protected Resources. This notification must occur at least two weeks before commencement of any field work and should include the intended locations of work and/or survey routes, estimated dates, and names and roles of all participants.
- To the maximum extent practicable, the permit holder should coordinate the spatial and temporal characteristics of the study with those that have similar plans, in order to minimize and possibly avoid unnecessary disturbance to animals.

Observers and Inspections

- Permitted activities may be reviewed by NMFS. Upon request by NMFS, the permit holder must cooperate with any review by allowing any employee of NOAA, or other individual designated by the Director of NMFS Office of Protected Resources, to observe permitted activities, or by providing any documents or other data relating to the permitted activities.

Modification, Suspension, and Revocation

- Any and all permits are subject to suspension, revocation, modification, and denial. The Director of NMFS Office of Protected Resources may modify, suspend, or revoke the permit in its entirety, or in part, for several reasons: in order to make the permit consistent with any change made after the date of permit issuance; in any case in which a violation of the terms and conditions of the permit is found; in response to a written request from the permit holder; if NMFS determines the application or other pertinent information is false; and if NMFS determines the activities authorized under the permit to be to the disadvantage of threatened or endangered species or to be no longer consistent with the ESA (only applicable to ESA-listed species).

Penalties and Permit Sanctions

- Any individual who violates any provision of a permit, MMPA, ESA, or regulations at 50 CFR 216 and 50 CFR 222-226 is subject to civil and criminal penalties, permit sanctions, and forfeiture.
- NMFS shall be the sole arbiter of whether or not a given activity is within the scope and limits of the authorization granted in the permit. It is the responsibility of the permit holder to verify whether an activity is within the scope of the permit. If verification is not performed and NMFS subsequently determines that an activity was outside the scope of the permit, this failure to verify may be used as evidence of a violation of the permit, the MMPA, the ESA, and other applicable regulations in any enforcement actions.

Acceptance of Permit

- Upon signing the permit, the permit holder and principal investigator agree(s) to all terms and conditions explained in the permit; understand(s) that the authority to conduct certain activities detailed in the permit is conditional and continued use of said permit is contingent upon compliance with annual reporting requirements; and acknowledge(s) that a NMFS permit does not absolve the permit holder of the responsibility of obtaining any other applicable permits (i.e., federal, state, local, or international).

Although no set of measures can fully prevent all adverse effects of research on SSLs and NFSs, the previously described, and requisite, permit terms and conditions do assist with both the documentation and minimization of effects of research activities on these animals.

4.7.5 Monitoring

All NMFS permits for research on SSLs and NFSs require permit holders to conduct post-activity monitoring to the maximum extent practical without causing further disturbance of the animals. Specifically, permit holders are required to conduct post-handling monitoring of captured or sampled animals for signs of acute stress or injury, and to monitor rookeries/haulouts following any disturbance (e.g., aerial surveys, capture activities, or scat collections) to determine if any animals have been injured or pups abandoned. The results of such observations are to be included in annual and final reports submitted as required under the permit.

4.8 Biological Environment

4.8.1 Steller Sea Lion

This section presents the analyses of the effects of the four different research alternatives on SSLs. The general methodology for performing this assessment is introduced in Section 4.4. However, a description of the SSL-specific analysis is presented here in more detail. The alternatives represent different levels of research effort, each with a range of research techniques and intensities that could be authorized by NMFS F/PR1. The intent of conducting research on endangered, threatened, and depleted species is to collect information useful in making management decisions to promote recovery of the species. However, any research activity that has the potential to disturb animals has some risk of adverse effect for animals exposed. Animals disturbed by research may exhibit a variety of behavioral and physiological responses that can result in injury, reduced fitness, or mortality. Similarly, animals' behavioral and physiological responses to capture, chemical or physical restraint, tissue sampling, attachment of tags or instruments, and exposure to various other marking or sampling procedures can result in injury, infection, reduced fitness, and mortality. For each type of research activity there are one or more possible responses from the animals. For some research activities (e.g., aerial surveys) many animals may exhibit no observable response, although they may have elevated adrenaline levels or other internal stress responses. For research activities that require the presence of researchers on a rookery or haulout, some animals will enter the water and others may hold their ground or move away on land. Animals targeted for capture and handling will be subject to additional types of stress and risks compared to animals that are not captured or handled.

The intensity and probability of potential responses is a function of a variety of factors including the sex/age class of the animal, the tendency of the individual animal to respond in certain ways, the intent and behavior of the researchers (how they approach animals), timing and location of the research, and environmental factors such as sea conditions and weather. Each research activity therefore has specific inherent risks of injury to an individual as determined by potential response, which could result in potential impacts on a population as measured by a combination of the intensity of individual responses and the number of animals exposed. The effect of exposure to a variety of research procedures may be additive or synergistic (i.e., the effect of the interaction of two or more procedures combined is greater than simply adding them together). Likewise, the combined effect of all the research activities authorized at any one time on a stock or population can be estimated based on the combined intensity of responses and scope of the permitted activities (e.g., number of individuals exposed). For all of the procedures analyzed, it is assumed that all researchers are experienced and qualified to fill their assigned roles and that all procedures are carried out under "best practices" conditions, including all mitigation measures specified in the relevant permits.

The analysis of the direct and indirect effects of research activities is divided into three major components: an assessment of research-related injuries that lead to serious injury or mortality; an assessment of research-related effects on reproductive success; and an assessment of how well each alternative research strategy would address recovery and conservation objectives for the species. Potential positive effects of research are evaluated based on the project's likelihood of contributing information that can be used to promote species recovery or conservation, in consideration of the potential adverse effects. The criteria for determining the impact level of each component are summarized in Table 4.4-1.

Assessment of Direct and Indirect Mortality Due to Research

There are many potential mechanisms for research-related injuries to occur, some of which may lead directly or indirectly to the death of individual animals. Some injuries may affect the ability of an animal to forage or behave normally but are not directly fatal (i.e., sub-lethal effects). The thresholds for sub-lethal effects (i.e., when they start to affect an animal's ability to survive) are not well known. There are many other natural and anthropogenic factors that also affect survival of individual animals and to attribute the fate of an animal to a particular factor can be difficult, especially for species that are difficult to track and observe over long periods of time. The key question for this impact assessment is whether or not effects on individuals translate into a population-level effect (i.e., reduced population growth or fitness). Population growth must be increasing, with an age/sex structure that promotes population stability, to lead to recovery of the species. In addition, a significant number of individuals within the population need to be robust to disease, free of deleterious genetic mutations, and resistant to environmental or anthropogenic changes or stresses. The population must also be distributed widely enough to withstand acute environmental or manmade disasters such as disease outbreak or an oil spill.

Mortality Assessment Process

The mortality assessment tables presented for each alternative summarize a multi-step process for determining the magnitude or intensity of direct and indirect mortality risks associated with each type of research activity:

Step 1. The potential responses to different types of research activities are categorized according to the intensity of an animal's response. Different responses can lead to mortality through a variety of known or suspected mechanisms for potential injury.

Step 2. The proportion of animals that typically respond in the different ways is estimated based on observed responses in different locations and under different environmental conditions. This estimate is an "average" response, incorporating the range of responses observed at different rookeries/haulouts over the years (see "Basis for estimates" later in this section).

Step 3. An estimation is made of the percentage of animals that would be injured and die as a result of various research activities, either while researchers are still present or sometime in the future after they have left. These estimates include sub-lethal injuries that require some time to heal, may involve some pain or discomfort, and may affect the ability of animals to move or behave normally for a period of time. It also includes estimates of individuals that may actually die as a result of infections, tissue damage, or impaired ability to forage successfully because of their injuries. These estimates do not include animals that would be injured and die due to natural causes.

Step 4. For each type of research activity, potential mortality has been calculated as a function of the mortality risk associated with an individual animal's response. This risk factor is then multiplied by the number of animals exposed to specific types of research under each alternative. The result of each risk calculation for a particular activity and age class of animal usually includes a fraction of one mortality. This is not meant to suggest that animals would only partly die or that every year a given activity would result in a consistent number of mortalities. The approach is probabilistic and should be considered in terms of an estimated average mortality rate that could occur over time and as a result of many different animals being exposed to the same type of activity or disturbance. The estimated number of mortalities for each activity and age class within a table (including fractional results) are totaled to get an overall estimate of the lethal risks to animals for a given scope and type of research activity.

Step 5. Total mortality is then calculated for all types of research activities for each alternative by adding the estimates from each activity table. Mortalities associated with conducting a suite of activities on an animal may be calculated by adding risk factors for specific research procedures from different tables. For example, activities that require handling of animals also involve:

- Incidental disturbance of animals as researchers approach ("researcher presence in view of animals").
- Incidental disturbance of animals as they move about on the rookery or haulout ("researcher presence among animals").
- Disturbance and stress for animals that are captured ("capture and restraint").
- Risks associated with each sampling procedure ("handling").

Step 6. A summary table (Table 4.8-49) shows the estimated number of animals that potentially might die from the specified scope of research defined for each alternative. These totals may include fractions of mortalities, which the reader could round up to the nearest whole number if they choose. Again, these are estimated probabilities that will fluctuate over time and should not be considered hard predictions for any given year. These totals are then used to evaluate the magnitude and intensity of the direct and indirect effects of research on mortality, which is one aspect of the overall impact assessment for each alternative. Sections 4.4 and 4.5 describe the other steps involved in the overall impact analysis.

Mechanisms of Injury from Disturbance

The extent to which human activities may have adverse effects on wildlife has recently become a source of conservation interest. Human disturbance causes a deviation in an animal's behavior from patterns occurring without human influence. There are numerous potential responses to different disturbances that could affect an individual's chance of survival and reproductive success. If the disturbance is severe and/or frequent enough to affect the fitness of many individuals, it may affect overall population size.

One type of response to disturbance is an animal's decision to move away from disturbed areas. This decision is typically determined by factors such as quality of the site being occupied, distance and quality to other suitable sites, relative risk of predation, density of competitors, and the investment the individual has made onsite (Gill *et al.* 2001a). The decisions made by animals in response to human disturbance, and the consequences thereof, have been compared to the decisions they make in response to predation risk (Frid and Dill 2002). Animals with suitable habitat nearby may move away from a disturbance simply because there is an alternative site. Conversely, animals with no suitable habitat nearby may remain despite disturbance and regardless of the survival or reproductive consequences (Gill *et al.* 2001b).

Knowledge of population and individual responses to disruptions of daily activities is necessary to assess viability of populations exposed to human activities. A review of available literature on responses of numerous species to a variety of human activities suggests that the responses of individuals and their effects are highly variable and dependent on multiple factors. For example, Anderson *et al.* (1996) found that there were no long-term effects of military activities on moose, and Englehard *et al.* (2002) concluded there were no long-term effects on elephant seals from human disturbance. However, Kerley *et al.* (2002) found that roads and traffic did affect the reproductive success and survivorship on Amur tigers, and Blackmer *et al.* (2004) found that human disturbance affected hatching success and nest-site fidelity of Leach's storm petrel.

In addition to behavioral responses, animals' responses to disturbance may also be physiological. For example, when an animal is exposed to a stressful stimulus, it may respond with the release of adrenocorticosteriods or other neurochemical changes. Stress has been identified as a factor in the development of pathological conditions in humans including ulcers, hypertension, arteriosclerosis, and immunodeficient conditions (Gorizontov *et al.* 1989). While studies on humans may not be directly applicable to marine mammals, an understanding of the processes for effects may be relevant (Fair and Becker 2000). Results of studies on a wide range of terrestrial birds and mammals suggest that differences in stress hormone concentrations pre- and post-disturbance are valid measures of response to disturbance. Stress hormone concentrations in fecal samples from northern spotted owls (Wasser *et al.* 1997), elk, and wolves (Creel *et al.* 2002) have been used to measure responses to disturbance. Other studies have measured short-term physiological responses, such as elevated heart rates measured via radio telemetry, in bighorn sheep and white-tailed deer (MacArthur *et al.* 1979; Moen *et al.* 1982).

Researchers have used fecal assays to examine the hormonal responses of captive SSLs and California sea lions to various stressors, including tissue contaminant levels, changes in diet, surgical procedures, and handling procedures such as isoflurane anesthesia and hot-branding (Bozza and Atkinson 2005; Mashburn and Atkinson 2005; Petrauskas *et al.* 2005). The results indicate that, for a given type of stressor, there are large variations in the response of individuals, as measured by concentrations of fecal glucocorticoids (cortisol and corticosterone). Responses to handling procedures included sharp increases in glucocorticoid concentrations that typically returned to background levels within days. While the techniques have been useful for monitoring physiological responses to stress under controlled conditions, their usefulness for explaining physiological stress in wild animals will require a better understanding of the natural variability in fecal glucocorticoids among individuals in the population, especially in relation to nutritional status, seasonal reproductive cycles, and territorial behavior (Bozza and Atkinson 2005). Furthermore, stress responses during capture and handling may not be a good indicator of subsequent survival. Serum cortisol concentrations did not vary among groups of deer that died at capture, within 14 days of release, or those surviving longer than 14 days post-release (DelGiudice *et al*. 2005).

Measures of the physiological responses of dolphins to the stress of capture include indicators such as decreased eosinophil counts, imbalances of thyroid hormones, glucocorticoids, and elevations of other blood constituents such as glucose, iron, and potassium (reviewed in Fair and Becker 2000). However, information is not available on responses to repeated captures in other marine mammal species.

Recent studies on pinnipeds have focused on two types of disturbance (reviewed in Kucey and Trites 2005): anthropogenic (e.g., noise, vessel and aircraft traffic, research, recreational, industrial, and development) and non-anthropogenic (e.g., environmental changes, storms, birds, other pinnipeds, or predators). To assess whether or not there is an effect of disturbance on pinniped haulout behavior, it is important to understand the measurement of post-disturbance recovery (i.e., what constitutes a return to "normal" conditions). Some studies have considered post-disturbance recovery to be attained when a certain percentage of the animals present at the time of the disturbance return to shore (i.e., Allen *et al.* 1984) or by applying statistical approaches that consider average densities and daily variation in numbers onshore (i.e., Kucey 2005). In the case of SSLs, disruptions often affect entire haulout sites and rookeries (Lewis 1987). Kucey (2005) documented the number of SSLs hauled out before (one to two weeks), during, and after (one to two weeks) directed research disturbance and found that the assessment of recovery depended on the criteria used. This type of study is useful in assessing short-term effects of disturbance, but cannot evaluate long-term consequences, thus indicating the need for additional methods for long-term studies. One study (McMahon *et al.* 2005) tracked the survival of endangered southern elephant seal pups (*Mirounga leonina*) that had been handled repeatedly and subjected to intrusive research procedures in their first six weeks of life and found no short-term (24 day nursing period) or long-term (first year of life and beyond) effects on survival. As indicated earlier, the results from studies of stress on one species may not apply to the responses of another species.

Understanding the effects of human disturbance on wildlife populations is critical to conservation efforts. Conservation measures will only be effective when we understand how disturbance affects the animals, physiologically or behaviorally. The insights gained by assessing effects of disturbance may help guide management of research activities, air and boat operations, and other forms of human disturbance.

Mechanisms of Injury from Presence of Researchers on or Near Rookeries and Haulouts

It is not always possible to detect animal responses to disturbance. Some responses go unnoticed for various reasons including cryptic behavior of the animal or limitations in methods used to observe or measure responses. For those species or circumstances where responses may be detected, the type and intensity of response can vary greatly. For SSLs, researchers have observed a variety of behaviors and measured various physiological indicators of stress in response to research activities.

In response to some research activities (e.g., "researcher presence in view of animals" or "researcher presence among animals"), some animals exhibit no obvious behavioral response although they may have physiological responses associated with stress. Other animals are "alerted" and show a noticeable increase in awareness of the researchers (e.g., head up, vocalization, etc.). Others may move away from the researcher or toward the water without actually entering the water. Others may enter the water either in an "orderly" fashion or in a stampede. Some mechanisms for direct and indirect adverse effects, including injury and mortality, during a stampede or flight into the water include:

- Increased corticosteroid levels or other physiological stress responses, especially from prolonged or repeated exposure to disturbance.
- Increased energy expenditure with the potential for hyperthermia (excessively high body temperature which could lead to muscle rigidity, brain damage, or death) for those animals involved in strenuous or prolonged activity.

- Hypothermia (characterized by abnormally low body temperature and associated with rapid, progressive mental and physical collapse which could be life-threatening) for those animals forced into the water, particularly animals undernourished or in poor health.
- Injury to pups from being trampled by adults or other pups.
- Injury to adults and pups from landing on sharp rocks when jumping or falling off cliffs or rocks.
- Injury to pups from aspirating water.
- Death of pups by drowning.
- Increased risk of predation for those animals forced into water, especially pups and juveniles with limited mobility.
- Increased conspecific aggression (e.g., biting and pushing) among adults and from adults toward pups as animals try to reestablish or access territories on the rookery or reunite with their pups.
- Delay in return of nursing females to the rookery/haulout, leading to a malnourished or weakened pup, or slower pup growth.
- Failure of pups and mothers to reunite after separation resulting in pup death by starvation or exposure.
- Stress reactions that produce psychological and physiological responses, especially if disturbance is chronic or frequent.

Mechanisms of Injury from Capture and Restraint

For research activities that require capture and restraint of animals, there are risks of injury in addition to those listed above. Capture and restraint methods include both land-based and at-sea techniques (see Appendix B). The following are mechanisms by which animals may be injured during capture:

- Efforts to avoid or escape capture can lead to contusions, lacerations, hematomas, nerve injuries, concussions, and fractures, as well as hyperthermia and myopathy from increased muscle activity.
- Pups herded into large groups for processing or that pile up in response to disturbance on rookeries may be injured or suffocated under the weight of other pups.
- Pups attempting to reunite with their mothers after researchers leave may encounter lactating females who may aggressively displace and injure them.
- Capture myopathy is associated with prolonged or repeated stress reactions in many mammals (but it is uncertain if it occurs in pinnipeds) and characterized by degeneration and necrosis of striated and cardiac muscles. Capture myopathy may be fatal and may not develop until 7-14 days after capture and handling.

Mechanisms of Injury from Sedation or Anesthesia

There are several types of drugs used to capture, sedate, or immobilize animals for marking, instrument attachment/insertion, hot-branding, or tissue sampling procedures. Technical descriptions of these procedures are presented in Appendix B. Some of the factors that contribute to adverse effects of anesthesia or sedation include:

- Chemical immobilization for sedation or anesthesia requires an accurate assessment of an animal's weight and condition to determine the appropriate dosage. Miscalculation can lead to an overdose that may result in death.
- A dart-injected animal may be injured if it enters the water after being darted and later aspirates water or drowns as the drug begins to take effect.
- Dart injection of anesthetic into blubber rather than muscle tissue can lead to aseptic necrosis and large abscesses.
- Dart injections into the abdominal or chest regions can result in puncture of the stomach or lungs, which may be fatal.
- Darts may hit an animal smaller than intended, leading to an inadvertent overdose.

- Animals under sedation can develop hyperthermia (over-heating) or hypothermia (reduced body temperature) due to stress reactions and the effects of some drugs on thermoregulation. Both conditions can influence the physiological response of the animal to drugs or exacerbate existing health problems.
- Immobilizing drugs can result in respiratory depression or apnea (stopped breathing); muscle spasms; increased salivation, which can lead to choking; and complications for animals that already have kidney or liver diseases.

Mechanisms of Injury from Tissue Sampling, Marking, and Other Research Procedures

There are numerous types of research procedures involving the handling of animals, including collection of various tissue samples, attaching tags or scientific instruments, and applying marks such as hot-brands. Technical descriptions of these procedures and their specific potential effects on animals are presented in Appendix B. In addition to the following risks associated with these procedures, all of the handled animals are exposed to the risks of researcher disturbance and capture listed previously.

- Blood collection can cause pain, stress, damage to the vein, abscesses, and clotting, particularly when multiple attempts are made on the same animal.
- Biopsy punches for skin and blubber samples produce a small wound that has the potential for infection, especially when considering the unsanitary conditions of the environment. Muscle biopsy produces a small-diameter deep wound that can bleed excessively and tends to heal at the surface prior to deep tissue healing, thereby increasing the chances of abscess formation.
- Hazards of remote biopsy sampling include inadvertently striking vulnerable areas such as the head or abdomen, darts that penetrate too deeply and cause excessive bleeding or tissue damage, stuck darts or broken tips remaining attached to the animals, causing irritation and possibly abscess and infection, and inadvertent repeated sampling of the same individual, thereby compounding the effects on that animal. Depending on the depth of penetration and force of impact, biopsy darts can damage internal organs if they strike the abdominal area, resulting in a fatal wound that may not be detected by researchers at the time of sampling. Animals can also be severely injured if darts strike them in the head (Gemmell and Majluf 1997).
- Tooth extraction can result in infection and cause more than momentary pain, which could temporarily interfere with foraging behavior.
- Flipper tags create puncture wounds that produce more than momentary pain, include chances of infection, and may also pull out over time, creating a rip in the flipper.
- Hot-brands are the permanent marking method currently used for SSLs and can lead to stress, more than momentary pain, wounds that remain open for prolonged periods, and infection.
- Use of dyes, bleach, paint, or other chemicals to temporarily mark the pelage of SSLs or NFSs can potentially cause irritation, and some of the chemicals can be toxic if ingested, and, if they get into an animal's eye can result in blindness. Additional physiological or behavioral effects of temporary pelage marking are unknown, but potentially could alter thermoregulation or grooming behavior.
- External attachment of instruments to the fur or skin with epoxy can cause irritation and lead to increases in grooming behavior with reductions in foraging behavior and other normal behavior. The hydrodynamic drag created by the instrument can hinder swimming performance and result in increased energetic costs of swimming, potentially affecting foraging efficiency.
- The potential long-term effects of injecting SSLs with substances for research purposes, such as isotope-labeled water and Evan's blue dye, and collecting serial blood samples have not been well studied. Also, these procedures necessitate the extended restraint of animals, which may increase the risk of stress-related effects and behavioral changes when the animals are released. All procedures that require insertion of needles carry the risk of infection and abscesses that may affect an animal's general health.
- Stomach intubation carries the risk of introducing fluids into the trachea and lungs, which may lead to pneumonia.

- Enemas and fecal loops carry the risk of perforating the rectum, which may lead to peritonitis.
- Surgical implantation of instruments is performed under anesthesia, which eliminates pain during surgery, but there may be complications from the anesthesia, as well as considerable pain during healing, which may take weeks or months and could inhibit normal foraging behavior, reproductive behavior (including lactation and mating), and the ability to escape predators. There is also a substantial risk of infection associated with exposing deep tissues or penetrating the abdominal cavity.

Number of Animals Affected by Research under Each Alternative

The permits that were active at the time this EIS was initiated constitute the Status Quo level of research (Alternative 3). The numbers of takes for different research activities under these permits are listed in Appendix A (Take by Permit Number and Research Activity). These Status Quo numbers were modified according to the policies stated for Alternatives 2 and 4 to derive proxy numbers of takes used in the analysis of Alternatives 2 and 4.

Alternative 1 – No Action: No New Permits or Authorizations

Alternative 1, the No Action Alternative, would allow continuation of research that is currently authorized until the existing permits expire. However, for the purposes of analysis, the effects of the No Action Alternative will be based on what would be allowed after all current permits expire. Because no new research permits or authorizations would be issued after that time, no activities that required a permit would be allowed, which would limit research to those methods that do not result in "takes" of marine mammals, such as remote surveys and observations and analysis of existing data and samples. No animals in the wild would be exposed to researcher activity under this alternative.

Alternative 2 – Research Program without Capture or Handling

Alternative 2 would prohibit any research activities that require capturing and handling of animals or researcher presence on rookeries during the breeding season. If these particular activities were not authorized, researchers might choose to expand their efforts with non-intrusive techniques or, alternatively, may elect not to pursue research on SSLs because they would not be able to address issues that interested them or fit their research and funding objectives. In other words, the level of non-intrusive research authorized could be more or less than the Status Quo, depending on the response of individual researchers and agencies to the policy represented in this alternative. For the purposes of analysis, the number of takes under each research activity will be defined as the numbers of animals affected by non-intrusive research activities under the Status Quo for those activities (see mortality assessment Tables 4.8-1, -2, -13, and -14).

Alternative 3 – Status Quo Research Program

For Alternative 3, the Status Quo alternative, the numbers of animals exposed to different research activities is taken directly from the permits that were valid on January 1, 2006, including those permits that were subsequently vacated by court order on May 26, 2006 (Civil Action No. 05-1392 [see mortality assessment Tables 4.8-3 through 4.8-7 and 4.8-15 through 4.8-19]). The alternative does not include activities that had been applied for (permits or amendments) but not yet authorized at the time this EIS was initiated. No new permits for research on SSLs in the wild have been issued since initiation of this EIS.

For survey and monitoring types of activities, the number of animals that would be exposed to potential disturbance depends on how many animals will be in a particular place at a particular time. To account for potential interannual variation in the distribution and abundance of animals within a survey area, researchers are encouraged to estimate the maximum number of animals that would be exposed (surveyed). Researchers generally estimate this number based on information in Stock Assessment Reports (SARs) and previous experience. When applying for permits, researchers may add a "buffer" to this maximum number of animals to make sure they do not exceed their permit allowance should the actual number of animals encountered be greater than predicted. The numbers of authorized takes for incidental disturbance are therefore less than the numbers reported after fieldwork is complete (see Table 3.7-1).

For some activities, such as capture of juveniles at sea, researchers have applied for and received permits to capture a specific number of animals. However, due to financial constraints or the logistical difficulty of capturing animals, the actual sample size has been less than the number authorized (see Table 3.7-1). For procedures that are intended to test specific hypotheses or provide statistically robust data for modeling or other applications, the number of animals requested to be captured or sampled may be based on a "power analysis" determination of sample size. Such statistical power calculations depend on the level of statistical resolution needed to either test the hypothesis or detect an environmental pattern (the effect). In all cases, the analysis of effects will be based on the number of takes authorized in the permits rather than the number of actual takes reported after the field season.

Alternative 4 – The Preferred Alternative – Research Program with Full Implementation of Conservation Goals

Alternative 4 includes all research activities that would be needed to address all information objectives identified in the Draft Recovery Plan for SSL (NMFS 2006a). While such a program would likely require a substantial increase in future funding levels and the sources of that funding have not yet been established, it will be assumed for the purposes of this EIS analysis that sufficient funding would be secured to implement an expanded research program under Alternative 4. This alternative would include the same types of research as described in the Status Quo plus activities that have not been authorized under the Status Quo, including new permits and permit amendments that were pending as of January 2006. It could also include some types of techniques and activities that have not been previously requested or authorized, including intentional lethal take.

The Draft Recovery Plan does not offer specific targets for the future scope or frequency of particular research activities but presents broad suggestions of research direction. All of the suggestions for new research are oriented toward the western DPS so the scope of research on the eastern DPS under Alternative 4 will be assumed to be the same as the Status Quo (Alternative 3). Two objectives that have been emphasized for the western DPS are the need for improved information on vital rates and foraging behavior. Increased effort towards these goals would be expected to increase the numbers of animals captured and marked (and hence takes associated with researcher presence among animals), and to increase the amounts of observational effort. Another objective would be to improve knowledge about the health and reproductive cycles of mature females and this could be addressed by development of capture techniques to allow handling of larger and older sea lions. In general, the numbers of takes for different research activities have been increased over the Alternative 3 levels with input on potential future research from agency experts. These increases have not been assessed with power analyses of sample sizes or with respect to testing specific hypotheses because such detail would depend on the particular objectives of future research proposals. The estimates of takes under each research category are therefore considered to be proxies for the scope of proposals that would arise from many sources under a favorable funding environment. These estimates will be used in the analysis of effects for Alternative 4 (see mortality assessment Tables 4.8-8 through 4.8-12 and 4.8-20 through 4.8-24).

Mortality Assessment Tables

The mortality assessment tables address the likelihood that animals exposed to various research activities could be injured and die as a result of those activities, either immediately or some time in the future. Note that effects of research related to reproduction are considered in the sections on sub-lethal effects. There are a total of five tables that are organized according to the nature of the research activity as follows:

- Table 4.8-1 – Estimated Mortality Due to Researcher Presence in View of Animals
  - aerial surveys
  - vessel surveys
  - remote observations on land
- Table 4.8-2 – Estimated Mortality Due to Researcher Presence among Animals
  - on rookeries during breeding season (disturbance during ground counts, scat collections, captures)

- on haulouts at any time or rookeries during non-breeding-season (disturbance during scat collections, brand or tag resights, captures)
- Table 4.8-3 – Estimated Mortality Due to Capture and Restraint Activities
  - capture/physical restraint
  - capture/chemical restraint (inhalant anesthesia)
  - capture/chemical restraint (injected anesthesia)
  - capture/chemical restraint (injected sedative)
  - intentional lethal take or permanent removal
- Table 4.8-4 – Estimated Mortality Due to Handling and Sampling Procedures
  - permanent mark/hot-brand
  - relatively low-risk procedures (e.g., ultrasound; pulling whiskers; applying paint/bleach/dye marks; instruments attached externally with epoxy/neoprene cement/harnesses; blood samples; flipper tags; isotopes; BIA; injections; enemas; stomach intubation; fecal loops; stomach pill telemeters; metabolic chambers)
  - relatively medium-risk procedures (e.g., tooth pull; biopsies; remote biopsies; local anesthesia)
  - relatively high-risk procedures (e.g., activities that require surgical procedures or otherwise expose a body cavity such as implanting transmitters sub-cutaneously or intraperitoneal or performing other surgeries)
  - Note that there are some procedures that do not pose any additional risk of mortality (e.g., external swabs/scrapings; clipping hair, nails, or whiskers; external physical exam; morphometric measurements
- Table 4.8-5 – Estimated Mortality Due to Capture, Temporary Captivity, and Release
  - capture/transport/holding/release
  - permanent mark/hot-brand
  - relatively low risk procedures as above
  - relatively medium risk procedures as above
  - relatively high risk procedures as above

Tables 4.8-1 and 4.8-2 are analyzed according to the following criteria as shown in the columns in each table:

- **Activity:** The tables assess different types of activities based on differences in risk associated with each activity and also by when those activities occur (breeding season or non-breeding-season), based on differences in risk associated with the presence of small pups.
- **Age Class:** Two age classes are evaluated: pups (less than 3 months old) and non-pups (adults and juveniles). For survey activities and incidental disturbance takes, researchers do not attempt to distinguish or report numbers of animals affected by different sex/age classes other than pups and non-pups. For research activities involving capture, researchers also distinguish between juveniles (3 months to 4 years old) and adults (> 4 years old).
- **Animals Potentially Exposed:** The number of animals exposed to the activity is the number of authorized takes for that activity as listed in the permits under the Status Quo (Alternative 3) or the predicted number of takes (proxies for analysis) as defined for Alternatives 2 and 4. This is generally the number of animals estimated to be present when the research activity is conducted, or the number of animals authorized to be captured or sampled.
- **Type of Response:** The types of responses include observed mortality during the activity, "alert" responses (e.g., head up, watching researchers, or moving away from the disturbance), entering the water, and injuries that occur during the disturbance either on land or as SSLs enter the water. Physiological responses are inferred from behavioral responses, as discussed under the various mechanisms of injury.

For example, the physiological response associated with entering the water is expected to range from mild to moderate changes in circulating stress hormones, to hyper- or hypothermia, myopathy, and death.

- **Estimated Proportion of Animals Affected:** For each age class (pups and non-pups), an estimate is given for the proportion of the population likely to be affected by being exposed to various research activities.
- **Predicted Numbers of Animals Affected:** Multiplying the proportion of the population likely to be affected by the number of animals exposed to a research activity yields the predicted total number of animals affected.
- **Estimated Mortality Rate per Affected Animal:** The next step is an estimation of the mortality rate associated with the different types of effects (i.e., the percentage of animals that is affected during a particular procedure that would immediately or eventually die as a result of the research).
- **Predicted Mortalities:** Multiplying the estimated mortality rate for a given research activity by the predicted number of animals affected by that activity yields the estimated number of mortalities within each age class. The injuries and mortalities may occur from different mechanisms related to the disturbance.

Tables 4.8-3, 4.8-4, and 4.8-5 are based on the number of animals captured in different ways and the number of procedures conducted. All animals captured are assumed to have the potential for injury (through stress or other mechanisms), so these tables do not list a separate number of "animals affected" as is done in the first two tables. Although some permits specify finer divisions in age classes for captured and handled animals, there are no standard age divisions used by all researchers, so the numbers of takes for all animals over 3 months of age have been combined into the non-pup category. The calculation of estimated mortalities is similar to that in the first two tables except that the calculation is divided into immediate mortalities (observed while researchers are present) and eventual or future mortalities that are estimated to occur after researchers leave. The number of handling procedures assessed in Tables 4.8-4 and 4.8-5 are greater than the number of animals captured because most animals are subjected to more than one procedure per capture event. For each animal, the number of times a given procedure is authorized is tallied in the appropriate row, independent of the number of other procedures conducted or the number of times the animal is captured (the risks of which are calculated separately in Table 4.8-3).

Basis for Estimates of Animals Affected, Injury Rates, and Mortality Rates

Although few studies dedicated to detecting effects of research on SSLs have been completed, the reactions of animals to research activities have been observed and recorded in numerous locations over the years by the researchers conducting the activities and, in some cases, by observers or remote cameras positioned well away from the animals. These data provide a basis for response estimates considering the mechanisms for injury or death described above. Serious injuries and deaths observed during research activities are recorded in the annual reports filed with NMFS F/PR1 and are the basis of some estimates as described below. However, we do not have quantitative information on the effects of research activities that may occur after researchers have left the area. We have therefore relied on estimates of the proportions and rates of animals experiencing injury through different mechanisms, based on the professional opinion of highly experienced researchers at NMML. Unless otherwise stated, estimates for proportions of animals responding and mortality rates are applied to both western and eastern populations of SSLs. This framework allows consideration of different risk elements, provides for maximum use of existing injury and mortality rate data, provides flexibility in estimating uncertain risks, and can assist with guiding priorities for future studies.

Aerial Surveys

Because permit applicants request takes based on the numbers expected to be counted during a survey (reflecting the maximum potential take) rather than an estimate of the number of sea lions likely to be disturbed, the actual number of takes of sea lions resulting from aerial surveys will likely be less than the number exposed. For the purposes of this analysis, the proportions of animals affected by research activities were derived from the NMML final report for permit number 782-1532 for the years 2000-2004 (Final Report MMPA/ESA Permit No. 782-

1532-02 NMFS 2004). Based on this summary report, 2,797 SSLs were observed to be disturbed (or 'alerted') out of 216,821 counted during monthly aerial surveys in both western and eastern populations, a rate of 0.013 SSLs alerted per counted animal. Observations made during these counts indicate it was very rare for SSLs to actually go into the water. The NMML final report for permit number 782-1532 also reported that <10 percent (0.10) of SSLs counted during breeding-season aerial surveys were observed to respond, and that few animals left a site. Observers at field camps in 2002 and 2004 observed little response to survey aircraft, but reported "mild spooks" (animals becoming alert and moving toward the water but remaining on the beach) at Ugamak Island.

Responses of animals to aerial survey aircraft may differ depending on the acoustics of the site (B.Fadely, L. Fritz, NMML, pers. comm). A response similar to that observed at Ugamak Island is more likely at rookeries or haulouts located at the base of a cliff or in an embayment. Little or no response of animals has been observed at sites on flat offshore islands. Given the range of alert response rates with no age-class specificity (0.013 - <0.10), 0.05 was selected as an estimate of the proportion of animals effected for the "alert" response rate for both pups and non-pups. Because no pups were observed entering the water in response to aerial surveys, their "enter water" rate was set to 0.0. For non-pups the "enter water" rate was set to 0.01 (likely an overestimate based on field camp reports and the proportion of sites on flat offshore islands). Estimated "injury" rates were set to 0.001 (1/1,000) for pups and 0.0001 (1/10,000) for non-pups. Pups were assumed to be more at risk than non-pups because pups are more prone to trampling or getting bitten by larger animals.

The NMML final report for permit number 782-1532 reported no observed mortalities during aerial survey activities. It is estimated that no individuals that are just alerted to aerial surveys are likely to subsequently die as a consequence. For non-pups that enter the water, the subsequent mortality rate is estimated at 0.0001 (1/10,000). For individuals injured during a survey, the subsequent mortality rate is estimated to be 0.05 (5/100) mortalities per injured animal for pups and 0.02 (2/100) mortalities for non-pups. Pups are assumed to be at greater risk than non-pups due to their smaller size and dependence on their mothers.

Vessel Surveys

In contrast to aerial and on-land surveys, researchers request incidental disturbance takes for vessel surveys as the number of sea lions that are likely to be affected (which may be less than the number of animals present), and thus all of this group of animals will be alerted (a proportion of 1.0). Proportions of SSLs entering the water during vessel surveys depend on age class and season. ADF&G estimated that the highest mean proportion of animals entering the water during their studies (primarily during breeding season) is 10-13% (0.10-0.13), but may be as low as 3% (0.03). NMML surveys for marked animals in the GOA and AI during May of 2004-2006 found 30% (0.30) of non-pups entered the water. Thus, the enter water rates for breeding season non-pups was estimated at 0.10, non-breeding season non-pups at 0.30, and breeding season pups at 0.0 (consistent with aerial surveys and on land presence). Potential mechanisms for injury and mortality are the same as in response to aerial surveys but the estimated rate of injury for pups is set at 0.01 (10 times as great as the rate for aerial surveys) because of a greater injury risk associated with the greater number of non-pups reacting and entering the water. The estimated rate of injury for non-pups is 0.0001 (the same rate used for non-pups being injured during aerial surveys). There were no observed mortalities during vessel surveys in 2000-2004, according to the NMML final report for permit numbers 782-1532 and 782-1768. Estimated unobserved mortality rates for sea lions responding by becoming alert, entering the water, or getting injured were the same as those described for aerial surveys.

On-Land Surveys

For survey activities conducted on land where researchers are positioned some distance from the animals for observation purposes (i.e., they are in view of animals but not moving among them), the proportions of animals affected by being alerted, entering the water or being injured were estimated to be the same as described for aerial surveys. The estimated indirect mortality rates for animals affected by this activity were the same as those described for aerial surveys.

Disturbance from Researcher Presence among Animals

Because these activities occur among animals on haulouts or rookeries, and most researchers request takes for incidental disturbance as the number that are likely to be affected, it is assumed that all animals listed as potentially exposed would be at least alerted by the presence of researchers on a rookery or haulout. During the breeding season (June and July), it is estimated that only a small proportion of pups (0.01) enter the water while most of the non-pups enter the water (0.9). These proportions are based on the estimates of the NMML researchers who have conducted the field research for permit number 782-1532 during the years 2000-2004. The current procedures used for accessing rookeries and separating pups from non-pups greatly reduce the chances of animals "stampeding" into the water compared to past procedures as documented by Lewis (1987) and Snyder (1998). Based on current procedures (described in Appendix B), the estimated rates of injury and mortality subsequent to these responses are the same as those estimated for the aerial, vessel, or land survey disturbances described above.

The tables distinguish between the mortality risks associated with the herding of animals (roundups) for branding versus roundups for taking morphometric measurements or other procedures, based on the observed mortality rates recorded by NMML and ADF&G. The NMML final report for permit 782-1532 and 782-1768 indicate there were no observed mortalities of pups or non-pups occurring incidental to counting, scat collection, or capture activities not related to branding on rookeries during the breeding season, so the observed mortality rate for these activities is set at 0.

During roundups for branding, a larger number of pups are collected for processing and pups may tend to climb on top of each other. Occasionally a pup will get trapped in a pool of water or in a crevice in the rocks and die before it is handled for branding. Pups have also suffocated or been crushed under the weight of these pup piles. This type of mortality is directly associated with the branding activity but not a consequence of the brand itself and has therefore been calculated separately from the mortality risks of the actual branding procedure. For the western DPS, NMML data for 2000-2005 indicate an observed rate of mortality associated with roundups for branding of 0.001 per pup branded based on 2 mortalities associated with rounding-up 1,449 pups that received brands during 16 rookery visits (Final Report MMPA/ESA Permit No. 782-1532-02 NMFS 2004, and 2006 782-1768 report). For the eastern DPS, data from ADF&G and NMML trip reports (summarized in NMML 2006 permit application) during the period 2001-2005 indicate that the observed mortality rate is 0.007 per pup branded. This higher mortality rate appears to be primarily due to differences in rookery substrate and topography between the geographic areas. No mortalities of non-pups have been observed during roundups for branding.

During the non-breeding-season (August through May) or on haulouts at any time, the presence of researchers among animals is assumed to cause alert behavior in all animals that become aware of the researchers presence. There are very few animals less than 3 months old (pups) at haulouts. Young-of-the-year at haulouts during the non-breeding season are older, larger, and similar to juveniles and adults in their ability to maneuver on land. Because the mechanisms of injury are related to the agility of the animal, the rates of entering the water or being injured as a consequence of the disturbance are therefore assumed to be equivalent for all non-pup age classes. The estimated proportion of animals that enter the water is 0.9 and the rate of injury is 0.0001, the same estimates as for non-pups during the breeding season. Any potential sub-lethal effects related to interruption of suckling bouts are considered in Section 4.6.1.2. The NMML final report for permit 782-1532 (for the years 2000-2004) and for 782-1768 (for 2005) indicate no observed mortalities incidental to counting, scat collecting, or capture activities during any season on haulouts, or on rookeries during the non-breeding-season. The estimated rates of future or eventual mortality (after the researchers have left) for animals that are alerted, enter the water, or are injured are the same as those estimated for the aerial, vessel, or land survey disturbances described above.

Capture and Restraint of Animals

The following estimates are all based on the number of animals captured and do not include the number of animals incidentally exposed to researcher disturbance during captures. It is assumed that all of the captured animals have the potential to be injured or die during capture procedures and will experience some degree of stress associated with capture; and these rates may vary by age-class. Injury or mortality may occur during capture, restraint, or handling procedures and is observable and reported by researchers. Expected rates can be calculated based on numbers of injuries or mortalities as a proportion of the total animals subjected to the specific activity, which is defined as "observed during activity." It is recognized that there is some possibility that mortality may also occur as a result of the capture, restraint, and handling process but not occur until after the animal is released, may not be observed by researchers, and hence is defined as "unobserved/post-capture." The sum of both risks is the total mortality risk associated with a specific technique or procedure. Any potential sub-lethal effects of capture, restraint, or handling are discussed in Section 4.6.1.2.

Capture and physical restraint of 1,725 western stock pups for measurement and sampling by NMML during 2000-2005 resulted in no observed mortalities during the activities (NMML 2006 permit application, NMML permit report for 782-1768). Of 464 animals (juveniles and adults) captured by ADF&G and NMML during 24 capture events from 2000 through 2005, no mortalities of juveniles captured and physically restrained were observed, one non-pup died during a hoop net capture, and no non-pups died during underwater noose captures for a combined expected rate of 0.002 mortalities per sea lion. For this analysis, the observed mortality rate for capture and physical restraint methods is set to 0.0 for pups and 0.002 for non-pups based on the prevalent capture technique. The estimated mortality rates after researchers leave are set to 0.001 for pups and 0.0001 for non-pups, based on NMML's professional judgment.

During 2000-2005, no mortalities occurred due to capture, chemical restraint with inhalable anesthesia (e.g., isoflurane) or handling for measurements, sampling and hot-iron branding of 4,231 pups from eastern and western stocks by NMML, ADF&G, ASLC and ODF&W researchers (summarized in Appendix 1 of NMML's 2006 permit application), for an estimated observed pup mortality rate of 0.0 mortalities per pups handled. Based on the same ADFG and NMML capture data reported above, observed mortality rates for juveniles captured and chemically restrained with inhalable anesthesia (e.g., isoflurane), were 2 anesthesia-related deaths out of 463 animals (yielding a rate of 0.004 for non-pups). The estimated mortality rates after researchers leave (i.e., after all animals recover from anesthesia) are set to the same indirect rates as above, 0.001 for pups and 0.0001 for non-pups.

Juvenile and adult SSLs (non-pups) have also been captured in the past by darting with injectable anesthetics (e.g., Telazol). Based on data summarized from NMML trip reports and data books from 1990-1996 (summarized in NMML 2005 and 2006 permit applications), the observed mortality rate for darting non-pups is 0.034 mortalities per capture attempt. The estimated mortality rate for this technique after researchers leave is estimated at 0.011 based on the finding of one dead non-pup on the beach the week after 88 animals were darted. Some non-pups that are captured may be injected with a sedative (e.g., valium) to assist with physical restraint. The observed mortality rate for use of valium on non-pups is 0.0 and the unobserved mortality rate is estimated to be 0.0001, the same value estimated for physical restraint.

The last row in the capture and restraint table is for intentional lethal takes (for scientific purposes) or capture for permanent captivity. Either procedure results in a removal from the population; therefore, the mortality rate is 1.

Handling, Testing, and Sampling Procedures

With the exception of hot-branding and tooth pulling, which are done only once per animal, the following predicted rates of injury or mortality are based on the number of procedures done regardless of how many animals are actually involved. These risks are estimates of the additional risk of mortality beyond the risk posed (and already accounted for in another table) by initial capture, handling, and restraint (using anesthetics, for example). It is suitably precautionary to separate several categories based on potential handling effects, though pinniped studies published thus far suggest no measurable effects on subsequent survival over a range of handling intensities (Baker and Johanos 2002; McMahon *et al.* 2005). Groupings for the relative additional mortality risk of research procedures were based on a combination of: a) level of invasiveness, b) whether the procedure is routinely used in wildlife and veterinary practice or is an ordinary diagnostic test, and c) potential mechanisms for mortality. These groupings and risk estimates assume that the procedures are conducted by qualified personnel and follow the mitigation practices as described in their permits.

According to ADF&G and NMML permit reports for 2000-2005, there were no observed mortalities of pups or non-pups during branding procedures (although there were mortalities associated with pup roundups for branding, which are considered separately in Table 4.8-2) and thus observed mortality rates for branding are 0.0 for pups and non-pups. A draft manuscript by Hastings *et al.* (2006) estimated the maximum potential mortality related to pup branding disturbance was 0.005-0.006 per pup branded at Lowrie Island, in southeast Alaska. Their estimate includes the combined mortality risk attributable to branding, capture/anesthesia, and incidental to the activity. In this EIS assessment, observed mortality associated with roundups during the breeding season is included in Table 4.8-2 and the observed mortality associated with capture/anesthesia is included in Table 4.8-3. Combined, they have an estimated rate of 0.003 mortalities/branded pup based on observed mortalities. The estimate for unobserved mortalities for the branding procedure in this table is therefore set to a rate of 0.002 mortalities per branded pup to be consistent with the overall mortality estimated by Hastings *et al*. (2006). Rates estimated by Hastings *et al.* (2006) are likely applicable to other sites in Alaska, given similar estimates in total survival over an extended period of time post-disturbance: estimates of pup survival through 11 weeks post-branding disturbance were similar between sites in Southeast Alaska (0.868; Hastings *et al*. 2006) and Ugamak Island (0.829-0.864, based on NMML data from 2005). The estimated mortality rate for non-pups is set to 0.0001 based on NMML's professional judgment.

Several procedures are considered to add negligible additional risk of mortality during or after the procedure, including: bacteriology/virology swabs, hair or nail clipping, temporary external marks such as hair dye or paint, morphological measurements, milk samples, and external physical exams.

Examples of procedures considered to have relatively low risks of post-procedure mortality include blood sampling, flipper tagging, whisker pulling, injections of isotopic or other relatively inert chemical substances (such as deuterated water, tritiated water, Evan's Blue dye), BIA, ultrasound measurements/imaging, stomach intubation, enemas, fecal collection with loops, and insertion of stomach telemeter "pills." These are routine procedures in marine mammal husbandry and rehabilitation and, given best-practices, an anesthetized animal (where appropriate), and a qualified practitioner, these procedures have a low likelihood of creating a condition that may subsequently result in death. Because no directed studies have been conducted to measure post-procedure mortality rates, they are estimated at 0.0001 mortalities per procedure for pups and non-pups based on NMML's professional judgment.

Examples of procedures considered to have relatively medium risks of post-procedure mortality include tooth removal under general anesthesia, biopsies (local and remote), and use of local anesthesia. Because no directed studies have been conducted to measure post-procedure mortality rates, they are estimated at 0.0002 mortalities per procedure for pups and non-pups, double the estimated low-risk procedure rate.

Examples of procedures considered to have relatively high risks of post-procedure mortality include transmitter implantation and other surgeries. Because no directed studies have been conducted to measure post-procedure mortality rates so they are estimated at 0.001 mortalities per procedure for both pups and non-pups, 10 times the estimated low-risk procedure rate.

Animals Taken into Temporary Captivity

The risk of mortality for animals taken into temporary captivity for research purposes contains components from all of the assessment tables described previously (e.g., capture, physical and chemical restraint, and numerous handling/sampling procedures). Temporary captivity also involves risks associated with transport of animals to and from the wild, and the stresses and other risks associated with living in an artificial environment and being chronically exposed to novel stimuli. One research method/risk unique to animals in captivity is dietary manipulations designed to study animals' responses to varying levels of nutrition and caloric content. The types of dietary manipulations performed are described in Appendix B, along with the suite of potential responses from the animals. Another factor unique to research on animals in captivity is that they can be monitored more closely and for longer periods of time post exposure to a risk or stressor than is practical for animals in the wild. As part of this additional monitoring, animals in captivity may receive veterinary care to resolve adverse effects (e.g., injuries, infections) associated with the research more readily and consistently than animals subject to the same or similar research activities in the wild. This may mitigate some of the adverse impacts associated with being in captivity.

The Animal Welfare Act (AWA), administered by the USDA APHIS, specifies requirements for ensuring the general health and welfare of captive marine mammals. APHIS is responsible for ensuring that research facilities adhere to these requirements. Because the AWA is not administered by NMFS, permits issued by NMFS do not include terms and conditions related to compliance with the AWA. However, NMFS permits can and do specify terms and conditions intended to ensure that the research conducted on captive marine mammals is consistent with the humane standards of the MMPA. Thus, NMFS permits require that these animals be monitored during and after experimental procedures and that mitigation measures are followed to minimize the potential for adverse impacts from the research. Permits allowing research on captive SSLs require that no animal be released back into the wild until passing a rigorous health assessment, both to ensure that the animal is capable of surviving in the wild and to minimize the potential for introducing disease into the wild population.

In acknowledgement of the different nature of risks associated with research on captive animals compared to that on wild animals, the mortality risks for temporarily captive animals will be calculated separately. Although much of the risk associated with research on captive animals is mitigated, the estimated mortality risks for all procedures will be assumed to be the same as for wild animals, as described previously.

Assessment of Sub-Lethal Effects Due to Research

This element of the direct and indirect effects analysis discusses the ways the scope of research activities represented by each alternative may affect animals in ways that do not lead to mortality, particularly the effects of research on the reproductive success of animals. As is the case for mortality, sub-lethal effects could occur as a direct result of the research activity itself or indirectly due to other contributing factors. The longer an animal takes to fully recover from the disturbance or injury, the greater the chance that other complicating factors could contribute to the overall effect. For example, a painful injury may make it more difficult for an animal to forage efficiently. If food is plentiful the animal may be able to compensate for the decrease in efficiency by foraging a little longer than usual and may not suffer an overall loss of nutrition. But if the prey population is at a low density or of low quality, a decrease in foraging efficiency could affect an animal's nutritional state. This could lead to a reduced rate of growth or loss of weight that could contribute to reproductive failure of the animal.

There have been efforts to analyze the effects of some research activities on the subsequent growth rates of SSLs. Appendix 1 (on the effects of branding on SSLs) in the NMML and ADFG 2006 permit applications contains the following relevant report. These data suggest that there was no measurable effect of capture, handling, and branding on the growth rate of pups through two years of age.

> "In unpublished studies to assess the effects of branding on Steller sea lion growth, ADFG and NMFS examined 371 juvenile Steller sea lions captured with hoop net or underwater noose techniques during 2000-2003; 27 of these had been branded as pups on natal rookeries. The pups did not differ in mass or length compared to non-branded sea lions of similar age up to 2 years of age (Figures 1 and 2), suggesting there was no effect of branding on subsequent growth. This conclusion was further supported by examination of the distribution of residuals from an analysis of covariance of mass (log-transformed) by sex, branding status (yes/no), and region (natal region for branded pups, region of capture for non-branded pups) with age (log transformed) as a covariate (Figure 3). Though there were significant effects of sex, region and age and the overall model accounted for 71% of variance in mass, there was no significant effect of branding (ANCOVA $F_{(1,370)}$=0.008, P=0.931)."

Other researchers have used marked animals to study the effects of various handling procedures on the survival, growth, and birth rates of other species (e.g., endangered Hawaiian monk seals, Baker and Johanos 2002; Antarctic fur seals, Goebel *et al.* 2003). Although these studies found no significant differences between handled and non-handled animals, the same results can not be inferred for SSLs. Additional analysis for these types of effects should be possible in the future if sample sizes for marked and recaptured individuals become large enough to make statistical comparisons.

While sub-lethal effects can result in changes in an individual's body condition, immune response, etc., the analysis of sub-lethal effects in this EIS focuses on reproductive success because of the potential for effects on the population.

The consequences of research-related effects depend on a number of environmental conditions that change seasonally, among years, and among locations. While the result of a disturbance or injury is difficult to predict because of the many complicating factors, the initial disturbance caused by research does play a role in the ultimate effect.

Part of the risk assessment includes estimates of the number of animals that are injured but do not die (sub-lethal effects). These estimates will be used as the basis for evaluating the potential effects on the reproductive success of animals exposed to research.

The potential mechanisms established or postulated for effects on reproductive success include:

- Physiological responses to stress that cause failure of embryonic implantation or reabsorption of fetuses.
- Injury to the reproductive organs or damage to hormonal regulation that leads to temporary or permanent sterility.
- Changes in maternal behavior that reduces feeding of pups, affecting growth rates.
- Delayed sexual maturation due to slow growth or poor health.
- Loss or shrinkage of territory, and therefore access to mates.

As noted for the mortality assessment, monitoring designed to specifically measure the effects of research techniques on reproductive success has not been conducted for most activities. There is a great deal of uncertainty regarding not only the intensity of effects but also the mechanisms of effects. The analysis of sub-lethal effects is therefore qualitative in nature and draws on studies of other species where pertinent.

In many cases, the mechanisms or means for potential sub-lethal effects are inferred from studies on the reactions of other species or humans to various types of stress. Direct evidence for the occurrence of most of these mechanisms in SSLs is weak or lacking altogether. Research designed to specifically measure the sub-lethal effects of different research techniques have not been conducted for most activities considered in this EIS. Acquiring comprehensive data on the long-term effects on survival and reproductive success would require an extensive monitoring program and would probably include intrusive research techniques, such as permanent marking and telemetry. Although the information would be useful to have, not only for this EIS assessment but for interpretation of the research data, there is a level of uncertainty regarding the collection of this kind of information. It is not possible to design studies to investigate every potential effect of research without also affecting the animals. It would also likely be difficult to differentiate sub-lethal effects of decreased growth or reproductive output potentially caused by research activities from other potential sources (for example disease, contaminants, nutritional limitation due to fisheries competition or environmental variation, disturbance due to tourism), in addition to the variability of individual behavior. Chapter 5 discusses issues related to post-research monitoring.

Assessment of Beneficial Contributions toward Conservation Objectives

This element of the direct and indirect effects analysis discusses how well the scope of research represented under each alternative would be able to address information needs for taking management actions that would promote recovery and conservation of the species. The evaluation of the alternatives against recovery and conservation goals is founded on the information needs identified in the Draft SSL Recovery Plan (hereafter referred to as the Draft Recovery Plan) (NMFS 2006a). The Draft Recovery Plan was released in 2006 for public review and comments. NMFS is currently incorporating those comments and expects to release a Final Revised Recovery Plan in the fall of 2007. Although there may be substantial differences between the draft and final revised Recovery Plans, this EIS along with current research permits and research permit applications currently under consideration are all based on the conservation objectives and research priorities as described in the 1992 Recovery Plan and the 2006 Draft Recovery Plan.

The goal of the Draft Recovery Plan is to promote the recovery of the western population of SSLs to the point that it could be down-listed from "endangered" to "threatened" and ultimately to the point that it could be removed from the list of threatened and endangered species under the ESA. Although there have been substantial efforts to understand the causes of the population decline in the 1980s and 1990s, the Draft Recovery Plan focuses on factors that are potentially impeding recovery of the population and the actions necessary to promote recovery. The Draft Recovery Plan recommends three broadly defined actions that are necessary for the population to recover:

- Maintain current fishery conservation measures.
- Design and implement an adaptive management program to evaluate fishery conservation measures.
- Continue population monitoring and research on the key threats potentially impeding sea lion recovery.

The first two actions are concerned with fishery management but would rely heavily on SSL field research to monitor the spatial/temporal effects of the fisheries. The last action effectively describes the overall objective of most current SSL research. The Draft Recovery Plan refines these and other conservation objectives into a series of recommended actions that are all directly or indirectly dependent on SSL research.

1. Baseline Population Monitoring
   - 1.1 Continue to estimate population-trends for pups and non-pups.
   - 1.2 Estimate vital rates.
   - 1.3 Monitor health, body condition, and reproductive status.
   - 1.4 Develop and implement live capture methods and non-lethal sampling techniques.
   - 1.5 Develop an implementation plan (for research).
2. Insure Adequate Habitat and Range for Recovery
   - 2.1 Maintain, and modify as needed, critical habitat designations.
   - 2.2 Redefine and catalog rookery and haulout sites and ensure their protection.
   - 2.3 Estimate prey consumption and essential characteristics of marine habitat.
   - 2.4 Determine the environmental factors influencing sea lion foraging and survival.
   - 2.5 Investigate sea lion bioenergetics.
   - 2.6 Assess and protect important prey resources for sea lions.
3. Protect from Over-Utilization for Commercial, Recreational, Scientific, or Educational Purposes
   - 3.1 Minimize threat of incidental take in fisheries.
   - 3.2 Minimize threat of intentional killing in fisheries.
   - 3.3 Minimize frequency and severity of sea lion-human interactions in ports and harbors.
   - 3.4 Minimize take by recreational and commercial viewing operations.
   - 3.5 Evaluate and reduce the direct and indirect impacts of research activities.
4. Protect from Diseases, Contaminants, and Predation
   - 4.1 Protect Steller sea lions from disease.
   - 4.2 Protect sea lions from contaminants.
   - 4.3 Predation.
5. Protect from Other Natural or Manmade Factors and Administer the Recovery Program
   - 5.1 Reduce damage to sea lions and their habitat from discharges of pollutants by developing preventive measures.

5.2 Reduce the potential for sea lion entanglement by improving and continuing programs aimed at reducing marine debris.
5.3 Monitor causes of sea lion mortality and use data to direct management actions.
5.4 Effectively administer the Steller sea lion recovery program by continuing to provide a recovery coordinator staff position.
5.5 Improve sea lion conservation by consulting with the State of Alaska on actions that are likely to adversely impact Steller sea lions.
5.6 Conduct an effective outreach program to inform the public about Steller sea lion biology, habitat utilization, and conservation issues.
5.7 Co-manage Steller sea lion subsistence harvests in Alaska by developing co-management agreements as appropriate with Alaska tribes and tribally authorized Alaska Native Organizations (ANOs).
5.8 Improve the effectiveness of research for Steller sea lion recovery by instituting a “fast track” process for expediting NMFS research permits for Steller sea lions.

Regarding the eastern population of SSLs, the Draft Recovery Plan recommended the initiation of a status review to consider removing the eastern DPS from the ESA’s List of Threatened and Endangered Wildlife. Given the long-term increasing population-trend and lack of significant conservation threats, the Draft Recovery Plan concludes the primary recovery goal is to develop a post-delisting monitoring plan to ensure that re-listing is not necessary after removal. Key components of this plan relative to research activities have not been prioritized in the Draft Recovery Plan, but would be likely to include population-trend monitoring, genetics research to refine population structure, monitoring terrestrial habitat threats, monitoring for unusual mortality events that may be related to contaminants or other human factors, and monitoring fisheries management plans to ensure that these remain consistent with SSL requirements.

4.8.1.1 Western DPS - Direct and Indirect Effects of Alternative 1 – No Action: No New Permits or Authorizations

<u>Direct and Indirect Mortality Due to Research</u>

There would be no research activities that would affect SSLs in the wild under this alternative; therefore, there would be no mechanism for research-related injury or mortality.

<u>Sub-Lethal Effects Due to Research</u>

There would be no mechanism for research-related injury under this alternative; therefore, there would be no sub-lethal effects on SSLs.

<u>Contribution to Conservation Objectives</u>

Although no research involving interactions with live SSLs in the wild would occur under this alternative, research on captive animals and surrogate species could continue, as could any remote monitoring, observations, and censusing conducted far enough away from SSLs to avoid take. In addition, analyses of data and tissue samples that have already been collected could continue. Research not directed at SSLs, but related to investigating the causes of decline or failure to recover, such as oceanographic studies, could continue under this alternative.

Considering the volume of research that has been conducted on SSLs in the past, there could be a number of new analyses and syntheses conducted from existing data and samples that could address some conservation objectives from the Recovery Plan. However, the usefulness of existing data would be likely to decrease over time as environmental conditions and the status of the population changes.

Past research on SSLs has been used to establish critical habitat boundaries, regulations about what types of activities would be allowed inside critical habitat, and a complex system of fisheries management regulations designed to mitigate potentially adverse effects on SSLs. Under Alternative 1, the level of scientific uncertainty regarding the efficacy of these critical habitat and fishery regulations would likely increase over time as the original data become outdated. Decisions about whether or how to modify regulations to either improve conservation of the species or ease the regulatory burden on the fishing industry would therefore have to rely more on data from other scientific studies and disciplines, including oceanographic and climatological studies, and research on other marine species in the ecosystem.

Conclusion for Conservation Objectives

Research conducted under Alternative 1 could provide a limited amount of information and is therefore considered to have a minor effect in support of the Recovery Plan conservation objectives. It is not clear whether researchers could develop techniques that would provide data comparable to previous census data or make observations in enough areas without causing takes of SSLs to collect information useful for other management decisions. Research conducted under Alternative 1 is unlikely to contribute useful data other than in very limited locations and times.

4.8.1.2 Western DPS - Direct and Indirect Effects of Alternative 2 – Research Program without Capture or Handling

All research activities authorized under Alternative 2 would meet the statutory and regulatory requirements of the permit process (see Section 3.7.1), including criteria for experienced research personnel, the use of "humane" procedures to minimize pain and suffering, and implementation of permit conditions to mitigate potentially adverse effects. The resulting research program is therefore assumed to be conducted under conditions that minimize disturbance and the chance of harm to the animals. The following assessment provides an estimate of the effects for the scope of research defined under Alternative 2. As described earlier, the mortality estimates are reported with fractions of mortalities as a result of the risk assessment methodology used. This is not meant to suggest that animals would only partly die. The reader may prefer to round these fractions to the nearest whole number but the estimates are intended to reflect probabilities that may occur over time and as a result of many different animals being exposed to the same type of activity or disturbance.

Direct and Indirect Mortality Due to Research

The potential mechanisms for injury and mortality are described in Section 4.8.1.1 and Appendix B. It is important to note here a distinction between "cause and effect" relationships and "effects" as defined under NEPA. Research can cause injury and mortality directly and indirectly. As stated in Section 4.1, under NEPA "direct effects" are those that occur at the same time and place as the action, whereas "indirect effects" are those that occur at times or places removed from the action. Thus, for the purpose of this analysis, direct effects are those injuries and mortalities occurring while the researchers are present (i.e., at the time of the action). We assume that all of these "direct" mortalities are observed by the researchers. Indirect effects are those injuries and mortalities occurring after researchers have left (removed in time from the action) or the animals have left the site (removed in place from the action). We assume that all of these "indirect" mortalities are unobserved by the researchers. However, this distinction in no way diminishes the "cause and effect" relationship between the research activity and the mortality. The mortality assessment tables estimate mortality due to research regardless of when or where it takes place and the following discussion addresses the combined direct and indirect effects of mortality.

Under this alternative, authorized research could include aerial surveys, vessel surveys, land surveys, scat collection from haulouts or rookeries during the non-breeding-season, as well as other activities that do not involve the capture or handling of animals or the presence of researchers on rookeries during the breeding season. The estimated number of takes and mortality assessments for these activities are described in Tables 4.8-1 and 4.8-2 below.

The estimated total direct and indirect mortality from *Researcher Presence in View of Animals* is 0.9 SSLs per year from the western DPS (Table 4.8-1). Most of this estimated mortality is due to disturbance from aerial surveys (0.8 animals per year). The estimated total direct and indirect mortality from *Researcher Presence Among Animals* is 2.5 SSLs per year from the western DPS (Table 4.8-2).

Conclusion for Mortality Effects

The combined estimated direct and indirect mortality from research under Alternative 2 is therefore 3.4 SSLs per year from the western DPS, which is 1.5 percent of PBR for this population (234 animals). The magnitude and intensity of the effects from mortality is therefore considered negligible at the population-level (see Table 4.4-1 for the impact criteria, and Section 2.5 for a description of PBR as a metric for population-level effects). While the intensity of the predicted mortality would be negligible, the research would be conducted across the geographic range of the population, and the effects would be distributed across the population. Disturbance effects are considered likely given current research techniques, but would only affect individual animals intermittently or infrequently and are therefore considered to be minor in duration.

Table 4.8-1
Estimated Mortality Due to Researcher Presence in View of Animals. SSL Western DPS - Alternative 2

Activity	Age class	Animals potentially exposed	Type of effect	Estimated proportion of animals affected	Predicted number of animals affected	Estimated mortality rate per affected animal[1]	Predicted mortalities (number of animals)	Mortality subtotal for activity
Aerial survey[2]	pups	10,000	Observed mortality during activity			0	0.0	
			Alert	0.05	500	0.0	0.0	
			Enter water	0	0	0.001	0.0	
			Injured during disturbance	0.001	10	0.05	0.5	
	adults and juveniles (non-pups)	98,250	Observed mortality during activity			0	0.0	
			Alert response	0.05	4,913	0.0	0.0	
			Enter water	0.01	983	0.0001	0.098	
			Injured during disturbance	0.0001	9.8	0.02	0.197	0.8
Vessel surveys[3]	pups	0	Observed mortality during activity			0	0.0	
			Alert response	1	0	0.0	0.0	
			Enter water	0	0	0.001	0	
			Injured during disturbance	0.01	0	0.05	0.00	
	non-pups (breeding season)	0	Observed mortality during activity			0	0.0	
			Alert response	1	0	0.0	0.0	
			Enter water	0.1	0	0.0001	0.0	
			Injury during disturbance	0.0001	0	0.02	0.0	0.0
	non-pups (non-breeding season)	2200	Observed mortality during activity			0	0.0	
			Alert response	1	110	0.0	0.0	
			Enter water	0.3	660	0.0001	0.07	
			Injury during disturbance	0.0001	0.2	0.02	0.004	0.1
On land[2]	pups	0	Observed mortality during activity			0	0.0	
			Alert response	0.05	0	0.0	0.0	
			Enter water	0	0	0.001	0.0	
			Injured during disturbance	0.001	0	0.05	0	
	non-pups	0	Observed mortality during activity			0	0.0	
			Alert response	0.05	0	0.0	0.0	
			Enter water	0.01	0	0.0001	0	
			Injured during disturbance	0.0001	0	0.02	0	0.0
Subtotal for estimated mortality due to researcher presence in view of animals								**0.9**

Notes: [1]Mortality rates associated with alert, enter water, and injured reactions account for unobserved or subsequent mortalities attributable to the activity.
[2]Estimate based on the number of animals expected to be present during survey.
[3]Estimate based on the number of animals expected to react to researcher presence.

Table 4.8-2
Estimated Mortality Due to Researcher Presence Among Animals. SSL Western DPS Alternative 2

Activity	Age class	Animals exposed[2]	Type of effect	Estimated proportion of animals affected	Predicted number of animals affected	Estimated mortality rate per affected animal[1]	Predicted mortalities (number of animals)	Mortality subtotal for activity
Haul-outs, rookeries non-breeding (scat collection, re-sights, ground counts)	All	27,000	Observed mortality during activity			0	0.0	
			Alert response	1	27,000	0.0	0.0	
			Enter water	0.9	24,300	0.0001	2.4	
			Injured during disturbance	0.0001	2.7	0.02	0.1	
Subtotal for estimated mortality due to researcher presence among animals								**2.5**

Notes: [1]Mortality rates associated with alert, enter water, and injured reactions account for unobserved or subsequent mortalities attributable to the activity.
[2]Estimate based on the number of animals expected to react to researcher presence.

Direct and Indirect Sub-Lethal Effects Due to Research

The estimated scope of research conducted under Alternative 2 could potentially affect, most if not all, animals in the population through disturbance from aerial surveys and other activities. The mortality assessment tables indicate that a small percentage of animals could die as a result of entering the water and/or being injured during a research-related disturbance. Most animals that are exposed to research activities do not die as a result; however, they may experience other effects ranging in intensity from a temporary alteration of their normal behavior to a reduction in foraging efficiency due to a painful injury or, at the extreme, to reproductive failure. The mechanisms for this range of potential sub-lethal effects are described in Section 4.8.1 and Appendix B.

Although research-related injuries under Alternative 2 could cause more than momentary pain or discomfort for individual animals, the focus of the analysis is how those injuries might contribute to a population-level effect. Not all sex/age classes are equally susceptible to sub-lethal effects that could alter the productivity of the population. Mature bulls that sustain a substantial injury may have difficulty establishing or reestablishing their breeding territory and could therefore lose potential mates. Although this would reduce individual reproductive success, one or more other bulls would be likely to take their places. All breeding females would still find mates, and the overall productivity of the rookery would remain unchanged. Pups and juveniles that are injured but do not die are likely to recover well before they approach reproductive-age (i.e., 4-5 years for females and 8-9 years for males). Their future survival and reproductive success is therefore much more likely to be determined by the many environmental variables that affect foraging success and growth rate, such as the abundance and distribution of forage fish and changes in ocean regimes.

The sex/age class most susceptible to effects that might decrease overall productivity is breeding-age females. Research-related disturbance could cause a lactating female to abandon her pup or disrupt her normal maternal care to the point that the pup dies. This loss of a pup is considered under the mortality assessment tables. However, a potential mechanism for sub-lethal effects on reproduction in breeding-age females not considered under the mortality assessment tables, is through physiological reactions to stress that cause reabsorption or abortion of fetuses or failure of fertilized embryos to implant. A female that reacts in any of these ways would lose the opportunity to raise a pup the following summer, but not necessarily in subsequent seasons. If these types of injuries occur to a relatively large number of females each year, overall pup production would decrease and hinder population recovery. The relevant question for the analysis is how many breeding-age females are likely to be affected each year to the extent that they fail to reproduce as a result of research activities.

Table 4.8-1 indicates that there would be an estimated 10 non-pups injured each year during aerial surveys, with approximately 980 non-pups entering the water. About 660 non-pups per year are predicted to enter the water during vessel surveys, with less than one injury during the disturbances. Table 4.8-2 indicates that about 24,300 animals per year would be predicted to enter the water during scat collection and other non-breeding-season activities, with three non-pups being injured during the disturbances. The mortality tables estimate that about three non-pups would be expected to die each year as a result of this level of disturbance. Unfortunately, we cannot make an equivalent estimate for how many failed pregnancies this level of disturbance would be likely to cause due to several factors:

- Uncertainty about what proportion of these disturbed animals would be reproductive-age females or gestating females.
- Uncertainty about the proportions of animals that are likely to respond in different ways.
- Uncertainty about the mechanisms of effect, particularly prior to implantation, which is several months after mating.
- Uncertainty about the environmental conditions that would strongly influence the ultimate effect on the individual.

Conclusion for Sub-lethal Effects

The magnitude of sub-lethal effects as they relate to population-level changes in productivity under Alternative 2 is unknown. The geographic extent of the research under Alternative 2 is likely to distribute sub-lethal effects across the range of the population. Disturbance effects are considered likely given current research techniques, but they would only affect individual animals intermittently or infrequently and are therefore considered to be minor in duration.

Contribution to Conservation Objectives

The non-intrusive research activities that could be authorized under Alternative 2 could contribute to some of the Draft Recovery Plan objectives. Aerial, vessel, and land-based surveys could be used to support all of the objectives listed under Recovery Plan Action 1, "Baseline Population Monitoring," except for 1.4 – develop capture methods and non-lethal sampling techniques. The ability to track population-trends for pups and non-pups would be consistent with past efforts. Information on vital rates could be collected through resighting of previously branded animals. However, the efficacy of these efforts would decline over time as the number of branded animals declined through mortality. Vital rate information derived from past brand/resight data and new observations would gradually become outdated. Health and body condition monitoring would be limited to visual assessments and scat analysis. Development of an implementation plan for an overall research program could take place under Alternative 2.

Past research on SSLs has been used to catalog important rookery and haulout sites, establish critical habitat boundaries, regulate what types of activities would be allowed inside critical habitat, and to develop a complex system of fishery management regulations designed to mitigate potentially adverse effects on SSLs. Under Alternative 2, the objectives listed under Recovery Plan Action 2, "Insure Adequate Habitat and Range for Recovery," would mostly be supported by data that have already been collected rather than by new field work. The level of scientific uncertainty regarding the efficacy of critical habitat and fishery regulations would be likely to increase over time as the original data become outdated. Efforts to modify the regulations to either improve conservation of the species or to ease the regulatory burden on the fishing industry would therefore have to rely more on data from other scientific studies and disciplines, including oceanographic and climatological studies, and research on other marine species in the ecosystem.

Most of the objectives under Recovery Plan Action 3, "Protect from Over-Utilization for Commercial, Recreational, Scientific, or Educational Purposes," are related to management regulations on fisheries and tourism operations and are not directly related to research on the species. The exception is Objective 3.5 – Evaluate and reduce the direct and indirect impacts of research activities, which is addressed in part through this EIS and the construction of Alternative 2 to eliminate the risk of capture and handling procedures.

Research under Alternative 2 would provide only limited support for the objectives under Recovery Plan Action 4, "Protect from Diseases, Contaminants, and Predation." While work on killer whales could proceed at a high level without intrusive work on SSLs, the ability of researchers to monitor disease and contaminant levels in SSLs would be limited to assays from found carcasses, tissue samples donated by subsistence hunters, and scat and fur samples collected from haulouts. Currently this type of work is reinforced and supplemented by histological and physiological research on captured animals that would not be possible under Alternative 2.

The objectives under Recovery Plan Action 5, "Protect from Other Natural or Manmade Factors and Administer the Recovery Program," are primarily related to management and administrative functions that are not directly dependent on new field research on SSLs. These objectives could be sufficiently supported by research under Alternative 2.

Conclusion for Conservation Objectives

Research conducted under Alternative 2 could provide information to support many of the conservation objectives listed in the Recovery Plan and the effect is therefore considered to be moderate in magnitude. Research conducted under Alternative 2 would be likely to address conservation issues across the range of the population, and to address both long-term and immediate information needs.

4.8.1.3 Western DPS - Direct and Indirect Effects of Alternative 3 – Status Quo Research Program

All research activities authorized under Alternative 3 would meet the statutory and regulatory requirements of the permit process, including criteria for experienced research personnel, the use of "humane" procedures to minimize pain and suffering, and implementation of permit conditions to mitigate potentially adverse effects. The resulting research program is therefore assumed to be conducted under conditions that would minimize disturbance and the chance of harm to the animals. The following assessment provides an estimate of the effects for the scope of research defined under Alternative 3. As described earlier, the mortality estimates are reported with fractions of mortalities as a result of the risk assessment methodology used. This is not meant to suggest that animals would only partly die. The reader may prefer to round these fractions to the nearest whole number but the estimates are intended to reflect probabilities that may occur over time and as a result of many different animals being exposed to the same type of activity or disturbance.

Direct and Indirect Mortality Due to Research

The potential mechanisms for injury and mortality that result from a variety of research activities are described in Section 4.8.1.1 and Appendix B. The mortality assessment tables estimate mortality due to research regardless of when or where it takes place, and the following discussion addresses the combined direct and indirect effects of mortality.

Under this alternative, authorized research could include:

- Activities with *Researchers in View of Animals* (Table 4.8-3 – aerial, vessel, and land surveys).
- Activities with *Researcher Presence Among Animals* (Table 4.8-4 – on rookeries and haulouts for ground counts, scat collection, captures).
- *Capture and Restraint activities* (Table 4.8-5 – various sex/age classes by various physical and chemical methods).
- *Handling and Sampling Procedures* on animals in the wild (Table 4.8-6 – various procedures, primarily on captured animals, plus remote sampling).
- *Capture, Temporary Captivity, and Release* back into the wild (Table 4.8-7 – non-pups taken to approved facilities for up to three months).

Each table lists the number of takes, estimated injuries, and estimated mortalities of western DPS SSLs for the given activities under Alternative 3, the Status Quo conditions.

The estimated total direct and indirect mortality from *Researcher Presence in View of Animals* is 0.9 SSLs per year (Table 4.8-3). Most of this estimated mortality is due to disturbance from aerial surveys (0.8 animals per year). The number of takes under aerial surveys is several times the total number of animals in this population. This reflects the fact that some existing permits authorize researchers to conduct more than one aerial survey per year for scientific purposes and each animal has the potential to be exposed to research disturbance more than once per year. In some cases, multi-year permits specify a greater survey effort in some years than others, corresponding to a larger number of takes. The numbers of takes used in the tables are the largest number of takes for any given year during the permit period; therefore the number of takes is a "maximum" value for the set of permits considered. This maximum effort, and therefore maximum estimated mortality risk, would only pertain to one or two years within the five-year permit period.

The estimated total direct and indirect mortality from *Researcher Presence Among Animals* is 5.8 SSLs per year (Table 4.8-4). The majority of this estimated mortality (3.4 animals per year) would be from non-pups that entered the water during ground counts, scat collection, and brand resight efforts on haulouts and rookeries during the non-breeding-season. The next highest estimated mortality (1.6 animals per year) would be from non-pups entering the water during ground counts, scat collection, and capture activities on rookeries during the breeding season. As described for aerial surveys, the number of takes in this table is greater than the number of animals in the population and reflects the authorization of multiple visits to the same rookeries/haulouts within a year. Under the Status Quo permits, takes by disturbance incidental to a variety of research activities are grouped into a general "incidental disturbance during research activities" category. Thus, Table 4.8-4 does not distinguish among takes for some activities such as roundups of pups for branding, disturbance during scat collection, disturbance of not-target animals during capture activities, etc.

The estimated total direct and indirect mortality from *Capture and Restraint activities* is 5.6 SSLs per year out of the total capture effort of 1,260 pups and 1,165 non-pups (Table 4.8-5). As with other activities, some permits authorize different numbers of captures in different years. The numbers of takes used in the table are the maximum authorized in any given year and therefore represent the maximum estimated mortality risk under the Status Quo permits. The majority of these estimated mortalities (4.9 animals per year) would result from capture and use of an inhalable anesthesia (e.g., isoflurane), with most of those estimated mortalities involving non-pups (4.3 animals per year) rather than pups (0.6 animals per year). Most of the remaining estimated mortality (0.7 animals per year) would be from pups captured with physical restraint methods.

The estimated total direct and indirect mortality from *Handling and Sampling Procedures* on animals in the wild is 2.4 SSLs per year (Table 4.8-6). This estimate does not include the risks associated with capture and restraint of the animals, calculated separately above, and therefore represents the estimated additional mortality from the handling and sampling procedures themselves. The total number of takes (expressed in units of "procedure-animals" in the table) is greater than the number of animals captured because many captured animals are subject to multiple procedures. Captured pups and non-pups are often subjected to various combinations of procedures to address the specific scientific objectives of one or more research programs. Not all captured animals are hot-branded and hot-brands are applied only once per animal in its lifetime. Under the Status Quo alternative, 400 of the 1,260 pups captured would be hot-branded. In addition, those 1,260 captured pups are subject to an average of 3.1 relatively low-risk procedures and 0.6 relatively medium-risk procedures each. Out of the 1,165 non-pups that would be captured per year by various means, 180 would be branded. In addition, those 1,165 non-pups would be subject to an average of 5.5 relatively low-risk procedures and 1.6 relatively medium-risk procedures each. The largest contribution to the estimated mortality in Table 4.8-6 is from relatively low-risk procedures (0.6 non-pups and 0.4 pups per year) due to the large numbers of these procedures that are authorized. Hot-branding contributes an estimated 0.8 mortalities per year, essentially all of which would be pups. Relatively medium-risk procedures account for about 0.5 mortalities per year (0.4 non-pups and 0.1 pups per year).

The estimated total direct and indirect mortality from *Capture, Temporary Captivity, and Release* back into the wild is 0.1 SSLs per year out of 16 taken per year in the existing program (Table 4.8-7). The estimated mortality risk is primarily associated with the numerous procedures done on each animal. However, these animals are monitored constantly throughout these procedures by experienced veterinarians and marine mammal experts. This estimated risk of mortality therefore likely represents a "worst-case scenario."

<u>Conclusion for Mortality Effects</u>

The combined estimated direct and indirect mortality from research under Alternative 3 is 14.8 SSLs per year from the western DPS, which is 6.3 percent of PBR for this population (234 animals). The magnitude and intensity of the effects from mortality is therefore considered negligible on the population-level (see Table 4.4-1 for the impact criteria and Section 2.5 for a description of PBR as a metric for population-level effects). While the intensity of the predicted mortality would be negligible, the research would be conducted across the geographic range of the population, and the effects would be distributed across the population. Disturbance effects that lead to mortality are considered likely given current research techniques. Although each exposure may be brief, individual animals could be affected by different research activities more than four times per year; they are therefore considered to be moderate in frequency.

Table 4.8-3
Estimated Mortality Due to Researcher Presence in View of Animals. SSL Western DPS - Alternative 3

Activity	Age class	Animals potentially exposed	Type of effect	Estimated proportion of animals affected	Predicted number of animals affected	Estimated mortality rate per affected animal[1]	Predicted mortalities (number of animals)	Mortality subtotal for activity
Aerial survey[2]	pups	10,000	Observed mortality during activity			0	0.0	
			Alert	0.05	500	0.0	0.0	
			Enter water	0	0	0.001	0.0	
			Injured during disturbance	0.001	10	0.05	0.5	
	adults and juveniles (non-pups)	98,250	Observed mortality during activity			0	0.0	
			Alert response	0.05	4,913	0.0	0.0	
			Enter water	0.01	983	0.0001	0.10	
			Injured during disturbance	0.0001	9.8	0.02	0.20	0.8
Vessel surveys[3]	pups	0	Observed mortality during activity			0	0.0	
			Alert response	1	0	0.0	0.0	
			Enter water	0	0	0.001	0	
			Injured during disturbance	0.01	0	0.05	0.00	
	non-pups (breeding season)	0	Observed mortality during activity			0	0.0	
			Alert response	1	0	0.0	0.0	
			Enter water	0.1	0	0.0001	0.0	
			Injury during disturbance	0.0001	0	0.02	0.00	
	non-pups (non-breeding season)	2,200	Observed mortality during activity			0	0.0	
			Alert response	1	110	0.0	0.0	
			Enter water	0.3	660	0.0001	0.07	
			Injury during disturbance	0.0001	0.2	0.02	0.004	0.1
On land[2]	pups	0	Observed mortality during activity			0	0.0	
			Alert response	0.05	0	0.0	0.0	
			Enter water	0	0	0.001	0.0	
			Injured during disturbance	0.001	0	0.05	0	
	non-pups	0	Observed mortality during activity			0	0.0	
			Alert response	0.05	0	0.0	0.0	
			Enter water	0.01	0	0.0001	0	
			Injured during disturbance	0.0001	0	0.02	0	0.0
Subtotal for estimated mortality due to researcher presence in view of animals								**0.9**

Notes: [1]Mortality rates associated with alert, enter water, and injured reactions account for unobserved or subsequent mortalities attributable to the activity.
[2]Estimate based on the number of animals expected to be present during survey.
[3]Estimate based on the number of animals expected to react to researcher presence.

Table 4.8-4
Estimated Mortality Due to Researcher Presence among Animals. SSL Western DPS - Alternative 3

Activity	Age class	Animals exposed[3]	Type of effect	Estimated proportion of animals affected	Predicted number of animals affected	Estimated mortality rate per affected animal[1]	Predicted mortalities (number of animals)	Mortality subtotal for activity
On rookeries during breeding season[4] (ground counts, scats, captures)	pups	6,000	Observed mortality during activity			0.0	0.0	
			Alert response	1	6,000	0.0	0.0	
			Enter water	0.01	60	0.001	0.06	
			Injured during disturbance	0.001	6	0.05	0.3	
Roundups for branding[2]		400	Observed mortality during activity	1	400	0.001	0.4	0.8
On rookeries during breeding season[4] (ground counts, scats, captures)	adults and juveniles (non-pups)	18,000	Observed mortality during activity			0.0	0.0	
			Alert response	1	18,000	0.0	0.0	
			Enter water	0.9	16,200	0.0001	1.6	
			Injured during disturbance	0.0001	1.8	0.02	0.04	1.6
On haulouts or rookeries during non-breeding season (scats, resights, captures)	pups	0	Observed mortality during activity			0.0	0.0	
			Alert response	1	0	0.0	0.0	
			Enter water	0.9	0	0.0001	0.0	
			Injured during disturbance	0.0001	0	0.02	0.0	
	non-pups	37,000	Observed mortality during activity			0.0	0.0	
			Alert response	1	37,000	0.0	0.0	
			Enter water	0.9	33,300	0.0001	3.3	
			Injured during disturbance	0.0001	3.7	0.02	0.07	3.4
Subtotal for estimated mortality due to researcher presence among animals								**5.8**

Notes: [1]Mortality rates associated with alert, enter water, and injured reactions account for unobserved or subsequent mortalities attributable to the activity.
[2]Number exposed are based on numbers of pups handled or branded, and are a subset of the number exposed to the activity.
[3]Estimate based on the number of animals expected to react to researcher presence.
[4]Breeding season is June/and July.

Table 4.8-5
Estimated Mortality Due to Capture and Restraint Activities. SSL Western DPS - Alternative 3

Activity	Age class	Number of animals captured	When mortality occurs	Estimated mortality rate per affected animal[1]	Predicted mortalities (number of animals)	Mortality subtotal for activity
Capture/physical restraint	pups	700	Observed during activity	0	0	
			Unobserved/post-capture	0.001	0.7	
	adults and juveniles (non-pups)	0	Observed during activity	0.002	0	
			Unobserved/post-capture	0.0001	00	0.7
Capture/chemical anesthesia (inhalable agent-isoflurane)	pups	560	Observed during activity	0	0	
			Unobserved/post-capture	0.001	0.56	
	non-pups	1,060	Observed during activity	0.004	4.24	
			Unobserved/post-capture	0.0001	0.106	4.9
Capture/chemical anesthesia (injectable)	non-pups	0	Observed during activity	0.034	0	
			Unobserved/post-capture	0.011	0	0
Capture/chemical sedation (injectable-eg valium)	non-pups	105	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0.01	0.0
Intentional lethal take or permanent removal	pups	0	Observed during activity	1	0	
	non-pups	0	Unobserved/post-capture	1	0	0
Subtotal for estimated mortality due to capture and restraint activities						**5.6**

Notes: [1] Mortality rates associated with alert, enter water, and injured reactions account for unobserved or subsequent mortalities attributable to the activity.

Table 4.8-6
Estimated Mortality Due to Handling and Sampling Procedures. SSL Western DPS - Alternative 3

Activity	Age class	Number of procedure-animals	When mortality occurs	Estimated mortality rate per procedure	Predicted mortalities (number of animals)	Mortality subtotal for activity
Permanent mark/hot-branding	pups	400	Observed during activity	0	0	
			Unobserved/post-capture	0.002	0.8	
	adults and juveniles (non-pups)	180	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0.018	0.8
Relatively low risk procedures	pups	3,860	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0.386	
	non-pups	6,433	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0.643	1.0
Relatively medium risk procedures	pups	695	Observed during activity	0	0	
			Unobserved/post-capture	0.0002	0.139	
	non-pups	1,918	Observed during activity	0	0	
			Unobserved/post-capture	0.0002	0.384	0.5
Relatively high risk procedures	pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.001	0	
	non-pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.001	0	0.0
Subtotal for estimated mortality due to handling and sampling procedures						**2.4**

Notes: Low risk - blood/flipper tag/whisker pull/isotopes/eb/BIA/injections/ultrasound/external instruments/enemas/stomach intubate/fecal loop/stomach pill telemeters/metabolic chamber
Medium risk - teeth pull/biopsies/remote biopsies/(includes local anesthesia)
High risk - implant transmitters, surgeries
No risk - swabs/hair or nail clipping, temp marks, morph measurements, milk sample, external physical exam

Table 4.8-7
Estimated Mortality Due to Temporary Captivity for Experimentation. SSL Western DPS - Alternative 3

Activity	Age class	Number of animals or procedure-animals	When mortality occurs	Estimated mortality rate per affected animal or procedure	Predicted mortalities (number of animals)	Mortality subtotal for activity
Capture, transport, holding, release	pups	0	Observed during activity			
			Unobserved/post-capture			
	non-pups	16	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0.0016	0.0
Chemical sedation (injectable-e.g., valium)	non-pups	208	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0.0208	0.0
Permanent mark/hot-branding	non-pups	16	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0.0016	0.0
Relatively low risk procedures	pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0	
	non-pups	1,104	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0.1104	0.1
Relatively medium risk procedures	pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.0002	0	
	non-pups	84	Observed during activity	0	0	
			Unobserved/post-capture	0.0002	0.0168	0.0
Relatively high risk procedures	pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.001	0	
	non-pups	16	Observed during activity	0	0	
			Unobserved/post-capture	0.001	0.016	0.0
Subtotal for estimated mortality due to temporary captivity for experimentation						**0.1**

Notes: Low risk - blood/flipper tag/whisker pull/isotopes/eb/BIA/injections/ultrasound/external instruments/enemas/stomach intubate/fecal loop/stomach pill telemeters/metabolic chamber
Medium risk - teeth pull/biopsies/remote biopsies/(includes local anesthesia)
High risk - implant transmitters, surgeries
No risk - swabs/hair or nail clipping, temp marks, morph measurements, milk sample, external physical exam

Sub-Lethal Effects Due to Research

The estimated scope of research conducted under Alternative 3 could potentially affect most, if not all, animals in the population through disturbance and capture/handling activities. The mortality assessment tables indicate that a small percentage of animals could die as a result of entering the water and/or being injured during a research-related disturbance. Most animals exposed to research activities do not die as a result; however, they may experience other effects, ranging in intensity from a temporary alteration of normal behavior to a reduction in foraging efficiency due to a painful injury or, at the extreme, to reproductive failure. The mechanisms for this range of potential sub-lethal effects are described in Section 4.8.1 and Appendix B.

As described under Alternative 2, sub-lethal effects could occur as a direct result of the research activity itself or indirectly due to other contributing factors, but this is difficult to determine as no specific studies on this topic have been conducted. Research activities could cause disturbance or injury to animals that could affect their ability to function normally. The consequences of such research-related effects will depend on a number of factors, including environmental conditions that change seasonally, among years, and among locations. While the effect of a disturbance or injury is difficult to predict because of the many complicating factors, the initial disturbance caused by research does play a role in the ultimate effect. Although research-related injuries under Alternative 3 could cause more than momentary pain or discomfort for individual animals, the focus of the analysis is how those injuries contribute to a population-level effect. The sex/age class most susceptible to effects that might decrease overall productivity of the population is breeding-age females, primarily through physiological reactions to stress that cause reabsorption or abortion of fetuses, or failure of fertilized embryos to implant. The relevant question for the analysis is how many breeding-age females are likely to be affected each year to the extent that they fail to reproduce as a result of research activities.

Table 4.8-3 indicates that there would be an estimated 10 non-pups injured each year during aerial surveys, with approximately 980 non-pups entering the water. About 660 non-pups are predicted to enter the water during vessel surveys, with less than one injury during the disturbances.

Table 4.8-4 indicates that research activities on rookeries during the breeding season could cause about 16,200 non-pups to enter the water and result in injury of about two animals. Research activities on rookeries during the non-breeding-season and on haulouts at any time could cause about 33,300 non-pups to enter the water and result in injury of about four animals.

The animals represented by the takes in Tables 4.8-3 through 4.8-7 are assumed to have responses to capture that are more stressful than entering the water, and they are all considered to have the potential for injury through several mechanisms. There are a total of 1,165 non-pup captures/recaptures authorized each year by various methods under Alternative 3. However, most of the animals involved are juveniles and sub-adults less than three years old. A total of 115 adult female captures are authorized. Considering authorized recaptures, these adult females account for 285 out of the 1,165 takes.

The combined mortality tables for Alternative 3 estimate that 14.8 animals per year would die as a result of research activities, including 11 non-pups per year. The research activities would create enough disturbance to cause about 58,000 non-pups to enter the water per year. Because this number of takes is more than the number of animals in the population, the average animal in the population could be chased into the water by research activities more than once per year. However, we cannot make an estimate for how many reproductive failures this level of disturbance would be likely to cause due to several factors:

- uncertainty about what proportion of these disturbed animals would be reproductive-age females or gestating females;
- uncertainty about the proportions of animals that are likely to respond in different ways;
- uncertainty about the mechanisms of effect; and

- uncertainty about the environmental conditions that could strongly influence the ultimate effect on the individual.

Conclusion for Sub-lethal Effects

The magnitude of sub-lethal effects as they relate to population-level changes in productivity under Alternative 3 is therefore unknown (see Table 4.4.1). The geographic extent of the research permitted under Alternative 3 includes the entire range of the population in the U.S. However, many permittees do not specify which specific rookeries/haulouts their research would affect until a month or two before they begin fieldwork. It is therefore not known at the time of permit issuance how permittees would distribute their activities within a large area. Activities could range from being widely dispersed across the range of the species to being concentrated in a few locations. Disturbance and sub-lethal effects are likely to occur, given the current understanding of how existing research techniques affect SSLs. Although each exposure may be brief, individual animals could be affected by different research activities more than four times per year. Disturbance from research activities is therefore considered to be moderate in frequency.

Contribution to Conservation Objectives

The range of research activities authorized under the Status Quo, Alternative 3, provides the means to address essentially all basic information needs about SSL that are identified in the Draft Recovery Plan. However, there are some sex/age classes underrepresented in the current data sets that address particular issues. Some of these data gaps are due to a lack of interest by researchers (i.e., behavior of mature males) and others are due to inadequate techniques for safely capturing and recapturing larger animals that researchers would like to study more closely (e.g., mature females). Although the following sub-objectives of the Draft Recovery Plan have been addressed to some extent, the limited ability of researchers to recapture specific reproductive females with currently authorized techniques has made it difficult to adequately address these:

- Develop methods and determine reproductive rates including pregnancy and parturition rates (objective 1.2.4).
- Examine the effects of season, age, and sex on body condition (objective 1.3.1).
- Deploy instruments to obtain fine scale data on sea lion foraging habitat (objective 2.3.3).
- Assess the relationships between oceanographic profiles or features and sea lion foraging ecology (objective 2.4.1).
- Determine the physiological diving capabilities and evaluate how this limits the ability to forage successfully (objective 2.5.1).
- Determine the energetic costs to foraging sea lions (objective 2.5.2).
- Develop an energetics model to investigate the interrelationships between prey availability and sea lion growth, condition, and vital rates (objective 2.5.4).

All basic objectives under the Action Plan are currently being addressed except for Objective 1.5 - develop an implementation plan. The intent of this objective is to develop a “comprehensive ecological and conceptual framework that integrates and further prioritizes the numerous recovery actions provided in this plan” (NMFS 2006a). There is currently no coordinated effort to develop an overall research plan that could be part of the recovery implementation plan for the species. Such an overall research plan could refine research priorities, determine an overall strategy for where, when, and how research efforts should be conducted, and specify how research results should be evaluated and used for management decisions. Developing an implementation plan could be pursued under this or any alternative.

Conclusion for Conservation Objectives

Research conducted under Alternative 3 could provide information to support all of the conservation objectives listed in the Recovery Plan, at least for some sex/age classes, and the effect is therefore considered to be major in magnitude. Research conducted under Alternative 3 would be likely to address conservation issues across the range of the population, and address both long-term and immediate information needs.

4.8.1.4 Western DPS - Direct and Indirect Effects of Alternative 4 – The Preferred Alternative – Research Program with Full Implementation of Conservation Goals

All research activities authorized under Alternative 4 would meet the statutory and regulatory requirements of the permit process, including criteria for experienced research personnel, the use of "humane" procedures to minimize pain and suffering, and implementation of permit conditions to mitigate potentially adverse effects. The resulting research program is therefore assumed to be conducted under conditions that minimize disturbance and the chance of harm to the animals. The following assessment provides an estimate of the effects for the scope of research defined under Alternative 4. As described earlier, the mortality estimates are reported with fractions of mortalities as a result of the risk assessment methodology used. This is not meant to suggest that animals would only partly die. The reader may prefer to round these fractions to the nearest whole number but the estimates are intended to reflect probabilities that may occur over time and as a result of many different animals being exposed to the same type of activity or disturbance.

Direct and Indirect Mortality Due to Research

The potential mechanisms for injury and mortality from a variety of research activities are described in Section 4.8.1.1 and Appendix B. The mortality assessment tables estimate mortality due to research regardless of when or where it takes place so the following discussion addresses the combined direct and indirect effects of mortality.

Under this alternative, authorized research could include:

- *Activities with Researcher Presence in View of Animals* (Table 4.8-8 - aerial, vessel, and land surveys).
- *Activities with Researcher Presence Among Animals* (Table 4.8-9 – on rookeries and haulouts for ground counts, scat collection, captures, etc.).
- *Capture and Restraint Activities* (Table 4.8-10 – various sex/age classes by various physical and chemical methods).
- *Handling and Sampling Procedures* on animals in the wild (Table 4.8-11 – various procedures, primarily on captured animals plus remote sampling).
- *Capture, Temporary Captivity, and Release* back into the wild (Table 4.8-12 – non-pups taken to approved facilities for up to three months).

Each table lists the number of takes, estimated injuries, and estimated mortalities for the given activities under Alternative 4 for the western DPS of SSLs.

The estimated total direct and indirect mortality from *Researcher Presence in View of Animals* is 4.1 SSLs per year (Table 4.8-8). Most of this estimated mortality (2.9 animals per year) is due to disturbance from vessel surveys. Under Alternative 4, vessel surveys are expected to expand from Status Quo conditions to accommodate an increased brand resight effort intended to improve vital rate models. Aerial surveys could expand to include a complete winter survey and could result in an estimated 0.9 mortalities per year. Land-based surveys could also expand under Alternative 4, but could account for less than one mortality per year. As was the case under Alternative 3, the number of takes that could be authorized per year is greater than the number of animals in the population, indicating that the average animal is likely to be exposed to research activities multiple times per year. Also, survey effort, and therefore the number of takes per year, is expected to vary among years under Alternative 4. The numbers used in the mortality tables represent a "maximum effort" year and therefore the maximum estimated mortality risk per year. Because each year within the five-year permit period may have varying levels of take (some years less than others), this maximum number of takes is not expected to occur every year within the permit period.

The estimated total direct and indirect mortality from *Researcher Presence Among Animals* is 9.8 SSLs per year (Table 4.8-9). Under Alternative 4, it is assumed that capture activities would increase for both pups and non-pups to support an expanded brand resight effort and other work. Scat collection efforts are also assumed to expand considerably, with monthly collection efforts in some locations. Ground count efforts are assumed to remain the same as under the Status Quo because these are considered adequate. The majority of the estimated mortality (6.8 animals per year) could result from non-pups entering the water during ground counts, scat collection, capture efforts, and brand resight efforts on haulouts and rookeries during the non-breeding-season. The next highest estimated mortality (1.8 animals per year) could result from non-pups entering the water during ground counts, scat collection, and capture activities on rookeries during the breeding season. The next highest estimated mortality (0.7 pups per year) could be expected during pup roundups for branding. These mortalities would be related to the pups piling on top of each other during the roundup with the potential for suffocation or drowning in pools, rather than the branding activity itself, which is calculated separately. As described for activities in Table 4.8-9, the number of takes in this table is greater than the number of animals in the population and reflects multiple visits to the same rookeries/haulouts per year, at least during some years of the five-year permit period.

The estimated total direct and indirect mortality from *Capture and Restraint activities* is 12.4 SSLs per year, out of the total capture effort of 1,560 pups and 1,285 non-pups per year (Table 4.8-10). This total includes five intentional lethal takes described below. As with other activities, capture efforts, and therefore the number of takes per year, are expected to vary between years under Alternative 4. The numbers used in the mortality tables represent a “maximum effort” year, and therefore the maximum estimated mortality risk per year, which may only pertain to a few years within the five-year permit period. The majority of estimated mortalities (5.3 animals per year) could result from capture and use of an inhalable anesthesia (e.g., isoflurane), with most of those estimated mortalities involving non-pups (4.4 animals per year) rather than pups (0.9 animals per year). The next highest estimated mortality (1.3 animals per year) could be from non-pups captured with injectable agents (darts). Most of the remaining estimated mortality (0.7 animals per year) could result from capture and physical restraint of pups.

Under Alternative 4, it is assumed that there would be an increased effort to capture and recapture breeding-age females in order to attach satellite transmitters and for other sampling/testing purposes. Current permits prohibit the use of the available injectable anesthetic (i.e., Telazol) on females potentially lactating or pregnant (essentially all mature females) due to concerns about potentially adverse effects of Telazol on fetal development and nursing pups. Because darting with Telazol is the most efficient means of capturing and recapturing specific large animals, this restriction limits the ability of researchers to work with breeding-age females. In order to expand research efforts with breeding-age females under Alternative 4, either studies would need to be conducted that demonstrated the safety of Telazol sufficient to allow its use, or new techniques/drugs would need to be developed for capture of this sex/age class. It is assumed that new, experimental drugs and procedures would be safety-tested and refined on surrogate species first (e.g., California sea lions or other non-ESA listed species) but that the new techniques would eventually be authorized for use on the western DPS SSLs. Permit conditions would contain mitigation measures to minimize the risk to individual animals, but the initial transition to use on SSLs could still be considered experimental and potentially lethal to a targeted female and her dependent pup. One way to conservatively estimate the risk of a potentially dangerous procedure in the mortality assessment tables is to assume that a new procedure will be lethal until the actual risk values are established by experience. Table 4.8-10 includes a small number of “intentional lethal takes” to illustrate the policy that intentional mortalities could be authorized under Alternative 4. The number of intentional mortalities under Alternative 4 has been set to five in this EIS assessment only as an example of how requests for intentional mortality (e.g., euthanasia of moribund animals) and/or potentially lethal experimental procedures (as described above) could be addressed in the risk assessment tables as part of an overall risk assessment for a given scope of research. It is important to note that, as is the case for all the other take numbers assessed under Alternative 4 for particular research activities, NMFS would be under no obligation to authorize five lethal takes or limit the number of lethal takes to five in the future. The numbers used in this assessment are proxies for the numbers and types of takes that researchers may request in permit applications in the future.

The estimated total direct and indirect mortality from *Handling and Sampling Procedures* on animals in the wild is 3.3 SSLs per year (Table 4.8-11). This estimate does not include the risks associated with *Capture and Restraint* of the animals, calculated separately, and therefore represents the estimated additional mortality from the handling and sampling procedures themselves. Under Alternative 4, it is assumed that there will be an increase in the number of pups and non-pups captured and an increase in the number of procedures done on captured individuals to address conservation objectives. As with Alternative 3, the total number of takes permitted for *Handling and Sampling Procedures* (expressed in units of "procedure-animals" in the table) would be greater than the number of animals captured because many captured animals are subject to multiple procedures. Under Alternative 4, 700 of the 1,560 pups captured per year would be hot-branded. In addition, those 1,560 captured pups would be subject to an average of 3.0 relatively low-risk procedures and 0.5 relatively medium-risk procedures. Out of the 1,285 non-pups that would be captured per year by various means, 300 would be hot-branded. In addition, those 1,285 non-pups would be subject to an average of 6.0 relatively low-risk procedures and 1.8 relatively medium-risk procedures each. The largest contribution to the estimated mortality in this table is from relatively low-risk procedures (0.8 non-pups and 0.5 pups per year). Hot-branding contributes an estimated 1.4 mortalities per year, essentially all pups. Relatively medium-risk procedures account for about 0.6 mortalities per year (0.5 non-pups and 0.2 pups per year). Under Alternative 4, it is assumed that 30 non-pups would be subject to relatively high-risk procedures, but this is expected to account for less than one mortality per year.

It is assumed that the number of animals taken into temporary captivity for experimentation would increase to 26 non-pups per year under Alternative 4. The estimated total direct and indirect mortality from *Capture, Temporary Captivity, and Release* is 0.2 SSLs per year (Table 4.8-12). The estimated mortality risk is primarily associated with the numerous procedures done on each animal. However, as under the Status Quo conditions, these animals would be monitored constantly throughout these procedures by experienced veterinarians and marine mammal experts, and this estimated risk of mortality likely represents a "worst-case scenario."

Conclusion for Mortality Effects

The combined estimated direct and indirect mortality from research under Alternative 4 is 29.8 SSLs per year from the western DPS, which is 12.7 percent of PBR for this population (234 animals). Based on the impact criteria presented in Table 4.4-1, the magnitude and intensity of the effects from mortality is therefore considered minor on the population level. The research would be conducted across the geographic range of the population. However, some of the specific rookeries/haulouts where research would take place each year under Alternative 4 would likely not be known until a month or two before fieldwork began (as under the Status Quo). It would therefore not be known at the time of permit issuance how permittees would distribute their activities within a large area. These could range from being widely dispersed across the range of the species to being concentrated in a few locations. Disturbance effects that lead to mortality are likely to occur given the current research techniques used. Although each exposure may be brief, individual animals could be affected by different research activities more than five or six times per year; thus disturbance effects are considered moderate in frequency.

Table 4.8-8
Estimated Mortality Due to Researcher Presence in View of Animals. SSL Western DPS Alternative 4

Activity	Age class	Animals potentially exposed	Type of effect	Estimated proportion of animals affected	Predicted number of animals affected	Estimated mortality rate per affected animal[1]	Predicted mortalities (number of animals)	Mortality subtotal for activity
Aerial survey[2]	pups	10,000	Observed mortality during activity			0	0.0	
			Alert	0.05	500	0.0	0.0	
			Enter water	0	0	0.001	0.0	
			Injured during disturbance	0.001	10	0.05	0.5	
	adults and juveniles (non-pups)	128,250	Observed mortality during activity			0	0.0	
			Alert response	0.05	6413	0.0	0.0	
			Enter water	0.01	1283	0.0001	0.128	
			Injured during disturbance	0.0001	12.8	0.02	0.257	0.9
Vessel surveys[3]	pups	5,000	Observed mortality during activity			0	0.0	
			Alert response	1	250	0.0	0.0	
			Enter water	0	0	0.001	0	
			Injured during disturbance	0.01	50	0.05	2.5	
	non-pups (breeding season)	7,500	Observed mortality during activity			0	0	
			Alert response	1	375	0	0	
			Enter water	0.1	750	0.0001	0.075	
			Injury during disturbance	0.0001	0.75	0.02	0.015	
	non-pups (non breeding season)	9,700	Observed mortality during activity			0	0.0	
			Alert response	1	485	0.0	0.0	
			Enter water	0.3	2,910	0.0001	0.29	
			Injury during disturbance	0.0001	1.0	0.02	0.02	2.9
On land[2]	pups	5,000	Observed mortality during activity			0	0.0	
			Alert response	0.05	250	0.0	0.0	
			Enter water	0	0	0.001	0.0	
			Injured during disturbance	0.001	5	0.05	0.25	
	non-pups	15,000	Observed mortality during activity			0	0.0	
			Alert response	0.05	750	0.0	0.0	
			Enter water	0.01	150	0.0001	0.015	
			Injured during disturbance	0.0001	1.5	0.02	0.03	0.3
Subtotal for Table 1 - Estimated mortality due to researcher presence in view of animals								**4.1**

Notes: [1]Mortality rates associated with alert, enter water, and injured reactions account for unobserved or subsequent mortalities attributable to the activity.
[2]Estimate based on the number of animals expected to be present during survey.
[3]Estimate based on the number of animals expected to react to researcher presence.

Table 4.8-9
Estimated Mortality Due to Researcher Presence among Animals. SSL Western DPS - Alternative 4

Activity	Age class	Animals exposed[3]	Type of effect	Estimated proportion of animals affected	Predicted number of animals affected	Estimated mortality rate per affected animal[1]	Predicted mortalities (number of animals)	Mortality subtotal for activity
On rookeries during breeding season[4] (ground counts, scats, captures)	pups	7,000	Observed mortality during activity			0.0	0.0	
			Alert response	1	7,000	0.0	0.0	
			Enter water	0.01	70	0.001	0.07	
			Injured during disturbance	0.001	7	0.05	0.4	
Roundups for branding[2]		700	Observed mortality during activity	1	700	0.001	0.7	1.2
On rookeries during breeding season[4] (ground counts, scats, captures)	adults and juveniles (non-pups)	20,000	Observed mortality during activity			0.0	0.0	
			Alert response	1	20,000	0.0	0.0	
			Enter water	0.9	18,000	0.0001	1.8	
			Injured during disturbance	0.0001	2	0.02	0.04	1.8
On haulouts or rookeries during non-breeding season (scats, resights, captures)	pups	0	Observed mortality during activity			0.0	0.0	
			Alert response	1	0	0.0	0.0	
			Enter water	0.9	0	0.0001	0.0	
			Injured during disturbance	0.0001	0	0.02	0.0	
	non-pups	74,000	Observed mortality during activity			0.0	0.0	
			Alert response	1	74,000	0.0	0.0	
			Enter water	0.9	66,600	0.0001	6.7	
			Injured during disturbance	0.0001	7.4	0.02	0.1	6.8
Subtotal for estimated mortality due to researcher presence among animals								**9.8**

Notes: [1]Mortality rates associated with alert, enter water, and injured reactions account for unobserved or subsequent mortalities attributable to the activity.
[2]Number exposed are based on numbers of pups handled or branded, and are a subset of the number exposed to the activity..
[3]Estimate based on the number of animals expected to react to researcher presence.
[4]Breeding season is June and/July.

Table 4.8-10
Estimated Mortality Due to Capture and Restraint Activities. SSL Western DPS Alternative 4

Activity	Age class	Number of animals captured	When mortality occurs	Estimated mortality rate per affected animal[1]	Predicted mortalities (number of animals)	Mortality subtotal for activity
Capture/physical restraint	pups	700	Observed during activity	0	0	
			Unobserved/post-capture	0.001	0.7	
	adults and juveniles (non-pups)	30	Observed during activity	0.002	0.06	
			Unobserved/post-capture	0.0001	0.003	0.8
Capture/chemical anesthesia (inhalable agent-isoflurane)	pups	860	Observed during activity	0	0	
			Unobserved/post-capture	0.001	0.86	
	non-pups	1,090	Observed during activity	0.004	4.36	
			Unobserved/post-capture	0.0001	0.109	5.3
Capture/chemical anesthesia (injectable)	non-pups	30	Observed during activity	0.034	1.02	
			Unobserved/post-capture	0.011	0.33	1.3
Capture/chemical sedation (injectable-eg valium)	non-pups	135	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0.014	0.0
Intentional lethal take or permanent removal	pups	0	Observed during activity	1	0	
	non-pups	5	Unobserved/post-capture	1	5	5
Subtotal for estimated mortality due to capture and restraint activities						**12.4**

Notes: [1]Mortality rates associated with alert, enter water, and injured reactions account for unobserved or subsequent mortalities attributable to the activity.

Table 4.8-11
Estimated Mortality Due to Handling and Sampling Procedures. SSL Western DPS Alternative 4

Activity	Age class	Number of procedure-animals	When mortality occurs	Estimated mortality rate per procedure	Predicted mortalities (number of animals)	Mortality subtotal for activity
Permanent mark/hot-branding	pups	700	Observed during activity	0	0	
			Unobserved/post-capture	0.002	1.4	
	adults and juveniles (non-pups)	300	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0.03	1.4
Relatively low risk procedures	pups	4,630	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0.463	
	non-pups	7,720	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0.772	1.2
Relatively medium risk procedures	pups	830	Observed during activity	0	0	
			Unobserved/post-capture	0.0002	0.166	
	non-pups	2,300	Observed during activity	0	0	
			Unobserved/post-capture	0.0002	0. 46	0.6
Relatively high risk procedures	pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.001	0	
	non-pups	30	Observed during activity	0	0	
			Unobserved/post-capture	0.001	0.03	0.0
Subtotal for estimated mortality due to handling and sampling procedures						**3.3**

Notes: Low risk - blood/flipper tag/whisker pull/isotopes/eb/BIA/injections/ultrasound/external instruments/enemas/stomach intubate/fecal loop/stomach pill telemeters/metabolic chamber
Medium risk - teeth pull/biopsies/remote biopsies/(includes local anesthesia)
High risk - implant transmitters, surgeries
No risk - swabs/hair or nail clipping, temp marks, morph measurements, milk sample, external physical exam

Table 4.8-12
Estimated Mortality Due to Temporary Captivity for Experimentation. SSL Western DPS Alternative 4

Activity	Age class	Number of animals or procedure-animals	When mortality occurs	Estimated mortality rate per affected animal or procedure	Predicted mortalities (number of animals)	Mortality subtotal for activity
Capture/transport/holding/release	pups	0	Observed during activity			
			Unobserved/post-capture			
	non-pups	26	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0.003	0.0
Chemical sedation (injectable-e.g., valium)	non-pups	338	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0.034	0.0
Permanent mark/hot-branding	non-pups	26	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0.003	0.0
Relatively low risk procedures	pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0	
	non-pups	1,794	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0.18	0.2
Relatively medium risk procedures	pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.0002	0	
	non-pups	136	Observed during activity	0	0	
			Unobserved/post-capture	0.0002	0.03	0.0
Relatively high risk procedures	pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.001	0	
	non-pups	26	Observed during activity	0	0	
			Unobserved/post-capture	0.001	0.03	0.0
Subtotal for estimated mortality due to temporary captivity for experimentation						

Notes: Low risk - blood/flipper tag/whisker pull/isotopes/eb/BIA/injections/ultrasound/external instruments/enemas/stomach intubate/fecal loop/stomach pill telemeters/metabolic chamber
Medium risk - teeth pull/biopsies/remote biopsies/(includes local anesthesia)
High risk - implant transmitters, surgeries
No risk - swabs/hair or nail clipping, temp marks, morph measurements, milk sample, external physical exam

0.2

Sub-Lethal Effects Due to Research

The estimated scope of research conducted under Alternative 4 could potentially affect all animals in the population through exposure to disturbance and capture/handling activities. The mortality assessment tables indicate that a small percentage of animals could die as a result of entering the water and/or being injured during research-related disturbance. Most animals exposed to research activities do not die as a result; however, they may experience other effects, ranging in intensity from a temporary alteration of normal behavior to a reduction in foraging efficiency due to a painful injury or, at the extreme, to reproductive failure. The mechanisms for this range of potential sub-lethal effects are described in Section 4.8.1 and Appendix B.

As described under Alternative 2, sub-lethal effects could occur as a direct result of the research activity itself or indirectly, due to other contributing factors; however, this is difficult to determine as no specific studies on this topic have been conducted. Research activities could cause disturbance of or injury to animals that could affect ability to function normally. The consequences of such research-related effects would depend on a number of factors including environmental conditions that vary seasonally, among years, and among locations. While the effect of a disturbance or injury is difficult to predict because of the many complicating factors, the initial disturbance caused by research does play a role in the ultimate effect. Although research-related injuries under Alternative 4 could cause more than momentary pain or discomfort for individual animals, the focus of the analysis is on how those injuries contribute to a population-level effect. The sex/age class most susceptible to effects that might decrease overall productivity of the population is breeding-age females, primarily through physiological stress reactions that cause reabsorption or abortion of fetuses, or failure of fertilized embryos to implant. The relevant question for the analysis is how many breeding-age females are likely to be affected each year to the extent that they fail to reproduce as a result of research activities.

Table 4.8-8 indicates that there would be an estimated 13 non-pups injured each year during aerial surveys, with approximately 1,280 non-pups entering the water each year. About 3,660 non-pups are predicted to enter the water each year during vessel surveys, with two non-pups injured during the disturbances. During land surveys, 150 non-pups are estimated to enter the water each year with two non-pups injured during the disturbances.

Table 4.8-9 indicates that research activities on rookeries during the breeding season would be predicted to cause about 18,000 non-pups to enter the water each year and to injure about two animals. Research activities on rookeries during the non-breeding-season and on haulouts at any time would be predicted to cause about 66,600 non-pups to enter the water each year and to injure about eight animals annually.

The animals represented by the takes in Tables 4.8-8 through 4.8-12 are assumed to have responses to capture that are more stressful than entering the water, and all are considered to have the potential for injury through several mechanisms. Under Alternative 4, a total of 1,285 non-pup captures/recaptures authorized each year by various methods is assumed. Under the Status Quo, most of the non-pups captured are juveniles and sub-adults less than three years old. While this is still likely to be true under Alternative 4, there would be an increased effort to capture breeding-age females to monitor their foraging behavior and for other purposes. It is therefore assumed that the non-pup captures under Alternative 4 would include up to 200 adult females. Considering authorized recaptures, these adult females would account for an estimated 400 out of the 1,285 takes.

The combined mortality tables for Alternative 4 estimate that 29.8 animals per year would die as a result of research activities, including 22 non-pups per year, and that the research activities would create enough disturbance to cause about 90,000 non-pups to enter the water each year. Because this number of permitted takes is more than the number of animals in the population, the average animal in the population would likely be chased into the water by research activities several times per year. However, we cannot make an estimate for how many reproductive failures this level of disturbance would be likely to cause due to several factors:

- Uncertainty about what proportion of these disturbed animals would be reproductive-age females or gestating females.

- Uncertainty about the proportions of animals likely to respond in different ways.
- Uncertainty about the mechanisms of effect.
- Uncertainty about the environmental conditions that would strongly influence the ultimate effect on individuals.

Conclusion for Sub-lethal Effects

The magnitude of sub-lethal effects as they relate to population-level changes in productivity under Alternative 4 is therefore unknown (see Table 4.4.1). The geographic extent of the research under Alternative 4 is likely to distribute sub-lethal effects across the range of the population. Disturbance and sub-lethal effects are considered likely given current research techniques. Although each exposure may be brief, individual animals could be affected by different research activities four or five times per year; disturbances they are therefore considered to be moderate in frequency.

Contribution to Conservation Objectives

Alternative 4 is designed to allow researchers to address all objectives and sub-objectives of the Draft Recovery Plan (see Section 4.8.1.4). The implementation of the alternative would require an increased level of funding and other resources compared to the Status Quo. Although such funding levels have not been appropriated by Congress or secured through other sources, Alternative 4 assumes that the full scope of research analyzed above could be authorized if funding were available. This means that researchers would be able to develop new capture techniques and drugs that would allow capture/recapture of mature animals to address sex/age class data gaps. In addition, procedures that present a greater risk of injury to individual animals could be permitted if they addressed essential data needs and had a reasonable chance of succeeding.

The expanded research efforts under Alternative 4 would highlight the need to address Objective 1.5 of the Draft Recovery Plan - develop an implementation plan. This implementation plan would be a "comprehensive ecological and conceptual framework that integrates and further prioritizes the numerous recovery actions provided in this plan" (NMFS 2006a). Development of an overall research plan as part of this effort would be essential for coordinating and maximizing the benefits of the expanded research efforts under Alternative 4. Such an overall research plan would refine research priorities, determine an overall strategy for where, when, and how research efforts should be conducted, and specify how research results should be evaluated and used for management decisions. Development of such a plan would require a substantial and coordinated commitment from NMFS and other federal and state agencies, Alaska Native organizations, academic institutions, environmental groups, the fishing industry, and other interested parties.

Conclusion for Conservation Objectives

Research conducted under Alternative 4 could provide information to support all of the conservation objectives listed in the Recovery Plan and the effect is therefore considered to be major in magnitude. Research conducted under Alternative 4 would be likely to address conservation issues across the range of the population and address both long-term and immediate information needs.

4.8.1.5 Western DPS - Cumulative Effects

Summary of Direct and Indirect Effects

Direct and indirect mortality and sub-lethal effects of research activities may result from disturbance, capture, and handling. The alternatives vary in the estimated amount of mortality that would occur under a given scope of research (Sections 4.8.1.1 through 4.8.1.4). For Alternatives 1, 2, and 3, the estimated mortality is less than 10 percent of PBR and is considered negligible on a population-level. The estimated mortality under Alternative 4 is about 13 percent of PBR and is considered minor on a population level. The magnitude of sub-lethal effects would be negligible for Alternative 1 and unknown for Alternatives 2, 3, and 4 because of uncertainty factors listed above. Alternative 1 would address few conservation objectives described in the Draft SSL Recovery Plan. Alternative 2 would address many but not all conservation objectives. Alternative 3 would address most conservation objectives, and Alternative 4 would address all conservation objectives.

Summary of Lingering Past Effects

The western DPS of SSLs has experienced a rapid population decline in the past 30 years and has not recovered. The causes of the decline and lack of recovery are still under investigation, but likely factors include competition with commercial fisheries, changes in the ocean climate and environment, predation by killer whales, environmental contamination, and anthropogenic mortality (NMFS 2006a). The role of these and other potential factors in the past decline, and their lingering effects on the current population status, are described in Section 3.1 of this document, and in other recent EIS documents (NMFS 2001a; NMFS 2004a).

The annual stock assessment reports (Angliss and Outlaw 2007) list as the past sources of anthropogenic mortality: incidental take in commercial fisheries, subsistence harvests, and illegal shooting. Commercial fisheries from different areas within the range of the western DPS of SSLs had a mean incidental mortality of 24.6 SSLs per year from 1990-2004 (Angliss and Outlaw 2007). Subsistence harvest from all areas within the range of the western DPS averaged 191 SSLs per year from 2000-2004 (Wolfe *et al.* 2002; Wolfe *et al.* 2004; Zavadil *et al.* 2004). Prior to passage of the MMPA in 1972, an estimated 45,000 SSLs were killed in Alaska by commercial harvest and predator-control programs. These activities became illegal after passage of the MMPA, but fishermen were still allowed to shoot SSLs to protect their fishing efforts. A large but unknown number of SSLs were as killed (NMFS 2006). This provision was repealed in 1990 when the species was listed as threatened under the ESA, and the level of illegal shooting is now believed to be minimal. NMFS enforcement records state that there were two cases of illegal shootings of SSLs in the Kodiak area in 1998, both of which were successfully prosecuted (Angliss and Outlaw 2007).

Other sources of disturbance of SSLs that are similar to the types of disturbance from research include researchers studying other nearshore and island-dwelling species such as sea otters, seabirds, and fish. These types of disturbances can lead to similar mechanisms for mortality and sub-lethal effects on reproduction as described in the direct/indirect effects sections. However, because these types of research activities generally take place on the periphery of SSL concentrations, the intensity of disturbances is likely to be much less than research activities designed to get close to SSLs. Most, if not all, of this type of research takes place within designated SSL critical habitat or on AMNWR lands that require specific permits, which stipulate that researchers must avoid SSLs to the greatest extent possible.

Analysis of Reasonably Foreseeable Future Actions (RFFAs)

The following is an analysis of impacts on SSLs based on the RFFA groups described in Table 4.4-2. Much of this analysis is summarized from the threats analysis in the Draft SSL Recovery Plan (NMFS 2006a).

Commercial fisheries: Potential future effects of commercial fishing can be divided into two major subgroups: 1) competition with fisheries and 2) incidental take due to interactions with active fishing gear.

Competition with fisheries recognizes that there is a substantial overlap between the size of fish and species targeted by commercial fisheries and those consumed by SSLs. The current system of fishery regulations designed to mitigate potential adverse effects on SSLs is based on the concept of distributing fishing effort over time and space to minimize localized depletion of prey for SSLs. The potential adverse impact of competition with fisheries is ranked “high” in the future threats analysis of the Draft Recovery Plan based on the concern that the aggregate effects of seasonal fishing in SSL foraging areas have resulted in alterations to the location, density, distribution, availability, and quality of SSL prey.

The potential impact from incidental take associated with active fishing gear is based on past assessments of incidental take from fishery observer data, self-reported fisheries data, and data on stranded animals. The average number of lethal entanglements in active U.S. fishing gear from 1990 to 2001 was 31 SSLs per a year (NOAA

2006). Because large segments of the fishing industry do not have observer coverage and do not self-report, incidental take in commercial fisheries is ranked as “medium” in the future threats analysis of the Draft Recovery Plan.

Ocean climate variability: The effects of climate change or regime shifts (i.e., Pacific decadal oscillations) on SSLs are not clearly understood. Regime shifts have altered the quality and availability of SSL prey in the past and are likely to do so in the future, which could lead to nutritional stress and possibly other unforeseen effects. These effects could interact synergistically with competition for prey with commercial fisheries. Due to the unpredictable dynamics of future climate changes and their potential for significant effects on SSL prey, the potential impact of ocean climate change is ranked as “high” in the future threats analysis of the Draft Recovery Plan.

Predation: The primary predator of SSLs is killer whales. However, there is substantial scientific disagreement and uncertainty about the relative importance of killer whale predation in the decline of the western population and the extent to which it may be impeding recovery of the population. Due primarily to a high degree of uncertainty, the potential impact of predation is ranked as “high” in the future threats analysis of the Draft Recovery Plan.

Scientific research: Although scientific research does result in disturbance to SSLs, these disturbances are monitored and attempts are made to minimize impacts. Moreover, as previously described, most research activities associated with other marine species, such as USFWS research on birds and sea otters, are on the periphery of SSL concentrations. As a result these researchers are not in close proximity to SSLs. Also, as much of the research on other marine species takes place in protected areas or SSL critical habitat, where permits declaring and outlining impact mitigation measures are necessary and help to minimize future potential impacts. For example, when USFWS personnel are performing bird surveys and are in an area where there are SSLs, they will avoid direct confrontation, which means they will not land on rookeries and move between the animals. Due to the relatively low volume of research-related SSL encounters and their ability to be mitigated, the potential impacts associated with scientific research activities on other marine species besides SSL are ranked as “low” in the future threats analysis of the Draft Recovery Plan.

Toxic pollutants: SSL tissue samples have shown relatively low levels of pollutants, and these substances are not believed to have caused high levels of mortality or reproductive problems. However, there have not been any studies on the effects of pollutants at the population-level to determine potential impacts on vital rates and population-trends. Long-term exposure to and bioaccumulation of pollutants such as DDT and PCB can result in damage to DNA, RNA, and cellular proteins (Matkin 2001). Therefore, due to the various unknowns associated with the effects of pollutants on SSLs and the risk of an oil spill in SSL critical habitat, the potential impacts of toxic pollutants are ranked as “medium” in the future threats analysis of the Draft Recovery Plan.

Subsistence activities: The ESA and the MMPA have provisions to allow coastal Alaska Natives to harvest threatened, endangered, or depleted species for subsistence purposes. The past annual number of takes (including struck and lost) from 1997-2004 was between 165 and 215 SSLs from the western DPS, down from about 550 SSLs in 1992 (NOAA 2006). Because estimates of subsistence take numbers are fairly accurate and the relative impacts of harvest can be mitigated, the overall potential impact is ranked as “low” in the future threats analysis of the Draft Recovery Plan.

Disease and Parasitism: Serological data indicate a prevalence of antibodies in SSLs for several endemic disease agents that could impede recovery of the population. However, the potential for those agents to cause disease has not been documented. Parasites may have little impact on otherwise healthy animals, but their effects could become substantial if combined with other stresses. Overall, due to the relatively low frequency of occurrence, the potential impacts of disease and parasitism are ranked as “low” in the future threats analysis of the Draft Recovery Plan.

Commercial shipping: The potential disturbance impacts of commercial and recreational vessel traffic vary depending on the speed and size of the vessels, season, and reproductive stage of the animal. Chronic or severe disturbances could cause animals to abandon traditional haulouts and rookeries. Commercial shipping also contributes to the potential for oil spills. Overall, due to the relatively modest volume of vessel traffic and the high degree of possible mitigation, the potential impacts from commercial shipping are ranked as "low" in the future threats analysis of the Draft Recovery Plan.

Invasive species: The presence of vessels, which could be rat-infested, poses the threat of releasing disease carrying rodents on islands (e.g., the Pribilof Islands). Efforts to eradicate invasive species (e.g., rats and foxes) will likely cause some disturbance of SSLs. However, USFWS personnel who conduct eradication programs in SSL habitats avoid direct confrontation (i.e., they do not land on rookeries and move discreetly around the outside of hauled-out animals) (Personal communication Vernon Byrd, USFWS). Also, non-native marine species could be introduced into SSL habitat through ballast water transfers, but long-term effects on the food web are unknown. The potential impact from invasive species and related eradication activities is ranked as "medium" in the future threats analysis of the Draft Recovery Plan.

Other economic development: RFFAs concerning economic development include: 1) military activity; 2) infrastructure development; and 3) tourism.

The main military activities that could potentially disturb SSLs include vessel operation and missile defense system launches. Impacts from vessels were discussed under the commercial shipping RFFA. Concerning missile defense, NMFS recently authorized the take of up to 900 SSLs per year for a five-year period at the Kodiak Launch Complex. However, that many takes is not expected to occur based on observed disturbances during past launches. Therefore, due to the modest degree of harassment associated with military activity, the potential future impact of military activity is considered minor.

Infrastructure development could include such things as sewer outfalls, port and harbor operations, and offshore oil and gas production. NMFS has processed applications for future Level B harassment of SSLs in the northwest portion of Upper Cook Inlet. These activities will take place in areas that are not typical SSL habitat and no SSLs were sighted in this area during recent beluga whale surveys, thus the potential future impact from infrastructure development is considered minor.

The majority of tourist activities relate to vessel traffic on wildlife sightseeing cruises. The potential impacts of vessel traffic were ranked low and previously described under the commercial shipping RFFA. Flight-seeing tours could also affect SSLs, but regulations concerning critical habitat air space would minimize the potential impacts. As a result of relatively infrequent tourism-based interactions and the ability to mitigate, the potential future impact of tourism is considered minor.

Cumulative Effects

Mortality

The primary contributors to cumulative anthropogenic mortality listed in the stock assessment reports (Angliss and Outlaw 2007) are subsistence harvest (191 animals per year) and incidental take in fishing gear (25 animals per year). This totals 216 animals per year, which is 92 percent of PBR for this population (234 animals). Alternative 1 would contribute no mortalities to this total and would therefore have no cumulative effect on mortality. Alternative 2 would contribute an estimated 3.4 mortalities per year, raising the overall total to about 220 animals, which is 94 percent of PBR. Alternative 3 would contribute an estimated 14.8 mortalities per year, raising the overall total to about 231 animals, which is 99 percent of PBR. Alternative 4 would contribute an estimated 29.8 mortalities per year, raising the overall total to about 246 animals, which is 105 percent of PBR. Under the criteria developed to assess the impacts of the alternatives (Table 4.4-1), the cumulative level of mortality for this population as a percentage of PBR would be considered "major" under all alternatives.

As explained in Section 2.5, the formula for PBR is defined in the MMPA and is a precautionary or conservative measure of human-caused mortality that could be expected to affect a marine mammal population's ability to recover from a depleted state. For endangered marine mammals the formula reserves 90 percent of the population's annual net production for recovery of the stock. This means that human-caused mortalities that exceeded PBR would not necessarily cause the population to decline (unless human-caused mortality accounted for all of the annual net production, [i.e., 1,000 percent of PBR]), but could slow the rate at which the population recovers. Through a series of extensive simulation modeling, NMFS has calculated that keeping human-caused mortality at or below PBR would increase the recovery time of endangered marine mammals by no more than 10 percent (Wade 1998). Total cumulative human-caused mortalities approaching or slightly above 100 percent of PBR, as occur under all of the alternatives, would therefore be unlikely to cause the population to decline but could slow its recovery.

Sub-Lethal Effects

Disturbance from research activities, marine vessel traffic, air traffic, fishing operations, tourism, and other sources can cause physical responses and physiological effects in SSLs ranging from temporary alterations of behavior and abandonment of haulout sites, to painful injuries, inability to forage normally, or reproductive failure. The intensity of response to a particular disturbance and the ultimate effect on individual animals depends on many factors, including the nutritional and reproductive status of the animal at the time of the disturbance. It is likely that animals in good condition and with access to adequate food supplies are able to tolerate more disturbance than animals in poor condition. The effects of disturbance therefore likely vary substantially from place to place and over time. Despite years of research on individual components of SSL ecology, the synergistic relationships between environmental conditions and the effects of human disturbance on SSL reproductive success are essentially unknown.

The alternatives vary in the amount of research-related disturbance and potential injuries, and thus in amounts of cumulative sub-lethal effects. Alternative 1 would result in no disturbance and would therefore make no contribution to cumulative sub-lethal effects. The other three alternatives would result in incremental increases in the scope and intensity of disturbance. However, because the population-level effect of disturbance and handling procedures from all of these alternatives is unknown, their contribution to the cumulative sub-lethal effects is also unknown.

Conservation Objectives

The Draft Recovery Plan (NMFS 2006a) describes numerous factors that contribute to the population dynamics of SSLs and many types of management actions that are likely to be necessary to promote the recovery of the population. These include, among other things, regulations on commercial and recreational fisheries, co-management agreements with Alaska Native organizations, planning and mitigation for coastal resource development, and efforts to control marine pollution. Information from scientific research on SSLs and other components of the marine environment plays a crucial role in making informed decisions about these regulations and management actions.

Research under the alternatives would contribute varying amounts of information in support of these conservation objectives. Alternative 1 would contribute no new field work involving takes of SSLs and its contribution to the cumulative conservation efforts would be minimal. The other alternatives can be ranked in increasing scope and intensity of contributed research from Alternative 2 to Alternative 3 to Alternative 4. While each of these alternatives could contribute to the scientific basis for management decisions to various extents, the use of these data to implement meaningful conservation measures is largely a political decision that is beyond the scope of this EIS.

4.8.1.6 Eastern DPS - Direct and Indirect Effects of Alternative 1 – No Action: No New Permits of Authorizations

Direct and Indirect Mortality Due to Research

There would be no research activities that affect SSLs in the wild under this alternative so there would be no mechanism for research-related injury or mortality on wild SSLs. A small number of SSLs are maintained in captivity and would still be affected by research, but potential impacts on these captive animals would have no direct effect on the wild population.

Sub-Lethal Effects Due to Research

There would be no mechanism for research-related injury under this alternative and therefore there would be no sub-lethal effects on wild SSLs.

Contribution to Conservation Objectives

Although no research involving interactions with live SSLs in the wild would occur under this alternative, research on captive animals and surrogate species could continue, as could any remote monitoring, observations, and censusing conducted far enough away from SSLs to avoid take. In addition, analyses of data and tissue samples that have already been collected could continue. Research not directed at SSLs, but related to investigating the causes of decline or failure to recover, such as oceanographic studies, could continue under this alternative.

Considering the volume of research that has been conducted in the past, there could be a number of new analyses and syntheses conducted from existing data that could address conservation objectives from the recovery plan. However, the usefulness of existing data would be likely to decrease over time as environmental conditions and the status of the population changed.

Past research on SSLs has been used to establish critical habitat boundaries, regulations about what types of activities would be allowed inside critical habitat, and a complex system of fishery management regulations designed to mitigate potentially adverse effects on SSLs. Under Alternative 1, the level of scientific uncertainty regarding the efficacy of these critical habitat and fishery regulations would be likely to increase over time as the original data become outdated. Decisions about whether or how to modify the regulations to either improve conservation of the species or ease the regulatory burden on the fishing industry would therefore have to rely more on data from other scientific studies and disciplines, including oceanographic and climatological studies, and research on other marine species in the ecosystem.

Conclusion for Conservation Objectives

Research conducted under Alternative 1 could provide a limited amount of information and is therefore considered to have a minor effect on support of the Recovery Plan conservation objectives. It is not clear whether researchers could develop techniques that would provide data comparable to previous census data, or make observations in enough areas, without causing takes of SSLs, to collect information useful for other management decisions. Research conducted under Alternative 1 is unlikely to contribute useful data other than in very limited locations and times.

4.8.1.7 Eastern DPS - Direct and Indirect Effects of Alternative 2 – Research Program without Capture or Handling

All research activities authorized under Alternative 2 would meet the statutory and regulatory requirements of the permit process, including criteria for experienced research personnel, the use of "humane" procedures that would minimize pain and suffering, and implementation of permit conditions that would mitigate potentially adverse effects. The resulting research program is therefore assumed to be conducted under conditions that minimize disturbance and the chance of harm to the animals. The following assessment provides an estimate of the effects for the scope of research defined under Alternative 2. As described earlier, the mortality estimates are reported with fractions of mortalities as a result of the risk assessment methodology used. This is not meant to suggest that animals would only partly die. The reader may prefer to round these fractions to the nearest whole number but the estimates are intended to reflect probabilities that may occur over time and as a result of many different animals being exposed to the same type of activity or disturbance.

Direct and Indirect Mortality Due to Research

The potential mechanisms for injury and mortality are described in Section 4.8.1.1 and Appendix B. Some injuries could lead to rapid mortalities that take place while researchers are still present, and have the potential to be observed. These mortalities would take place at the same time and place as the research activity and be considered "direct" effects under the NEPA definition of effects (Section 4.1). Other injuries could result in mortalities that do not occur for some time after researchers leave (hours or days or weeks) or take place after animals have moved to other locations. These mortalities could be direct, resulting from research activities, or indirect, resulting from impairment and mortality resulting from other causes. However, this distinction in no way diminishes the responsibility of the research activity for the injury and mortality. The mortality assessment tables estimate mortality due to research regardless of when or where it takes place, so the following discussion addresses the combined direct and indirect effects of mortality.

Under this alternative, authorized research could include aerial surveys, vessel surveys, land surveys, scat collection from haulouts or rookeries during the non-breeding-season, and other activities that do not involve the capture or handling of animals or the presence of researchers on rookeries during the breeding season. The estimated number of takes and mortality assessments for these activities are described in Tables 4.8-13 and 4.8-14 below.

The estimated total direct and indirect mortality from *Researcher Presence in View of Animals* is 1.9 SSLs per year from the eastern DPS (Table 4.8-13). Most of this estimated mortality is due to disturbance from aerial surveys (1.7 animals per year). The estimated total direct and indirect mortality from *Researcher Presence Among Animals* is 1.3 SSLs per year from the eastern DPS (Table 4.8-14).

Conclusion for Mortality Effects

The combined estimated direct and indirect mortality from research under Alternative 2 is therefore 3.2 SSLs per year from the eastern DPS, which is 0.2 percent of PBR for this population (2,000 animals). The magnitude and intensity of the effects from mortality is therefore considered negligible on the population level (see Table 4.4.1 for the impact criteria and Section 2.5 for a description of PBR as a metric for population-level effects). While the intensity of the predicted mortality would be negligible, the research would be conducted across the geographic range of the population and the effects would be distributed across the population. Disturbance effects are considered likely given current research techniques; however, they would only affect individual animals intermittently or infrequently and are therefore considered to be minor in duration.

Table 4.8-13
Estimated Mortality Due to Researcher Presence in View of Animals. SSL Eastern DPS - Alternative 2

Activity	Age class	Animals potentially exposed	Type of effect	Estimated proportion of animals affected	Predicted number of animals affected	Estimated mortality rate per affected animal[1]	Predicted mortalities (number of animals)	Mortality subtotal for activity
Aerial survey[2]	pups	21,000	Observed mortality during activity			0	0	
			Alert	0.05	1050	0	0	
			Enter water	0	0	0.001	0	
			Injured during disturbance	0.001	21	0.05	1.05	
	non-pups	225,000	Observed mortality during activity			0	0	
			Alert	0.05	11250	0	0	
			Enter water	0.01	2250	0.0001	0.225	
			Injured during disturbance	0.0001	22.5	0.02	0.45	1.7
Vessel surveys[3]	pups	0	Observed mortality during activity			0	0	
			Alert	1	0	0	0	
			Enter water	0	0	0.001	0	
			Injured during disturbance	0.01	0	0.05	0	
	non-pups (breeding season)	0	Observed mortality during activity			0	0	
			Alert	1	0	0	0	
			Enter water	0.1	0	0.0001	0	
			Injured during disturbance	0.0001	0	0.02	0	
	non-pups (non-breeding season)	4,600	Observed mortality during activity			0	0	
			Alert	1	230	0	0	
			Enter water	0.3	1,380	0.0001	0.14	
			Injured during disturbance	0.0001	0.5	0.02	0.0	0.1
On land[2]	pups	0	Observed mortality during activity			0.0000	0	
			Alert	0.05	0	0.0000	0	
			Enter water	0	0	0.0010	0	
			Injured during disturbance	0.001	0	0.0500	0	
	non-pups	1,500	Observed mortality during activity			0	0	
			Alert	0.05	75	0	0	
			Enter water	0.01	15	0.0001	0.002	
			Injured during disturbance	0.0001	0.15	0.02	0.003	0.0
Subtotal mortality for incidental effects of researcher presence in view of animals:								**1.9**

Notes: [1]Mortality rates associated with alert, enter water, and injured reactions account for unobserved or subsequent mortalities attributable to the activity.
[2]Estimate based on the number of animals expected to be present during survey.
[3]Estimate based on the number of animals expected to react to researcher presence.

Table 4.8-14
Estimated Mortality Due to Researcher Presence among Animals. SSL Eastern DPS Alternative 2

Activity	Age class	Animals exposed[2]	Type of effect	Estimated proportion of animals affected	Predicted number of animals affected	Estimated mortality rate per affected animal[1]	Predicted mortalities (number of animals)	Mortality subtotal for activity
Haulouts, rookeries non-breeding (scat collection, resights, ground counts)	All	14,500	Observed mortality during activity			0	0	
			Alert response	1	14,500	0.0	0.0	
			Enter water	0.9	13,050	0.0001	1.3	
			Injured during disturbance	0.0001	1.45	0.02	0.0	
Subtotal for estimated mortality due to researcher presence among animals								**1.3**

Notes: [1]Mortality rates associated with alert, enter water, and injured reactions account for unobserved or subsequent mortalities attributable to the activity.
[2]Estimate based on the number of animals expected to react to researcher presence.

Sub-Lethal Effects Due to Research

The estimated scope of research conducted under Alternative 2 could potentially affect all animals in the population through disturbance from aerial surveys and other activities. The mortality assessment tables indicate that a small percentage of animals could die as a result of entering the water and/or being injured during a research-related disturbance. Most animals exposed to research activities do not die as a result but may experience other effects ranging in intensity from a temporary alteration of their normal behavior to a reduction in foraging efficiency due to a painful injury or, at the extreme, to reproductive failure. The mechanisms for this range of potential sub-lethal effects are described in Section 4.8.1.1 and Appendix B.

Although research-related injuries under Alternative 2 could cause more than momentary pain or discomfort for individual animals, the focus of the analysis is how those injuries might contribute to a population-level effect. Not all sex/age classes are equally susceptible to sub-lethal effects that could alter the productivity of the population. Mature bulls that sustain a substantial injury may have difficulty establishing or reestablishing their breeding territory and could therefore lose potential mates. Although this would reduce individual reproductive success, one or more other bulls would likely take the place of a displaced bull. All breeding females would still find mates, and the overall productivity of the rookery would remain unchanged. Pups and juveniles that are injured but do not die are likely to recover well before they approach reproductive-age (i.e., 4-5 years for females and 8-9 years for males). Their future survival and reproductive success is therefore much more likely to be determined by the many environmental variables that affect foraging success and growth rate, such as the abundance and distribution of forage fish and changes in ocean regimes.

The sex/age class most susceptible to effects that might decrease overall productivity is breeding-age females. Research-related disturbance could cause a lactating female to abandon her pup or disrupt her normal maternal care to the point that the pup dies. This loss of a pup is considered under the mortality assessment tables. However, a potential mechanism for sub-lethal effects on reproduction in breeding-age females not considered under the mortality assessment tables is through physiological reactions to stress that cause reabsorption or abortion of fetuses or failure of fertilized embryos to implant. A female that reacts in any of these ways would lose the opportunity to raise a pup the following summer, but not necessarily in subsequent seasons. If these types of injuries occur to a relatively large number of females each year, overall pup production would decrease and hinder the ability of the population to recover. The relevant question for the analysis is how many breeding-age females are likely to be affected each year to the extent that they fail to reproduce as a result of research activities.

Table 4.8-13 indicates that there would be an estimated 23 non-pups injured each year during aerial surveys, with approximately 2,250 non-pups entering the water. About 1,380 non-pups are predicted to enter the water each year during vessel surveys, with one injured during the disturbances. About 15 non-pups are predicted to enter the water each year during land-based surveys, with perhaps one injured during the disturbances. Table 4.8-14 indicates that about 13,050 animals per year would be predicted to enter the water during scat collection and other non-breeding-season activities, with two non-pups being injured during the disturbances. The mortality tables estimate that about two non-pups per year would be expected to die as a result of this level of disturbance. Unfortunately, we cannot make an equivalent estimate for how many failed pregnancies this level of disturbance would likely cause due to several factors:

- Uncertainty about what proportion of these disturbed animals would be reproductive-age females or gestating females.
- Uncertainty about the proportions of animals likely to respond in different ways.
- Uncertainty about the mechanisms of effect.
- Uncertainty about the environmental conditions that would strongly influence the ultimate effect on individuals.

Conclusion for Sub-lethal Effects

The magnitude of sub-lethal effects as they relate to population-level changes in productivity under Alternative 2 is therefore unknown (see Table 4.4.1). The geographic extent of the research under Alternative 2 is likely to distribute sub-lethal effects across the range of the population. Disturbance effects are considered likely given current research techniques but would only affect individual animals intermittently or infrequently and are therefore considered to be minor in duration.

Contribution to Conservation Objectives

Regarding the eastern population of SSLs, the Draft Recovery Plan (NMFS 2006a) concludes that the primary recovery goal is to develop a post-delisting monitoring plan should a status review conclude that de-listing was warranted; however, it does not prioritize research activities required to do this. The Draft Recovery Plan suggests that such an effort would be likely to include population-trend monitoring, genetics research to refine understanding of population structure, monitoring terrestrial habitat threats, monitoring for unusual mortality events that may be related to contaminants or other human factors, and monitoring fishery management plans to ensure that these stay consistent with SSL requirements.

The scope and type of research activities described under Alternative 2 would be sufficient to address all of these conservation objectives, except perhaps for the genetics component. Genetic analysis can be done on numerous types of tissue. Hair samples would likely be available from haulouts and rookeries during the non-breeding-season under the conditions of this alternative. However, whether or not these would be sufficient for the types of analyses that could be specified at a later date is not clear.

Conclusion for Conservation Objectives

Research conducted under Alternative 2 could provide information to support most of the conservation objectives outlined in the Recovery Plan for the eastern DPS, and the effect is therefore considered to be moderate in magnitude. Research conducted under Alternative 2 would be likely to address conservation issues across the range of the population and to address long-term information needs. There may be some immediate information needs concerning potential acute threats to the population (e.g., disease outbreaks) that would be difficult to address under Alternative 2.

4.8.1.8 Eastern DPS - Direct and Indirect Effects of Alternative 3 – Status Quo Research Program

All research activities authorized under Alternative 3 would meet the statutory and regulatory requirements of the permit process, including criteria for experienced research personnel, the use of "humane" procedures to minimize pain and suffering, and implementation of permit conditions to mitigate potentially adverse effects. The resulting research program is therefore assumed to be conducted under conditions that would minimize disturbance and the chance of harm to the animals. The following assessment provides an estimate of the effects for the scope of research defined under Alternative 3. As described earlier, the mortality estimates are reported with fractions of mortalities as a result of the risk assessment methodology used. This is not meant to suggest that animals would only partly die. The reader may prefer to round these fractions to the nearest whole number but the estimates are intended to reflect probabilities that may occur over time and as a result of many different animals being exposed to the same type of activity or disturbance.

Direct and Indirect Mortality Due to Research

The potential mechanisms for injury and mortality that result from a variety of research activities are described in Section 4.8.1.1 and Appendix B. The mortality assessment tables estimate mortality due to research regardless of when or where it takes place, and the following discussion addresses the combined direct and indirect effects of mortality.

Under this alternative, authorized research could include:

- Activities with *Researchers in View of Animals* (Table 4.8-15 – aerial, vessel, and land surveys).
- Activities with *Researcher Presence Among Animals* (Table 4.8-16 – on rookeries and haulouts for ground counts, scat collection, captures).
- *Capture and Restraint activities* (Table 4.8-17 – various sex/age classes by various physical and chemical methods).
- *Handling and Sampling Procedures* on animals in the wild (Table 4.8-18 – various procedures, primarily on captured animals plus, remote sampling).
- *Capture, Temporary Captivity, and Release* back into the wild (Table 4.8-19 – non-pups taken to approved facilities for up to 3 months).

Each table lists the number of takes, estimated injuries, and estimated mortalities for the given activities under Alternative 3, the Status Quo conditions for the eastern DPS of SSLs.

The estimated total direct and indirect mortality from *Researcher Presence in View of Animals* is 1.9 SSLs per year (Table 4.8-15). Most of this estimated mortality is due to disturbance from aerial surveys (1.7 animals per year) and vessel surveys (0.2 animals per year). The total number of takes under aerial, vessel, and land-based surveys is many times the total number of animals in this population. This is because some existing permits authorize researchers to conduct multiple surveys per year for scientific purposes and each animal has the potential to be exposed to research disturbance more than once per year. In some cases, multi-year permits specify a greater survey effort in some years than others, corresponding to a larger number of takes. The numbers of takes used in the mortality assessment tables are the largest number of takes for any given year during the permit period. The number of takes therefore, is a “maximum” value for the set of permits considered. This maximum effort, and therefore maximum estimated mortality risk, would pertain to only one or two years within the five-year permit period.

The estimated total direct and indirect mortality from *Researcher Presence Among Animals* is 11.5 SSLs per year (Table 4.8-16). The majority of this estimated mortality (6.3 pups and 1.8 non-pups per year) would result from animals that enter the water or are injured during ground counts, scat collection, and capture activities on rookeries during the breeding season. An estimated mortality of 3.3 animals per year would result from non-pups that enter the water during ground counts, scat collection, and brand resight efforts on haulouts and rookeries during the non-breeding-season. As described for surveys in Table 4.8-15, the total number of takes in Table 4.8-16 is greater than the number of animals in the population and reflects the authorization of multiple visits to the same rookeries/haulouts within a year. Under the Status Quo permits, takes by disturbance incidental to a variety of research activities are grouped into a general “incidental disturbance during research activities” category. Thus, Table 4.8-16 does not distinguish among takes for some activities such as roundups of pups for branding, disturbance during scat collection, disturbance of not-target animals during capture activities, etc.

The estimated total direct and indirect mortality from *Capture and Restraint activities* is 8.6 SSLs per year out of the total capture effort of 900 pups and 1,302 non-pups (Table 4.8-17). As with other activities, some permits authorize different numbers of captures in different years. The numbers of takes used in the table are the maximum authorized in any given year and therefore represent the maximum estimated mortality risk under the Status Quo permits. The majority of these estimated mortalities (5.9 animals per year) would result from capture and use of an inhalable anesthesia (e.g., isoflurane), with most of those estimated mortalities involving non-pups (5.0 animals per year) rather than pups (0.9 animals per year). Most of the remaining estimated mortality (2.7 non-pups per year) would be through capture with injectable chemical methods.

The estimated total direct and indirect mortality from *Handling and Sampling Procedures* on animals in the wild is 3.5 SSLs per year (Table 4.8-18). This estimate does not include the risks associated with capture and restraint of the animals, but rather represents the estimated additional mortality from the handling and sampling procedures themselves. The total number of takes (expressed in units of “procedure-animals” in the table) would be greater than the number of animals captured because many captured animals are subject to multiple procedures. Captured pups and non-pups are often subjected to various combinations of procedures to address the specific scientific objectives of one or more research programs. Not all captured animals are hot-branded and hot-brands are applied only once per animal in its lifetime. Under the Status Quo alternative, 800 of the 900 captured pups would be hot-branded. In addition, those 900 captured pups would be subject to an average of 4.6 "relatively low-risk" procedures each, and 20 pups would be subject to a "relatively medium-risk" procedure. Out of the 1,302 non-pups that would be captured by various means, 906 would be branded. In addition, those 1,302 non-pups would be subject to an average of 7.3 "relatively low-risk" procedures and 1.6 "relatively medium-risk" procedures each. The highest contribution to the estimated mortality in this table is from hot-branding (1.6 pups and 0.1 non-pups per year). The estimated mortality from "relatively low-risk" procedures is 0.9 non-pups and 0.4 pups per year. "Relatively medium-risk" procedures would account for about 0.4 mortalities of non-pups per year.

No SSLs from the eastern DPS would be brought into temporary captivity for experimentation under the Status Quo permits. The mortality risk table for *Capture, Temporary Captivity, and Release* therefore has no mortality associated with it for the population (Table 4.8-19).

Conclusion for Mortality Effects

The combined estimated direct and indirect mortality from research under Alternative 3 is 25.5 SSLs per year from the eastern DPS, which is 1.3 percent of PBR for this population (2,000 animals). The magnitude and intensity of the effects from mortality is therefore considered negligible on the population level (see Table 4.4-1 for the impact criteria and Section 2.5 for a description of PBR as a metric for population-level effects). While the intensity of the predicted mortality would be negligible, the research would be conducted across the geographic range of the population and the effects would be distributed across the population. Disturbance effects that lead to mortality are considered likely given current research techniques. Although each exposure may be brief, individual animals could be affected by different research activities several times per year. They are therefore considered to be moderate in frequency.

Table 4.8-15
Estimated Mortality Due to Researcher Presence in View of Animals. SSL Eastern DPS - Alternative 3

Activity	Age class	Animals potentially exposed	Type of effect	Estimated proportion of animals affected	Predicted number of animals affected	Estimated mortality rate per affected animal[1]	Predicted mortalities (number of animals)	Mortality subtotal for activity
Aerial survey[2]	pups	21,000	Observed mortality during activity			0	0.0	
			Alert	0.05	1,050	0.0	0.0	
			Enter water	0	0	0.001	0.0	
			Injured during disturbance	0.001	21	0.05	1.05	
	non-pups	225,000	Observed mortality during activity			0	0	
			Alert	0.05	11,250	0	0	
			Enter water	0.01	2,250	0.0001	0.225	
			Injured during disturbance	0.0001	22.5	0.02	0.45	1.7
Vessel surveys[3]	pups	0	Observed mortality during activity			0	0	
			Alert	1	0	0	0	
			Enter water	0	0	0.001	0	
			Injured during disturbance	0.01	0	0.05	0	
	non-pups (breeding season)	0	Observed mortality during activity			0	0	
			Alert	1	0	0	0	
			Enter water	0.1	0	0.0001	0	
			Injured during disturbance	0.0001	0	0.02	0	
	non-pups (non-breeding season)	4,600	Observed mortality during activity			0	0	
			Alert	1	230	0	0	
			Enter water	0.3	1,380	0.0001	0.138	
			Injured during disturbance	0.0001	0.46	0.02	0.009	0.1
On land[2]	pups	0	Observed mortality during activity			0	0	
			Alert	0.05	0	0	0	
			Enter water	0	0	0.001	0	
			Injured during disturbance	0.001	0	0.05	0	
	non-pups	1,500	Observed mortality during activity			0	0	
			Alert	0.05	75	0.0	0.0	
			Enter water	0.01	15	0.0001	0.002	
			Injured during disturbance	0.0001	0.15	0.02	0.003	0.0
Subtotal mortality for incidental effects of researcher presence in view of animals:								**1.9**

Notes: [1]Mortality rates associated with alert, enter water, and injured reactions account for unobserved or subsequent mortalities attributable to the activity.
[2]Estimate based on the number of animals expected to be present during survey.
[3]Estimate based on the number of animals expected to react to researcher presence.

Table 4.8-16
Estimated Mortality Due to Researcher Presence among Animals. SSL Eastern DPS - Alternative 3

Activity	Age class	Animals exposed[3]	Type of effect	Estimated proportion of animals affected	Predicted number of animals affected	Estimated mortality rate per affected animal[1]	Predicted mortalities (number of animals)	Mortality subtotal for activity
On rookeries during breeding season[4] (ground counts, scats, captures)	pups	12,000	Observed mortality during activity			0	0	
			Alert response	1	12,000	0.0	0.0	
			Enter water	0.01	120	0.001	0.12	
			Injured during disturbance	0.001	12	0.05	0.6	
Roundups for branding[2]		800	Observed mortality during activity	1	800	0.007	5.6	6.3
On rookeries during breeding season[4] (ground counts, scats, captures)	adults and juveniles (non-pups)	20,000	Observed mortality during activity			0	0	
			Alert response	1	20,000	0.0	0.0	
			Enter water	0.9	18,000	0.0001	1.8	
			Injured during disturbance	0.0001	2	0.02	0.04	1.8
On haulouts or rookeries during non-breeding season (scats, resights, captures)	pups	0	Observed mortality during activity			0	0	
			Alert response	1	0	0.0	0.0	
			Enter water	0.9	0	0.0001	0.0	
			Injured during disturbance	0.0001	0	0.02	0.0	
	non-pups	36,750	Observed mortality during activity			0.0	0.0	
			Alert response	1	36,750	0.0	0.0	
			Enter water	0.9	33,075	0.0001	3.3	
			Injured during disturbance	0.0001	3.7	0.02	0.07	3.4
Subtotal for estimated mortality due to researcher presence among animals								**11.5**

Notes: [1]Mortality rates associated with alert, enter water, and injured reactions account for unobserved or subsequent mortalities attributable to the activity.
[2]Number exposed are based on numbers of pups handled or branded, and are a subset of the number exposed to the activity..
[3]Estimate based on the number of animals expected to react to researcher presence.
[4]Breeding season is June and/July.

Table 4.8-17
Estimated Mortality Due to Capture and Restraint Activities. SSL Eastern DPS - Alternative 3

Activity	Age class	Number of animals captured	When mortality occurs	Estimated mortality rate per affected animal[1]	Predicted mortalities (number of animals)	Mortality subtotal for activity
Capture/physical restraint	pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.001	0	
	Adults and juveniles (non-pups)	0	Observed during activity	0.002	0	
			Unobserved/post-capture	0.0001	0	0
Capture/chemical anesthesia (inhalable agent- isoflurane)	pups	900	Observed during activity	0.000	0	
			Unobserved/post-capture	0.001	0.9	
	non-pups	1,230	Observed during activity	0.004	4.92	
			Unobserved/post-capture	0.0001	0.123	5.9
Capture/chemical anesthesia (injectable)	non-pups	60	Observed during activity	0.034	2.04	
			Unobserved/post-capture	0.011	0.66	2.7
Capture/chemical sedation (injectable -e.g., valium)	non-pups	12	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0.001	0.0
Intentional lethal take or permanent removal	pups	0	Observed during activity	1	0	
	non-pups	0	Unobserved/post-capture	1	0	0
Subtotal for estimated mortality due to capture and restraint activities						**8.6**

Notes: [1]Mortality rates associated with alert, enter water, and injured reactions account for unobserved or subsequent mortalities attributable to the activity.

Table 4.8-18
Estimated Mortality Due to Handling and Sampling Procedures. SSL Eastern DPS - Alternative 3

Activity	Age class	Number of procedure-animals	When mortality occurs	Estimated mortality rate per procedure	Predicted mortalities (number of animals)	Mortality subtotal for activity
Permanent mark/hot-branding	pups	800	Observed during activity	0	0	
			Unobserved/post-capture	0.002	1.6	
	non-pups	906	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0.091	1.7
Relatively low risk procedures	pups	4,180	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0.418	
	non-pups	9,490	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0.949	1.4
Relatively medium risk procedures	pups	20	Observed during activity	0	0	
			Unobserved/post-capture	0.0002	0.004	
	non-pups	2,052	Observed during activity	0	0	
			Unobserved/post-capture	0.0002	0.410	0.4
Relatively high risk procedures	pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.001	0	
	non-pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.001	0	0.0
Subtotal for estimated mortality due to handling and sampling procedures						**3.5**

Notes: Low risk - blood/flipper tag/whisker pull/isotopes/eb/BIA/injections/ultrasound/external instruments/enemas/stomach intubate/fecal loop/stomach pill telemeters/metabolic chamber
Medium risk - teeth pull/biopsies/remote biopsies/(includes local anesthesia)
High risk - implant transmitters, surgeries
No risk - swabs/hair or nail clipping, temp marks, morph measurements, milk sample, external physical exam

Table 4.8-19
Estimated Mortality Due to Temporary Captivity for Experimentation. SSL Eastern DPS - Alternative 3

Activity	Age class	Number of animals or procedure-animals	When mortality occurs	Estimated mortality rate per affected animal or procedure	Predicted mortalities (number of animals)	Mortality subtotal for activity
Capture, transport, holding, release	pups	0	Observed during activity			
			Unobserved/post-capture			
	non-pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0	0
Chemical sedation (injectable - e.g., valium)	non-pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0	0
Permanent mark/hot-branding	non-pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0	0
Relatively low risk procedures	pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0	
	non-pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0	0
Relatively medium risk procedures	pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.0002	0	
	non-pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.0002	0	0
Relatively high risk procedures	pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.001	0	
	non-pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.001	0	0
Subtotal for estimated mortality due to temporary captivity for experimentation						**0**

Notes: Low risk - blood/flipper tag/whisker pull/isotopes/eb/BIA/injections/ultrasound/external instruments/enemas/stomach intubate/fecal loop/stomach pill telemeters
Medium risk - teeth pull/biopsies/remote biopsies/(includes local anesthesia)
High risk - implant transmitters, surgeries
No risk - swabs/hair or nail clipping, temp marks, morph measurements, milk sample, external physical exam

Sub-Lethal Effects Due to Research

The estimated scope of research conducted under Alternative 3 could potentially affect most, if not all, animals in the population through disturbance and capture/handling activities. The mortality assessment tables indicate that a small percentage of animals could die as a result of entering the water and/or being injured during a research-related disturbance. Most animals exposed to research activities do not die as a result; however, may experience other effects, ranging in intensity from a temporary alteration of their normal behavior to a reduction in foraging efficiency due to a painful injury or, at the extreme, to reproductive failure. The mechanisms for this range of potential sub-lethal effects are described in Section 4.8.1.1 and Appendix B.

As described under Alternative 2, sub-lethal effects could occur as a direct result of the research activity itself or indirectly due to other contributing factors; however, this is difficult to determine because no specific studies on this topic have been conducted. Research activities could cause disturbance or injury to animals that affect ability to function normally. The consequences of such research-related effects will depend on a number of factors, including environmental conditions that vary seasonally, among years, and among locations. While the result of a disturbance or injury is difficult to predict because of the many complicating factors, the initial disturbance caused by research does play a role in the ultimate effect. Although research-related injuries under Alternative 3 could cause more than momentary pain or discomfort for individual animals, the focus of the analysis is on how those injuries contribute to a population-level effect. The sex/age class most susceptible to effects that might decrease overall productivity of the population is breeding-age females, primarily through physiological reactions to stress that cause reabsorption or abortion of fetuses, or failure of fertilized embryos to implant. The relevant question for the analysis is how many breeding-age females are likely to be affected each year because of research activities to the extent that they fail to reproduce.

Table 4.8-15 indicates that there would be an estimated 23 non-pups injured each year during aerial surveys, with approximately 2,250 non-pups entering the water. About 1,380 non-pups are predicted to enter the water during vessel surveys, with one injured during the disturbances. About 15 non-pups are predicted to enter the water during land-based surveys, with one injured during the disturbances.

Table 4.8-16 indicates that research activities on rookeries during the breeding season would cause about 18,000 non-pups to enter the water and would injure about two animals. Research activities on rookeries during the non-breeding-season and on haulouts at any time would be predicted to cause about 33,000 non-pups to enter the water and to injure about four animals.

All animals represented by the takes in Tables 4.8-17 and 4.8-18 are assumed to have responses to capture that are more stressful than entering the water, and all are considered to have the potential for injury through several mechanisms. A total of 1,302 non-pup captures/recaptures are authorized each year by various methods under Alternative 3. However, most of the animals involved are juveniles and sub-adults less than three years old. A total of 30 adult females are authorized for capture. Considering authorized recaptures, these adult females account for 60 out of the 1,302 takes.

The combined mortality tables for Alternative 3 estimate that 25.5 SSLs per year from the eastern DPS would die because of research activities, including about 15 non-pups per year. Research activities would also create enough disturbance to cause about 55,000 non-pups per year to enter the water. Because this number of takes is more than the number of animals in the population, the average animal in the population would be likely to be chased into the water by research activities multiple times per year. However, an estimate of how many reproductive failures this level of disturbance would likely cause is not possible due to several factors:

- Uncertainty about what proportion of these disturbed animals would be reproductive-age females or gestating females.
- Uncertainty about the proportions of animals likely to respond in different ways.
- Uncertainty about the mechanisms of effect.

- Uncertainty about the environmental conditions that would strongly influence the ultimate effect on individuals.

Conclusion for Sub-lethal Effects

The magnitude of sub-lethal effects as they relate to population-level changes in productivity under Alternative 3 is considered unknown (see Table 4.4-1). The geographic extent of the research under Alternative 3 includes the entire range of the population. However, many permittees do not specify which specific rookeries/haulouts their research would affect until a month or two before they begin their fieldwork. It is therefore not known at the time of permit issuance how permittees would distribute their activities within a large area. These could range from being widely dispersed across the range of the species to concentrated in a few locations. Disturbance and sub-lethal effects are considered likely given current research techniques. Although each exposure may be brief, individual animals could be affected by different research activities more than four times per year. Disturbance from research activities is therefore considered to be moderate in frequency.

Contribution to Conservation Objectives

Regarding the eastern population of SSLs, the Draft Recovery Plan (NMFS 2006a) concludes that the primary recovery goal is to develop a post-delisting monitoring plan; however, it does not prioritize research activities required to do this. The Draft Recovery Plan suggests that such an effort would be likely to include population trend monitoring, genetics research to refine understanding of population structure, monitoring terrestrial habitat threats, monitoring for unusual mortality events that may be related to contaminants or other human factors, and monitoring fishery management plans to ensure these stay consistent with SSL requirements.

All of these recovery objectives could be addressed sufficiently with the scope of research described under Alternative 3. There would likely be modifications to research objectives or locations over time to address conservation issues as they arise, but the overall numbers of takes and types of research techniques described under Alternative 3 should be sufficient to accomplish future conservation objectives for this population.

Conclusion for Conservation Objectives

Research conducted under Alternative 3 could provide information to support all of the conservation objectives outlined in the Recovery Plan for the eastern DPS and the effect is therefore considered to be major in magnitude. Research conducted under Alternative 3 would be likely to address conservation issues across the range of the population and to address both long-term and immediate information needs.

4.8.1.9 Eastern DPS - Direct and Indirect Effects of Alternative 4 – The Preferred Alternative – Research Program with Full Implementation of Conservation Goals

The Draft SSL Recovery Plan (NMFS 2006a) recommended the initiation of a status review to consider removing the eastern DPS from the ESA's List of Threatened and Endangered Wildlife. Given the long-term increasing population trend and lack of significant conservation threats, the Draft Recovery Plan concludes that, if the DPS is de-listed, the primary recovery goal is to develop a post-delisting monitoring plan to ensure relisting is not necessary after removal. Key components of this plan, relative to research activities, have not been prioritized in the Draft Recovery Plan but would be likely to include population trend monitoring, genetics research to refine understanding of population structure, monitoring terrestrial habitat threats, monitoring for unusual mortality events that may be related to contaminants or other human factors, and monitoring fishery management plans to ensure these stay consistent with SSL requirements.

All of these recovery and conservation objectives could be addressed sufficiently within the scope of research described under Alternative 3. It is therefore assumed that no additional takes or procedures would be warranted under Alternative 4 for this population. The numbers of takes and types of procedures under Alternative 4 are therefore defined as the same as under the Status Quo conditions (see mortality assessment Tables 4.8-20 through 4.8-24). The assessment and conclusions of Alternative 4 on the eastern DPS of SSLs for mortality effects, sub-lethal effects, and the contribution to conservation objectives are the same as described above for Alternative 3.

Table 4.8-20
Estimated Mortality Due to Researcher Presence in View of Animals. SSL Eastern DPS - Alternative 4

Activity	Age class	Animals potentially exposed	Type of effect	Estimated proportion of animals affected	Predicted number of animals affected	Estimated mortality rate per affected animal[1]	Predicted mortalities (number of animals)	Mortality subtotal for activity
Aerial survey[2]	pups	21,000	Observed mortality during activity			0	0.0	
			Alert	0.05	1,050	0.0	0.0	
			Enter water	0	0	0.001	0.0	
			Injured during disturbance	0.001	21	0.05	1.05	
	non-pups	225,000	Observed mortality during activity			0	0	
			Alert	0.05	11,250	0	0	
			Enter water	0.01	2,250	0.0001	0.225	
			Injured during disturbance	0.0001	22.5	0.02	0.45	1.7
Vessel surveys[3]	pups	0	Observed mortality during activity			0	0	
			Alert	1	0	0	0	
			Enter water	0	0	0.001	0	
			Injured during disturbance	0.01	0	0.05	0	
	non-pups (breeding season)	0	Observed mortality during activity			0	0	
			Alert	1	0	0	0	
			Enter water	0.1	0	0.0001	0	
			Injured during disturbance	0.0001	0	0.02	0	
	non-pups (non-breeding season)	4,600	Observed mortality during activity			0	0	
			Alert	1	230	0	0	
			Enter water	0.3	1,380	0.0001	0.138	
			Injured during disturbance	0.0001	0.46	0.02	0.009	0.1
On land[2]	pups	0	Observed mortality during activity			0	0	
			Alert	0.05	0	0	0	
			Enter water	0	0	0.001	0	
			Injured during disturbance	0.001	0	0.05	0	
	non-pups	1,500	Observed mortality during activity			0	0	
			Alert	0.05	75	0.0	0.0	
			Enter water	0.01	15	0.0001	0.002	
			Injured during disturbance	0.0001	0.15	0.02	0.003	0.0
Subtotal mortality for incidental effects of researcher presence in view of animals:								**1.9**

Notes: [1]Mortality rates associated with alert, enter water, and injured reactions account for unobserved or subsequent mortalities attributable to the activity.
[2]Estimate based on the number of animals expected to be present during survey.
[3]Estimate based on the number of animals expected to react to researcher presence.

Table 4.8-21
Estimated Mortality Due to Researcher Presence among Animals. SSL Eastern DPS - Alternative 4

Activity	Age class	Animals exposed[3]	Type of effect	Estimated proportion of animals affected	Predicted number of animals affected	Estimated mortality rate per affected animal[1]	Predicted mortalities (number of animals)	Mortality subtotal for activity
On rookeries during breeding season [4] (ground counts, scats, captures)	pups	12,000	Observed mortality during activity			0	0	
			Alert response	1	12,000	0.0	0.0	
			Enter water	0.01	120	0.001	0.12	
			Injured during disturbance	0.001	12	0.05	0.6	
Roundups for branding[2]		800	Observed mortality during activity	1	800	0.007	5.6	6.3
On rookeries during breeding season [4] (ground counts, scats, captures)	adults and juveniles (non-pups)	20,000	Observed mortality during activity			0	0	
			Alert response	1	20,000	0.0	0.0	
			Enter water	0.9	18,000	0.0001	1.8	
			Injured during disturbance	0.0001	2	0.02	0.04	1.8
On haulouts or rookeries during non-breeding season (scats, resights, captures)	pups	0	Observed mortality during activity			0	0	
			Alert response	1	0	0.0	0.0	
			Enter water	0.9	0	0.0001	0.0	
			Injured during disturbance	0.0001	0	0.02	0.0	
	non-pups	36,750	Observed mortality during activity			0.0	0.0	
			Alert response	1	36,750	0.0	0.0	
			Enter water	0.9	33,075	0.0001	3.3	
			Injured during disturbance	0.0001	3.7	0.02	0.07	3.4
Subtotal for estimated mortality due to researcher presence among animals								**11.5**

Notes: [1]Mortality rates associated with alert, enter water, and injured reactions account for unobserved or subsequent mortalities attributable to the activity.
[2]Number exposed are based on numbers of pups handled or branded, and are a subset of the number exposed to the activity..
[3]Estimate based on the number of animals expected to react to researcher presence.
[4]Breeding season is June and/July.

Table 4.8-22
Estimated Mortality Due to Capture and Restraint Activities. SSL Eastern DPS - Alternative 4

Activity	Age class	Number of animals captured	When mortality occurs	Estimated mortality rate per affected animal[1]	Predicted mortalities (number of animals)	Mortality subtotal for activity
Capture/physical restraint	pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.001	0	
	Adults and juveniles (non-pups)	0	Observed during activity	0.002	0	
			Unobserved/post-capture	0.0001	0	0
Capture/chemical anesthesia (inhalable agent-isoflurane)	pups	900	Observed during activity	0.000	0	
			Unobserved/post-capture	0.001	0.9	
	non-pups	1,230	Observed during activity	0.004	4.92	
			Unobserved/post-capture	0.0001	0.123	5.9
Capture/chemical anesthesia (injectable)	non-pups	60	Observed during activity	0.034	2.04	
			Unobserved/post-capture	0.011	0.66	2.7
Capture/chemical sedation (injectable -e.g., valium)	non-pups	12	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0.001	0.0
Intentional lethal take or permanent removal	pups	0	Observed during activity	1	0	
	non-pups	0	Unobserved/post-capture	1	0	0
Subtotal for estimated mortality due to capture and restraint activities						**8.6**

Notes: [1]Mortality rates associated with alert, enter water, and injured reactions account for unobserved or subsequent mortalities attributable to the activity.

Table 4.8-23
Estimated Mortality Due to Handling and Sampling Procedures. SSL Eastern DPS - Alternative 4

Activity	Age class	Number of procedure-animals	When mortality occurs	Estimated mortality rate per procedure	Predicted mortalities (number of animals)	Mortality subtotal for activity
Permanent mark/hot-branding	pups	800	Observed during activity	0	0	
			Unobserved/post-capture	0.002	1.6	
	non-pups	906	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0.091	1.7
Relatively low risk procedures	pups	4,180	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0.418	
	non-pups	9,490	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0.949	1.4
Relatively medium risk procedures	pups	20	Observed during activity	0	0	
			Unobserved/post-capture	0.0002	0.004	
	non-pups	2,052	Observed during activity	0	0	
			Unobserved/post-capture	0.0002	0.410	0.4
Relatively high risk procedures	pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.001	0	
	non-pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.001	0	0.0
Subtotal for estimated mortality due to handling and sampling procedures						**3.5**

Notes: Low risk - blood/flipper tag/whisker pull/isotopes/eb/BIA/injections/ultrasound/external instruments/enemas/stomach intubate/fecal loop/stomach pill telemeters/metabolic chamber
Medium risk - teeth pull/biopsies/remote biopsies/(includes local anesthesia)
High risk - implant transmitters, surgeries
No risk - swabs/hair or nail clipping, temp marks, morph measurements, milk sample, external physical exam

Table 4.8-24
Estimated Mortality Due to Temporary Captivity for Experimentation. SSL Eastern DPS - Alternative 4

Activity	Age class	Number of animals or procedure-animals	When mortality occurs	Estimated mortality rate per affected animal or procedure	Predicted mortalities (number of animals)	Mortality subtotal for activity
Capture, transport, holding, release	pups	0	Observed during activity			
			Unobserved/post-capture			
	non-pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0	0
Chemical sedation (injectable - e.g., valium)	non-pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0	0
Permanent mark/hot-branding	non-pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0	0
Relatively low risk procedures	pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0	
	non-pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0	0
Relatively medium risk procedures	pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.0002	0	
	non-pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.0002	0	0
Relatively high risk procedures	pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.001	0	
	non-pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.001	0	0
Subtotal for estimated mortality due to temporary captivity for experimentation						**0**

Notes: Low risk - blood/flipper tag/whisker pull/isotopes/eb/BIA/injections/ultrasound/external instruments/enemas/stomach intubate/fecal loop/stomach pill telemeters/metabolic chamber
Medium risk - teeth pull/biopsies/remote biopsies/(includes local anesthesia)
High risk - implant transmitters, surgeries
No risk - swabs/hair or nail clipping, temp marks, morph measurements, milk sample, external physical exam

4.8.1.10 Eastern DPS - Cumulative Effects

Summary of Direct and Indirect Effects

Direct and indirect mortality and sub-lethal effects of research activities may result from disturbance, capture, and handling. The alternatives vary in the estimated amount of mortality that would occur under a given scope of research, but the estimated mortality for all alternatives is less than 10 percent of PBR and is considered negligible on a population level. (Sections 4.8.1.6 through 4.8.1.9). The magnitude of sub-lethal effects would be negligible for Alternative 1 and are unknown for Alternatives 2, 3, and 4 because of uncertainty factors listed above. In regard to ability to provide research support for the conservation objectives described in the Draft Recovery Plan; Alternative 1 would address few conservation objectives, Alternative 2 would address all conservation objectives except serological monitoring of disease and genetic refinement of the population structure, and Alternatives 3 and 4 would be sufficient to address all conservation objectives.

Summary of Lingering Past Effects

The population trend over the past 30 years has been very different for the eastern DPS of SSLs than it has been for the western DPS. In contrast to the population decline in the western DPS, the eastern DPS has increased steadily over the past 20 years (Angliss and Outlaw 2007). However, the factors that influence injury and mortality in the western DPS are similar to those that affect the eastern DPS, just often to lesser degrees. These include competition with commercial fisheries, changes in the ocean climate and environment, predation by killer whales, environmental contamination, and human-caused mortality (NMFS 2006a).

The annual stock assessment reports (Angliss and Outlaw 2007) list as the past sources of anthropogenic mortality; incidental take in commercial fisheries, subsistence harvests, and illegal shooting. Commercial fisheries from different areas within the range of the eastern DPS of SSLs had a mean incidental mortality of 2.6 SSLs per year from 1990-2004 (Angliss and Outlaw 2007). The mean subsistence harvest for 16 Alaskan coastal communities within the range of the eastern DPS was six animals per year between 2000-2004, based on hunter interviews (Wolfe *et al.* 2004). An unknown number of SSLs from the eastern DPS were taken by Canadian subsistence hunters, but this number is believed to be small (Angliss and Outlaw 2007). There were no commercial harvests of SSLs in the range of the eastern DPS in the U.S. but an unknown number of SSLs were killed by fishermen before passage of the MMPA in 1972. Thousands of animals were also killed during predator-control programs in British Columbia prior to 1970 (NMFS 2006a). The MMPA provision allowing fishermen to kill SSLs to protect their gear was repealed in 1990 when the species was listed as threatened under the ESA. The level of illegal shooting is now believed to be minimal. NMFS enforcement records state that there were two cases of illegal shootings of SSLs in southeast Alaska: one near Sitka, where one animal was shot, and one in Petersberg, where three animals were shot. Both of these cases were successfully prosecuted (Angliss and Outlaw 2007).

Analysis of RFFAs

The types of RFFAs for the eastern DPS are similar to those presented for the western DPS in Section 4.8.1.5, although their scope and intensity vary. For example, commercial fishing activities in southeast Alaska and in the states of Washington, Oregon, and California have been and will likely continue to be quite different from those that occur in the BSAI/GOA, in the quantity and method of fish being harvested and in the numbers of SSLs killed in fishing gear. Incidental take for fisheries in the range of the eastern DPS has averaged less than four SSLs per year and are likely to remain at low levels.

Given the increasing population trend for the eastern DPS, the Draft Recovery Plan does not consider any of the RFFAs listed in Section 4.8.1.5 to be a serious threat to the population in the future.

Cumulative Effects

Mortality

The primary contributors to cumulative human-caused mortality listed in the stock assessment reports (Angliss and Outlaw 2007) are subsistence harvest (six animals per year) and incidental take in fishing gear (three animals per year). Nine animals per year is about 0.4 percent of PBR for this population (2,000 animals). Alternative 1 would contribute no mortalities to this total and would therefore have no cumulative effect on mortality. Alternative 2 would contribute an estimated 3.2 mortalities per year, raising the overall total to about 13 animals, which is 0.7 percent of PBR. Alternatives 3 and 4 would contribute an estimated 25.5 mortalities per year, raising the overall total to about 36 animals, which is 1.8 percent of PBR. Under the criteria developed to assess the impacts of the alternatives (Table 4.4-1), the cumulative level of mortality for this population as a percentage of PBR would be considered negligible under all alternatives.

Sub-Lethal Effects

Disturbance from research activities, marine vessel traffic, air traffic, fishing operations, tourism, and other sources can cause physical responses and physiological effects in SSLs ranging from temporary alterations of behavior and abandonment of haulout sites, to painful injuries, inability to forage normally, or reproductive failure. The intensity of a response to a particular disturbance and the ultimate effect on individual animals depends on many factors, including the nutritional and reproductive status of the animal at the time of the disturbance. It is likely that animals in good condition and with access to adequate food supplies could tolerate more disturbance than animals in poor condition. The effects of disturbance, therefore, likely vary substantially from place to place and over time. Despite years of research on individual components of SSL ecology, the synergistic relationships between environmental conditions and the effects of human disturbance on SSL reproductive success are essentially unknown.

The alternatives vary in the amount of research-related disturbance and potential injuries that they would contribute to the cumulative sub-lethal effects. Alternative 1 would contribute no disturbance and would therefore make no contribution to cumulative sub-lethal effects. Alternative 2 would contribute a relatively small amount of disturbance compared to Alternatives 3 and 4. However, because the population-level effects of disturbance and handling procedures from Alternatives 2, 3, and 4 are unknown, their contributions to the cumulative sub-lethal effects are also unknown.

Conservation Objectives

The Draft Recovery Plan (NMFS 2006a) concludes that the primary recovery goal for the eastern DPS is to develop a post-delisting monitoring plan. This plan would likely include both research components and regulation/management components related to fisheries, tourism, coastal development, marine pollution, and other sources of human interactions with SSLs. Information from scientific research on SSLs and other components of the marine environment play a crucial role in making informed decisions about these regulations and management actions.

The alternatives would contribute varying amounts of information in support of a post-delisting monitoring plan. Alternative 1 would contribute no new field work; its contribution to the cumulative conservation effort would therefore be minimal. Alternative 2 would contribute to all conservation objectives, except perhaps serological monitoring of disease and genetic refinement of the population structure. Alternatives 3 and 4 would be sufficient to address all conservation objectives. While each of these alternatives could contribute to the scientific basis for management decisions to varying extents, the use of these data to implement meaningful conservation measures is largely a political decision that is beyond the scope of this EIS.

4.8.2 Northern Fur Seal

This section presents the analyses of the effects of the four different research alternatives on the eastern Pacific and San Miguel stocks of NFSs. The general methodology for this assessment is introduced in Section 4.4 and is the same methodology used for SSLs in Section 4.8.1. The alternatives represent different levels of research effort on NFSs, each with a range of research techniques and intensities that could be authorized by NMFS F/PR1. The intent of conducting research on a depleted species is to collect information that is useful in making management decisions to conserve and restore the species to its optimum sustainable population (OSP).

As discussed under Section 4.8.1, any research activity that has the potential to disturb animals has some risk of adverse effect for animals exposed. For each type of NFS research activity there are one or more possible responses from the animals. For some research activities (e.g., aerial surveys) many animals may exhibit no observable response although they may have elevated adrenaline levels or other internal stress responses. For research activities that require the presence of researchers on a rookery, some NFSs will enter the water and others may hold their ground or move away on land. NFSs targeted for capture and handling will be subject to additional types of stress and risks compared to animals that are disturbed by researches but not captured or handled.

The intensity and probability of potential responses is a function of a variety of factors including the sex/age class of the animal, the tendency of the individual animals to respond in certain ways, the intent and behavior of the researchers (how they approach animals), timing and location of the research, and environmental factors such as sea conditions and weather (see in Section 4.8.1). Each research activity therefore has specific inherent risks of injury to an individual as determined by a particular response, which could result in potential impacts on a population as measured by a combination of the intensity of individual responses and the number of animals exposed.

The effect of exposure to a variety of research procedures may be additive or synergistic. Also, the cumulative effect of all research activities on a stock during one season can be estimated based on the cumulative intensity of responses (i.e., the number of animals exposed) and scope of the research.

For all of the procedures analyzed, it is assumed that all researchers are experienced and qualified to fill their assigned roles and that all procedures are carried out under “best practices” conditions, including all mitigation measures specified in the relevant permits. Standard mitigation measures common to all alternatives are described in Section 4.7.4.

Similar to the effects analysis for SSLs in Section 4.8.1, the analysis of the direct and indirect effects of research activities on NFSs is divided into three major components: an assessment of research-related injuries that lead to serious injury or mortality; an assessment of research-related effects on reproductive success; and an assessment of how well each alternative research strategy would address conservation objectives in the 2006 Draft Conservation Plan (hereafter referred to as the Draft Conservation Plan) (NMFS 2006b). Potential beneficial effects of research are evaluated based on the likelihood of contributing information that can be used to promote the conservation of the species, in comparison to the potential adverse effects of the research activities. The criteria for determining the impact level of each component are summarized in Table 4.4-1.

<u>Assessment of Direct and Indirect Mortality Due to Research</u>

There are many potential mechanisms for research-related injuries to occur, some of which may lead directly or indirectly to the death of individual NFSs. Some injuries may affect the ability of individuals to forage or behave normally but are not directly fatal (i.e., sub-lethal effects). The thresholds for sub-lethal effects (i.e., when they start to affect an animal’s ability to survive) are not well known. There are many other natural and anthropogenic factors that also affect survival of individual animals and it can be difficult to attribute the fate of an animal to one particular factor, especially for species that are difficult to track and observe over long periods of time. The primary concern for this impact assessment is whether effects on individuals results in a population-level effect (i.e. reduced population growth or fitness). Population growth must be increasing, with an age/sex structure that promotes population stability, to lead to recovery of the species.

In addition, a significant number of individuals within the population need to be robust to disease, deleterious genetic mutations, and environmental or anthropogenic changes or stresses. The population must also be distributed widely enough to withstand acute environmental or manmade disasters such as disease outbreak or an oil spill.

Mortality Assessment Process

The mortality assessment tables presented for each alternative follow the same process as described under Section 4.8.1 for SSLs for determining the magnitude or intensity of direct and indirect mortality risks associated with each type of research activity.

A summary table (Table 4.8-49) shows the estimated number of NFSs that may sustain lethal effects from the specified scope of research defined for each alternative. These totals are then used to evaluate the magnitude or intensity of the direct and indirect effects of research on mortality, which is one aspect of the overall impact assessment for each alternative. Sections 4.4 and 4.5 describe the other steps involved in the overall impact analysis.

Mechanisms of Injury from Disturbance

Human presence at breeding and resting areas harasses NFSs (NMFS 2006b). Such presence includes research activities, ecotourism, and activities of residents of St. Paul and St. George. The presence and activities of humans near or in fur seal rookeries/haul-outs can cause major disturbances. As a result regulatory closures (50 CFR 216, subpart J) preclude human access to fur seal breeding and resting areas from 15 May until 15 October without prior authorization.

The mechanisms for injury to NFSs from human disturbance would be generally the same as discussed under SSLs in Section 4.8.1. Knowledge of population and individual responses to disruptions of daily activities is necessary to assess viability of populations exposed to human activities. A review of available literature on responses of numerous species to a variety of human activities suggests that the response, and the effect, may be variable and dependent on multiple factors. For a discussion on the mechanism of injury from disturbance, presence of researchers (in view of or among animals) on or near rookeries, capture and restraint of individual animals, and handling of animals for conducting invasive procedures, see Section 4.8.1.1.

Mechanisms of Injury from Presence of Researchers on or near rookeries

It is not always possible to detect animal responses to disturbance. Some responses go unnoticed for various reasons including cryptic behavior of the animal, or limitations in methods used to observe or measure responses. For those species or circumstances where responses may be detected, the type and intensity of response can vary greatly. For NFSs, researchers have documented a variety of behaviors and measured various physiological indicators of stress in response to research activities. Many of the responses are similar to those of SSLs.

The biological effects of disturbance are strongly related to the season, type of disturbance, and frequency. During the peak of the breeding season, NFSs are reluctant to leave the breeding areas (NMFS 2006b). NFSs seem to tolerate disturbances in the breeding areas during the peak of the breeding season and studies have indicated that NFSs are resilient to extreme disturbances during the breeding season Gentry (1998).

Mechanisms of Injury from Capture and Restraint

For research activities that require capture and restraint of animals, there are risks of injury in addition to those listed above. Capture and restraint methods include both land-based and at-sea techniques (see Appendix B). Mechanisms by which NFSs can be injured during captured or incidental to capture include:

- Efforts to avoid or escape capture can lead to contusions, lacerations, hematomas, nerve injuries, concussions, and fractures, as well as hyperthermia and myopathy from increased muscle activity.
- Pups herded into large groups for processing or that pile up in response to disturbance on rookeries may be injured or suffocated under the weight of other pups.
- Pups attempting to reunite with their mothers after researchers leave may encounter lactating females who may aggressively displace and injure them.
- Capture myopathy is associated with prolonged or repeated stress reactions and is characterized by degeneration and necrosis of striated and cardiac muscles, which may be fatal and may not develop until 7-14 days after capture and handling.

Mechanisms of Injury from Sedation or Anesthesia

There are several types of drugs used to capture, sedate, or immobilize animals for marking, instrument attachment/insertion, or tissue sampling procedures. Technical descriptions of these procedures are presented in Appendix B. Some of the factors that contribute to adverse effects of anesthesia or sedation are discussed for SSLs in Section 4.8.1.1.

Mechanisms of Injury from Tissue Sampling, Marking, and Other Research Procedures

There are numerous types of research procedures involving the handling of NFSs, including collection of various tissue samples, attaching tags or scientific instruments, and applying temporary or permanent marks to animals. Technical descriptions of these procedures and their specific potential effects on animals are presented in Appendix B. Additional risks of procedures described for SSLs would also apply to NFSs. Risks associated with these other handling procedures on NFS are in addition to the risks of researcher disturbance and capture.

Attachment of instruments on NFSs have shown some negative effects. Gentry and Kooyman (1986) found that lactating females who were outfitted with to secure dive recording instruments had significantly longer foraging trips than those that were flipper tagged but not carrying instruments. However, this method is not currently in use.

<u>Number of Animals Affected by Research under Each Alternative</u>

The permits that were active at the time this EIS was initiated constitute the Status Quo level of research (Alternative 3). The numbers of takes for different research activities under these permits are listed in Appendix A (Take by Permit Number and Research Activity). These Status Quo numbers were modified according to the policies stated for Alternatives 2 and 4 to derive proxy numbers of takes used in the analysis of Alternatives 2 and 4.

Alternative 1 – No Action: No New Permits or Authorizations

Alternative 1, the no action alternative, would allow continuation of research that is currently authorized until the existing permits expire. However, for the purposes of analysis, the effects of the no action alternative will be based on what would be allowed after all current permits expire. Because no new research permits or authorizations would be issued after that time, no activities that required a permit would be allowed, which would limit research to those methods that do not result in “takes” of marine mammals such as remote surveys and observations and analysis of existing data and samples. No NFSs in the wild would be exposed to researcher activity under this alternative.

Aerial surveys of NFS rookeries could occur, but only at elevations above 1,000 ft. to avoid disturbing NFSs. Limited census activities, including pup and adult male counts, would be allowed if there were conducted from a distance and in way that causes no animals to respond to the activities. NFSs could also be monitored through use of time-lapse and remote video cameras mounted on cliffs overlooking rookeries. Tissue collection, use of collected materials, and measurements from animals taken for subsistence by Alaska Natives would be allowed to continue. This alternative would allow continued disentanglement programs for NFSs on the Pribilof Islands authorized by Marine Mammal Stranding Agreement with the NMFS and Scientific Research Permit No. 481-623 for Level B harassment. Collection of scat samples would be allowed at vacant haulouts and rookeries.

Alternative 2 - Research Program without Capture or Handling

Alternative 2 would prohibit any research activities that require capturing and handling of NFSs or researcher presence on rookeries during the breeding season. If these specific activities were not authorized, researchers could choose to expand their efforts with non-intrusive techniques or, alternatively, might elect not to pursue research on NFSs because they would not be able to address issues of interest or fit their research and funding objectives. Therefore, the level of non-intrusive research authorized could be similar the Status Quo, depending on the response of individual researchers and agencies to the policy represented in this alternative. For the purposes of analysis, the number of takes under each research activity will be defined as the numbers of animals affected by non-intrusive research activities under the Status Quo for those activities (see mortality assessment Tables 4.8-25 and 4.8.26).

This alternative would essentially limit research to census activity and behavioral observations that are not expected to cause injury to animals. Activities allowed under this alternative would include any aerial, vessel, and land-based survey activities that would result in only minor, short-term disturbance of NFSs. Marine mammal observers on resting areas or rookeries would be positioned at locations that would avoid disturbing the animals. Any remote sensing equipment would be placed at times and in such a manner as to avoid disturbing animals. Researchers could obtain permits for receipt and use of tissue samples from animals collected by Alaska Natives in the subsistence harvest or from animals that have been found dead. Scat collection would be allowed but only from haulouts and rookeries during the non-breeding season. No activities involving capture, restraint, or disturbance of animals on rookeries during the breeding season would be permitted, but disturbance on haulouts for resighting efforts and scat collection could be authorized.

Alternative 3 – Status Quo Research Program

For Alternative 3, the Status Quo, the numbers of animals exposed to different research activities is taken directly from the permits that were valid on January 1, 2006. For survey and monitoring types of activities, the number of animals that would be exposed to potential disturbance depends on how many animals will be in a particular place at a particular time. To account for potential interannual variation in the distribution and abundance of animals at the rookeries, researchers are encouraged to estimate the maximum number of animals that would be exposed (surveyed). Researchers generally estimate this number based on information in Stock Assessment Reports (SAR) and previous experience. When applying for permits, researchers may add a “buffer” to this maximum number of animals to make sure they do not exceed the permit allowance should the actual number of animals encountered be greater than predicted. The numbers of authorized takes for incidental disturbance are therefore often greater than the numbers reported after field work is complete (see Table 4.8-27 through 4.8-31).

For some activities, researchers have applied for and received permits to capture a specific number of animals. However, the actual sample size has been less than the number authorized. For procedures that are intended to test specific hypotheses or provide statistically robust data for modeling or other applications, the number of animals requested to be captured or sampled may be based on a “power analysis” determination of sample size. In all cases, the analysis of effects is based on the number of takes authorized in the permits rather than the number of actual takes reported after the field season.

Alternative 4 – Research Program with Full Implementation of Conservation Goals

Alternative 4 includes all research activities that would be needed to address all information objectives identified in the Draft Conservation Plan for NFS (NMFS 2006b). While such a program would likely require a substantial increase in future funding levels and the sources of that funding have not yet been established, it will be assumed for the purposes of this EIS analysis that sufficient funding would be secured to implement an expanded research program under Alternative 4. This alternative would include the same types of research as described in the Status Quo plus activities that have not been authorized under the Status Quo, including new permits and permit amendments that were pending as of January 2006. It could also include some types of techniques and activities that have not been previously requested or authorized, including temporary or permanent removal of animals from the wild and intentional lethal take.

The Draft Conservation Plan does not offer specific targets for the future scope or frequency of particular research activities but presents broad suggestions of research direction. All of the suggestions for new research are oriented toward the Eastern Pacific stock so the scope of research on the San Miguel Island stock under Alternative 4 will be assumed to be the same as the Status Quo (Alternative 3). Research objectives that have been emphasized for the Eastern Pacific stock are the need for improved information on vital rates, foraging behavior, habitat use, and the potential role of disease in the population decline. Increased effort towards these goals would be expected to increase the numbers of animals captured and marked (and hence takes associated with researcher presence among animals), and to increase the amounts of observational effort. New efforts to monitor reproductive success and the incidence of disease in the population would likely increase captures of mature females and involve an increase in handling procedures (e.g., blood samples) from captured animals. In general, the numbers of takes for different research activities have been increased over the Alternative 3 levels with input on potential future research from agency experts. These increases have not been assessed with power analyses of sample sizes or with respect to testing specific hypotheses because such detail would depend on the particular objectives of future research proposals. The estimates of takes under each research category are therefore considered to be proxies for the scope of proposals that would arise from many sources under a favorable funding environment. These estimates will be used in the analysis of effects for Alternative 4 (see mortality assessment Tables 4.8-32 through 4.8-36).

Because the San Miguel Island stock is not listed as depleted, and therefore has no Conservation Plan, the scope of research would be the same as under Alternative 3 (see mortality assessment tables 4.8-39 through 4.8-48).

<u>Basis for Estimates of Animals Affected, Injury Rates, and Mortality Rates</u>

Although few studies dedicated to detecting effects of research on NFSs have been conducted, the reactions of animals to research activities have been observed and recorded in numerous locations over the years by the researchers conducting the activities and, in some cases, by observers positioned well away from the animals. These data provide a basis for response estimates. Serious injuries and deaths that are observed during research activities are recorded in the annual reports filed with NMFS F/PR1 and are the basis of some estimates. However, quantitative information on the effects of research activities that may occur after researchers have left the area is not readily available. Therefore, this analysis relies on estimates of the proportions and rates of animals experiencing injury through different mechanisms, based on the professional opinion of highly experienced researchers at NMML. Except where noted, estimated reaction and mortality rates are applied to both NFS stocks.

Disturbance from Researcher Presence in View of Animals

Disturbance from research activities may result in a proportion of animals reacting to a research activity. *Researcher Presence in View of Animals* includes aircraft, vessel, and land observational platforms. Expected reactions of exposed NFSs include: 1) becoming alerted (includes physiological reactions that may not be externally expressed); 2) entering water; or 3) sustaining an injury because of the activity (e.g., being trampled, or having an elevated physiological stress reaction).

The mortality rate is the proportion of the animals reacting to the research activity (in the ways defined above) that might be expected to die as a result of the research activity either during the activity (and therefore directly observable), or as a direct result of the activity but expressed as an unobserved mortality occurring after the researchers have left the area. Differential mortality rates depending upon the response type (alerted, entered water, or injured) are estimated. The mortality rate estimated for NFSs is the same as described for SSLs (Section 4.8.1), except that no vessel survey category is included as it is not a technique utilized in NFS studies.

Incidental disturbance of NFSs may occur during surveys of other marine mammal species. Because takes of NFSs resulting from aerial surveys are requested based on the numbers expected to be exposed incidental to other marine mammal surveys, the number of NFSs actually reacting to this survey activity will potentially be less than the number of NFS exposed. An objective of aerial surveys is to not disturb NFSs while surveying for other animals.

Because takes resulting from aerial surveys are requested based on the numbers expected to be counted during a survey, the number of NFSs actually reacting to this activity will potentially be less than exposed. Observations at San Miguel Island found no observable reactions by NFSs in response to aerial surveys (R. Delong, NMML, personal communications 2006). Aerial surveys are rarely conducted on NFSs in Alaska. Insley (1992, 1993) suggested that aircraft activity could cause disturbance of NFSs because sound spectra of aircraft noise and airborne vocalizations are similar and noted that some NFSs oriented towards aircraft noise during overflights. However, due to the infrequency of the use of aerial surveys and based on observations from San Miguel Island responses in Alaska are likely to be rare, and thus estimated reaction rates are less than those estimated for SSLs, and assuming that non-pups are more likely to enter the water, but are less likely to be injured, than pups.

For aerial surveys and *Researcher Presence in View of Animals*, no pups are assumed to enter the water as a response based on their age. However, to account for uncertainty, a small proportion of the total number of pups potentially affected was used to estimate the number alerted and entering the water. The proportion of non-pups alerted and entering the water in response to aerial surveys was estimated from the SSL estimates; based on behavioral differences between these two species and the time of year of the surveys, NFSs were estimated to exhibit this response at a proportion half that of SSLs. The proportions of pups and non-pups potentially exposed and estimated to be injured were based on the NMML final report for permit number 782-1532 for the years 2000-2004. This estimate accounts for the type of activity as well as the time of year. In general, pups were assumed to be more at risk than non-pups.

No mortalities were observed to occur as a result of aerial surveys at San Miguel Island. Potential unobserved mortality rates have been estimated using the same approach used for aerial surveys of SSLs.

Disturbance from Researcher Presence among Animals

A proportion of 1.0 alerted animals of the total animals potentially exposed (all animals) was selected for the number of animals becoming alert in response to researcher presence among animals assuming the total number of individuals potentially and estimated to be actually affected are the same. This reflects how takes are requested by researchers for these activities. Proportion of animals that enter water in response to researcher presence among animals was based on NMML researcher experience on rookeries and resting areas, and accounts for different types of activities as well as the time of year (related to behavioral changes as the rookery structure breaks down). The proportions of pups and non-pups potentially exposed that were estimated to be injured were based on NMML professional opinion, and accounts for the type of activity as well as the time of year. In general, pups were assumed to be more at risk than non-pups.

For all listed activities except incidental takes of pups for *Researchers Present Among Animals*, no mortalities have been observed to occur based on the NMML final report for permit number 782-1532 for the years 2000-2004. When researchers are present among animals for pup round-ups and clearing of rookeries, the proportion of pups estimated to die (of the total number of pups incidentally taken during these activities) is 0.00001. This proportion was calculated based on 1998-2005 NMML permit reports documenting mortalities for these activities. It is likely that none of the individuals alerted incidental to these activities are likely to subsequently die. Pups were assumed to be more at risk than non-pups. According to NMML professional judgment, proportions of animals estimated to subsequently die as a result of sustaining injuries in response to activities are 0.05 (5/100) mortalities per injured animal for pups and 0.02 (2/100) mortalities per injured animal for non-pups, assuming pups are at greater risk than non-pups. These values are equivalent to the unknown mortality risks associated with similar activities anticipated for SSLs (Section 4.8.1).

Capture and Restraint of Animals

Mortality rates observed during the activity for capture/physical restraint and capture/chemical sedation were obtained from review of permit and trip reports for NMML NFS activities. Estimated rates for capture/chemical anesthesia were based on SSL data. Post-handling mortality rates are unknown, and estimates are as described for SSLs (Section 4.8.1). For this analysis, the observed mortality rate for capture and physical restraint methods is set to 0.0 for pups and 0.004 for non-pups. The estimated mortality rates after researchers leave are set to 0.001 for pups and 0.0001 for non-pups, based on NMML's professional judgment.

Handling, Testing, and Sampling Procedures

No mortalities have been reported by NMML resulting from any procedures performed on NFSs. All unobserved/post-capture mortality estimates are as described for SSLs. Several procedures are considered to add negligible additional risk of mortality during or after the procedure, including; bacteriology/virology swabs, hair or nail clipping, temporary external marks such as hair dye or paint, morphological measurements, milk samples, and external physical exams.

Examples of procedures considered to have relatively low risks of post-procedure mortality include blood sampling, flipper tagging, whisker pulling, injections of isotopic or other relatively inert chemical substances (such as deuterated water, tritiated water, Evan's Blue dye), BIA, ultrasound measurements/imaging, stomach intubation, enemas, fecal collection with loops, and insertion of stomach telemeter "pills." Because no directed studies have been conducted to measure post-procedure mortality rates, unobserved mortality is estimated at 0.0001 mortalities per procedure for pups and non-pups based on NMML's professional judgment.

Examples of procedures considered to have relatively medium risks of post-procedure mortality include tooth removal under general anesthesia, biopsies (local and remote), and use of local anesthesia. Because no directed studies have been conducted to measure post-procedure mortality rates, they are estimated at 0.0002 mortalities per procedure for pups and non-pups, double the estimated relatively low-risk procedure rate.

Examples of procedures considered to have relatively high risks of post-procedure mortality include transmitter implantation and other surgeries. Because no directed studies have been conducted to measure post-procedure mortality rates so they are estimated at 0.001 mortalities per procedure for both pups and non-pups, 10 times the estimated relatively low-risk procedure rate.

Animals Taken into Temporary Captivity

Historically, NFSs have rarely been taken into temporary captivity for research. However for the purposes of this EIS, this risk of these activities have been included as reasonably foreseeable future actions. The risk of mortality for animals taken into temporary captivity for research purposes contains components from all of the assessment tables described previously (e.g., capture, physical and chemical restraint, and numerous handling/sampling procedures). Temporary captivity also involves risks associated with transport of animals to and from the wild, and the stresses and other risks associated with living in an artificial environment and being chronically exposed to novel stimuli. One research method/risk unique to animals in captivity is dietary manipulations designed to study animals' responses to varying levels of nutrition and caloric content. The types of dietary manipulations performed are described in Appendix B, along with the suite of potential responses from the animals. Another factor unique to research on animals in captivity is that they can be monitored more closely and for longer periods of time post exposure to a risk or stressor than is practical for animals in the wild. As part of this additional monitoring, animals in captivity may receive veterinary care to resolve adverse effects (e.g., injuries, infections) associated with the research more readily and consistently than animals subject to the same or similar research activities in the wild. This may mitigate some of the adverse impacts associated with being in captivity.

The Animal Welfare Act (AWA), administered by the USDA APHIS, specifies requirements for ensuring the general health and welfare of captive marine mammals. APHIS is responsible for ensuring that research facilities adhere to these requirements. Because the AWA is not administered by NMFS, permits issued by NMFS do not include terms and conditions related to compliance with the AWA. However, NMFS permits can and do specify terms and conditions intended to ensure that the research conducted on captive marine mammals is consistent with the humane standards of the MMPA. Thus, NMFS permits require that these animals be monitored during and after experimental procedures and that mitigation measures are followed to minimize the potential for adverse impacts from the research. Permits allowing research on captive NFSs require that no animals be released back into the wild until passing a rigorous health assessment both to ensure the animal is capable of surviving in the wild and to minimize the potential for introducing disease into the wild population.

Assessment of Sub-lethal Effects Due to Research

As discussed for SSLs under Section 4.8.1, this element of the direct and indirect effects analysis addresses the ways the scope of research activities represented by each alternative may affect animals in ways other than those that lead to mortality, particularly the effects of research on the reproductive success of animals. As was the case for mortality, sub-lethal effects could occur as a direct result of the research activity itself or indirectly due to other contributing factors. While sub-lethal effects can result in changes in body condition, immune response, etc., our analysis of sub-lethal effects focuses on reproductive success and assumes these other responses ultimately affect reproductive capacity of adults or survival of offspring in some manner.

The consequences of research-related effects depend on a number of environmental conditions that vary seasonally, among years, and among locations. While the result of a disturbance or injury is difficult to predict because of the many complicating factors, the initial disturbance caused by research does play a role in the ultimate effect.

Part of the risk assessment for mortality includes estimates of the number of animals that are injured but do not die (sub-lethal effects). These estimates will be used as the basis for evaluating the potential effects on the reproductive success of animals exposed to research.

In many cases, the mechanisms or means for potential sub-lethal effects are inferred from studies on the reactions of other species or humans to various types of stress. Direct evidence for the occurrence of most of these mechanisms in NFSs is weak or lacking altogether. Although the information would be useful to have, not only for this EIS assessment but for interpretation of the research data, there is a level of uncertainty regarding the collection of this kind of information. It is not possible to design studies to investigate every potential effect of research without also affecting the animals. Chapter 5 discusses issues related to post research monitoring.

Assessment of Contributions towards Conservation Objectives

The direct and indirect effects analysis for the contributions towards conservation objectives discusses the degree to which the scope of research represented under each alternative would be able to address information needs for taking management actions that would promote recovery and conservation of the species. The evaluation of the alternatives against recovery and conservation goals is founded on the objectives and information needs identified in the Draft NFS Conservation Plan (NMFS 2006b).

The goal of the Draft Conservation Plan for NFS (NMFS 2006b) is to promote the recovery of the eastern Pacific NFS stock to a level appropriate to justify removal from MMPA depleted listing. NMFS will focus management using a science-based ecosystem approach to determine how and when to implement and monitor the conservation actions identified in the plan. NMFS noted that as of the writing of the Draft Conservation Plan, the stock was declining, and stopping the decline was of paramount importance. Meeting the goal of recovery to an OSP level and reclassification as not depleted may take many decades. The Draft Conservation Plan proposes four objectives aimed at restoring and maintaining the eastern Pacific stock of NFSs to its OSP level.

1. Identify and eliminate or mitigate the cause or causes of human-related mortality of the eastern Pacific stock of NFSs.
2. Assess and avoid or mitigate adverse effects of human-related activities on or near the Pribilof Islands and other habitat essential to the survival and recovery of the eastern Pacific stock of NFSs.
3. Continue and, as necessary, expand research or management programs to monitor trends and to detect natural or human-related causes of change in the NFS population and habitats essential to NFS survival and recovery.
4. Coordinate and assess the implementation of the conservation plan, based on the implementation of conservation actions and the completion of high-priority studies.

The first two objectives are concerned with human-related mortality in regards to marine debris and commercial fishing, but would rely on NFS field research to monitor effects. The third objective is the continuation of research to monitor the population trends and their causes. The last objective focuses on coordination associated with implementing the conservation plan and the conservation actions, but also monitors vital research. Under each of these objectives is a series of recommended conservation actions that would assist in achieving the stated objective:

1. Identify and eliminate or mitigate the cause or causes of human-related mortality of the eastern Pacific stock of NFSs
   - 1.1 Improve understanding of the sources, fates, and effects of marine debris.
   - 1.2 Improve assessments of incidental take of NFSs in commercial fishing operations.
   - 1.3 Evaluate harvests and harvest practices.
2. Assess and avoid or mitigate adverse effects of human-related activities on or near the Pribilof Islands and other habitat essential to the survival and recovery of the eastern Pacific stock of NFSs
   - 2.1 Work with the Tribal governments under co-management agreements.
   - 2.2 Advise and consult with the relevant action agencies and industries.
   - 2.3 Review and make recommendations on proposed activities and actions that have the potential for adversely affecting NFSs.
   - 2.4 Conduct studies to quantify effects of human activities (e.g., research, hunting, tourism, vehicles, discharges, facilities) at or near breeding and resting areas.
   - 2.5 Undertake conservation or management measures as necessary to eliminate or minimize deleterious impacts to NFSs.
   - 2.6 Assess and monitor pollutants.
3. Continue and, as necessary, expand research or management programs to monitor trends and to detect natural or human-related causes of change in the NFS population and habitats essential to NFS survival and recovery
   - 3.1 Monitor and study changes in the NFS population.
   - 3.2 Improve assessment of the effects of disease.

3.3 Describe and monitor essential NFS habitats.

3.4 Identify and evaluate natural ecosystem changes.

4. Coordinate and assess the implementation of the conservation plan, based on the implementation of conservation actions and the completion of high-priority studies

   4.1 Establish conservation plan coordinator position.

   4.2 Develop and implement education and outreach programs.

   4.3 Develop and promote international conservation efforts.

   4.4 Enforce existing regulations.

This section presents the analyses of the effects of the four different research alternatives on NFSs. The general methodology for performing this assessment is introduced in Section 4.4, and a more detailed description of the approach to analyzing mortality and sub-lethal effects in SSLs is presented in Section 4.8.1. The same approach used for SSLs applies to NFSs.

4.8.2.1 Eastern Pacific Stock – Direct and Indirect Effects of Alternative 1 – No Action: No New Permits or Authorizations

Because there would be no research-related takes of NFSs on the Pribilof Islands and Bogoslof Island under Alternative 1, there would be no mechanism for research-related injury or mortality.

Direct and Indirect Mortality Due to Research

Because there would be no research-related takes of NFSs on the Pribilof Islands and Bogoslof Island under Alternative 1, there would be no mechanism for research-related injury or mortality. Direct and indirect effects of the authorized research would be negligible.

Sub-Lethal Effects Due to Research

There would be no mechanism for research-related injury under this alternative; therefore, there would be no sub-lethal effects on NFSs. Direct and indirect effects of the authorized research would be negligible.

Contribution to Conservation Objectives

Alternative 1 - research program would continue to pursue the identified actions under Objectives 1 and 2. NMFS and the Tribal groups would be able to conduct marine debris studies, disentanglement programs, and programs to improve the assessment of incidental take in commercial fisheries; to monitor and evaluate subsistence harvest and collect tissue from the animals harvested; and to analyze previously collected samples and other data. Programs under Objective 2 would address potential adverse human-caused effects on NFSs in the Pribilof Islands. With the exception of 2.4, neither of these objectives relies directly on NFS research.

Most of the programs and actions under Objective 3 would not be able to be pursued under Alternative 1. Some census activity could take place using high-altitude aerial surveys and observations from distant vantage points. To ensure that animals are not disturbed, these activities would be restricted only to specific research projects that can be conducted in a manner and distance that eliminates any potential for animal response. However, these data would be of questionable quality and value, would not be comparable to previous years, and would not provide a continuous time-series record of population levels. Without census information on the population, efforts to upgrade this stock from a depleted status would likely be unsuccessful; use of existing data or data collected from subsistence-harvested animals, as allowed by Alternative 1, would not provide the appropriate metrics of time frame to address the critical scientific needs related to the recovery of the stock.

Under Alternative 1, Objective 4, Conservation Action 4.1 - Establish conservation plan coordinator position, would not be warranted to monitor for such minimal conservation actions. The other three conservation actions under Objective 4 could be supported without field research and include 4.2 - Develop and implement education and outreach programs, 4.3 - Develop and promote international conservation efforts, and 4.4 - Enforce existing regulations.

Conclusion for Conservation Objectives

Because of the limited magnitude or intensity of the research program under Alternative 1, the beneficial contribution towards the conservation objectives in the 2006 Draft Conservation Plan is primarily analysis of information already collected and cursory field observations and is therefore considered minor.

4.8.2.2 Eastern Pacific Stock - Direct and Indirect Effects of Alternative 2 – Research Program without Capture or Handling

All research activities authorized under Alternative 2 would meet the statutory and regulatory requirements of the permit process, including criteria for experienced research personnel, the use of "humane" procedures to minimize pain and suffering, and permit conditions to mitigate potentially adverse effects. It is assumed that the resulting research program would be conducted under "best practice" conditions that would minimize disturbance and the chance of harm to the animals. The following assessment provides an estimate of the effects that would remain even after all reasonable precautions are taken for the scope of research defined under Alternative 2.

Alternative 2 would include research methods that would not involve capture, restraint, tissue sampling, or intentionally causing animals to leave rookeries during the breeding season. This alternative would essentially limit research to census activity and behavioral observations that are not expected to cause injury to animals.

Direct and Indirect Mortality Due to Research

The potential mechanisms for injury and mortality are described in Section 4.8.1 and Appendix B. Under Alternative 2, the majority of research would consist of aerial and ground-based surveys. Disturbance from aerial survey activity would be incidental to surveys for other marine mammals. Mortality as a result of incidental overflights would likely be extremely small (an estimated 0.1 animals per year). Land-based surveys of rookeries during the breeding season would be limited to observations from blinds, catwalks, and cliffs, and in such a manner as to avoid disturbing them. No mortality is anticipated from these activities. Thus, an estimation of the risk of mortality associated with *Researcher Presence in View of Animals* is approximately 0.1 animal per year (Table 4.8-25).

After the breeding season, researchers would be authorized to enter the rookery to collect scat samples, look for tagged animals, and ground count animals remaining. Therefore, some animals still present at a rookery would be affected from these disturbances. Mortality from *Researcher Presence Among Animals* is estimated to be 1.1 animals per year.

Conclusion for mortality effects

Total mortality for all research activities on eastern Pacific NFSs under Alternative 2 is estimated at 1.2 animals per year. This represents substantially less than 0.1 percent of PBR (15,262 animals). The magnitude and intensity of the effects from mortality is therefore considered negligible at the population-level (see Table 4.4-1 for the impact criteria, and Section 2.5 for a description of PBR as a metric for population-level effects).

Table 4.8-25
Estimated Mortality Due to Researcher Presence in View of Animals. NFS Eastern Pacific Stock - Alternative 2

Activity	Age class	Animals potentially exposed	Type of effect	Estimated proportion of animals affected	Predicted number of animals affected	Estimated mortality rate per affected animal[1]	Predicted mortalities (number of animals)	Mortality subtotal for activity
Aerial survey	pups	0	Observed mortality during activity			0	0.0	
			Alert response	0.01	0	0.0	0.0	
			Enter water	0.0001	0	0.001	0.0	
			Injured during disturbance	0.00005	0	0.05	0.0	
	non-pups	30,500	Observed mortality during activity			0	0.0	
			Alert response	0.01	305	0.0	0.0	
			Enter water	0.005	153	0.0001	0.02	
			Injury during disturbance	0.00001	0.3	0.02	0.0	0.0
On land catwalks, tripods, cliffs	pups	6,500	Observed mortality during activity			0	0.0	
			Alert response	0.05	325	0.0	0.0	
			Enter water	0.0001	1	0.001	0.0	
			Injured during disturbance	0.00005	0	0.05	0.0	
	non-pups	38,450	Observed mortality during activity			0	0.0	
			Alert response	0.05	1,923	0.0	0.0	
			Enter water	0.005	192	0.0001	0.02	
			Injured during disturbance	0.00001	0.4	0.02	0.01	0.0
Subtotal for estimated mortality due to researcher presence in view of animals								**0.1**

Notes: [1]Mortality rates associated with alert, enter water, and injured reactions account for unobserved or subsequent mortalities attributable to the activity.

Table 4.8-26
Estimated Mortality Due to Researcher Presence among Animals. NFS Eastern Pacific Stock - Alternative 2

Activity	Age class	Animals potentially exposed	Type of effect	Estimated proportion of animals affected	Predicted number of animals affected	Estimated mortality rate per affected animal[1]	Predicted mortalities (number of animals)	Mortality subtotal for activity
Haulouts, rookeries non-breeding (scat collection, resights, ground counts)	pups	1,000	Observed mortality during activity			0.00001	0.0	
			Alert response	1	1,000	0.0	0.0	
			Enter water	0.05	50	0.0001	0.0	
			Injured during disturbance	0.0005	1	0.05	0.0	
	non-pups and "all"	11,500	Observed mortality during activity			0.0	0.0	
			Alert response	1	11,500	0.0	0.0	
			Enter water	0.9	10,350	0.0001	1.04	
			Injured during disturbance	0.0001	1	0.02	0.0	1.1
Subtotal for estimated mortality due to researcher presence among animals								**1.1**

Notes: [1]Mortality rates associated with alert, enter water, and injured reactions account for unobserved or subsequent mortalities attributable to the activity.

Sub-Lethal Effects due to Research

The estimated scope of research conducted under Alternative 2 could potentially affect many animals in the population through disturbance from aerial surveys and other activities. The mortality assessment tables indicate that a very small percentage of animals could die as a result of entering the water and/or being injured during a research-related disturbance. Most animals exposed to research activities do not die as a result but may experience other effects ranging in intensity from a temporary alteration of normal behavior to a reduction in foraging efficiency due to a painful injury or, at the extreme, to reproductive failure. The mechanisms for this range of potential sub-lethal effects are described in Section 4.8.1 and Appendix B.

Although research-related injuries under Alternative 2 could cause more than momentary pain or discomfort for individual animals, the focus of the analysis is how those injuries contribute to a population-level effect. Not all sex/age classes are equally susceptible to sub-lethal effects that could alter the productivity of the population. Mature bulls that sustain a substantial injury may have difficulty establishing or reestablishing breeding territories and could therefore lose potential mates. Although this would reduce individual reproductive success, one or more other bulls would be likely to take the place of displaced bulls. All breeding females would still find mates, and the overall productivity of the rookery would remain unchanged. Pups and juveniles that are injured but that do not die are likely to recover well before they approach reproductive age (i.e., 5-7 years for females and 8-10 years for males). Their future survival and reproductive success is therefore much more likely to be determined by the many environmental variables that affect foraging success and growth rate, such as the abundance and distribution of forage fish and changes in ocean regimes.

The sex/age class most susceptible to effects that might decrease overall productivity is breeding-age females, primarily through physiological reactions to stress that may cause re-absorption or abortion of fetuses, or failure of fertilized embryos to implant. A female that reacts in any of these ways would lose the opportunity to raise a pup the following summer, but not necessarily in subsequent seasons. Another potential mechanism for sub-lethal reproductive effect would be if an injury was sustained somewhere in the reproductive tract or hormonal regulatory system that led to permanent sterility. If these types of injuries occur to a relatively large number of females each year, overall pup production would decrease and hinder the ability of the population to recover. The relevant question for the analysis is how many breeding age females are likely to be affected each year to the extent that they fail to reproduce as a result of research activities.

Sub-lethal effects of *Researcher Presence in View of Animals* can range from avoidance of the disturbance (little or no adverse effect) to pain and suffering resulting in serious injury. During aerial survey activity, sub-lethal effects are caused by an animal's flight response from the disturbance. Injury can result from stampedes where pups get trampled or chased into the water, or from aggressive interaction between adults. For NFSs, it is anticipated that only 1 percent of the exposed animals would respond by an alert reaction, and half of those animals would enter the water to escape. Therefore, under Alternative 2, if 30,500 NFSs were overflown during aerial surveys (incidental to surveys of other marine mammals), disturbance would be sufficient to drive approximately 153 into the water.

Because these aerial surveys are focused on other marine mammals and are incidental to NFS-specific research, they would likely be flown at an elevation greater than 600 feet, which would more than likely not result in flight response in NFSs. There is little information on the effect of aerial surveys on NFSs, but impacts are likely to be similar to those on SSLs. Disturbance from aircraft traffic has been observed to have highly variable effects on hauled-out SSLs, ranging from no reaction to complete departure from the site (Calkins and Pitcher 1982; Johnson *et al.* 1989; Williams 2001). Because of the low intensity of this disturbance, and the short-term duration, effects of these types of aerial surveys are expected to be negligible.

Disturbance caused by *Researcher Presence Among Animals* results from researchers coming in close contact with animals on the rookeries. The only types of activities in this category under Alternative 2 are scat collections, looking for tags, and general animal counts after the breeding season. There could potentially be some disturbance to an estimated 12,500 animals still present at the rookeries. However, no mortality is expected due to these activities.

Conclusion for sub-lethal effects

Sub-lethal effect on reproductive success is unknown; however, based on the estimated low number of animals responding to this type of disturbance, effects on the population are expected to be negligible. The duration of research activities affecting the animals would be relatively short-term, occurring for a short period at the time of the survey. Therefore, the degree to which this portion of the research program would contribute to direct and indirect mortality would be negligible.

Contribution to Conservation Objectives

Under Alternative 2, the non-intrusive research activities that could be authorized could contribute to some of the Draft Conservation Plan objectives that address research (see Section 4.8.2). However, aerial and land-based surveys would do little to support two of the conservation activities listed under Objective 3: 3.1 - Continue monitoring and study changes in the NFS population and 3.2 - Improve assessment of the effects of disease. The other two conservation actions under Objective 3 do not rely on intrusive field research and could be conducted without intrusive activities: 3.3 - Describe and monitor essential NFS habitats and 3.4 - Identify and evaluate natural ecosystem changes. The conservation actions would be limited to descriptions of historical NSF distributions and collection of environmental data and would, therefore, not provide for direct evaluation of causal relationships to changes in the NFS population.

Under the Alternative 2 research program, the standard mark/recapture technique (shear-sampling) used in the past to estimate pup production (York and Kozloff 1987) would not be authorized. Data from any new census methods would not be comparable with past results and monitoring population trends would be compromised.

Some biological samples could be collected from male NFSs during the subsistence harvest in the Pribilof Islands. Health and body condition monitoring would be limited to visual assessments and scat analysis.

Under Alternative 2, Objective 4, Conservation Action 4.1 - Establish conservation plan coordinator position, no position would be warranted because there would be minimal conservation actions. The other three conservation actions under Objective 4 could be supported without field research. These are 4.2 - Develop and implement education and outreach programs, 4.3 - Develop and promote international conservation efforts, and 4.4 - Enforce existing regulations.

Conclusion for Conservation Objectives

Because the magnitude or intensity of the research program under Alternative 2 would allow for some low-level field research activities and non-field-related research, the beneficial contribution towards the conservation objectives in the Draft Conservation Plan is considered minor.

4.8.2.3 Eastern Pacific Stock - Direct and Indirect Effects of Alternative 3 – Status Quo Research Program

All research activities authorized under Alternative 3 would meet the statutory and regulatory requirements of the permit process, including criteria for experienced research personnel, the use of “humane” procedures to minimize pain and suffering, and implementation of permit conditions to mitigate potentially adverse effects. It is assumed that the resulting research program would be conducted under conditions that would minimize disturbance and the chance of harm to the animals. The following assessment provides an estimate of the effects for the scope of research defined under Alternative 3. The existing grant and permit process is relatively flexible in that it can accommodate minor changes in the level of funding, management priorities, scientific interests, research techniques, population status, and it addresses threats to the recovery of the NFSs. The scope of research activities conducted under this alternative depends substantially on the amount of funding that is available, which can often limit the amount of research that can be done. The number, types, and distribution of takes allowed by all permits approved by January 2006 will be used for the analysis of effects under this alternative.

Direct and Indirect Mortality Due to Research

Under Alternative 3, the Status Quo alternative, new permits would be issued for the same type and scope of research as occurred before January 1, 2006. New permits would be issued to replace permits as they expire, such that the levels and types of research activities would continue to the extent that funding allowed. Under Alternative 3, the combined permits and authorizations for incidental mortality would not exceed 10 percent of PBR (i.e., 1,526).

New requests for permits and amendments to existing permits would be considered on a case-by-case basis and would be granted as long as the researchers were qualified to do the work, the research was bona fide and justified through reference to the Draft Conservation Plan objectives, the project had a reasonable chance of succeeding, the authorizations for incidental mortality would not exceed 10 percent of PBR, and it was consistent with all other permit issuance criteria. Under this alternative, authorized research could include:

- Activities with *Researcher Presence in View of Animals* (Table 4.8-27 - aerial and land surveys).
- Activities with *Researcher Presence Among Animals* (Table 4.8-28 – on rookeries and haulouts for ground counts, scat collection, captures).
- *Capture and Restraint Activities* (Table 4.8-29 – various sex/age classes by various physical and chemical methods).
- *Handling and Sampling Procedures* on animals in the wild (Table 4.8-30 – various procedures, primarily on captured animals, plus remote sampling. Pups and juveniles captured for invasive procedure may be injected with valium if necessary to reduce stress levels).
- *Capture, Temporary Captivity for Experimentation, and Release* back into the wild (Table 4.2-31 – non-pups taken to approved facilities for up to 3 months).

Each table lists the number of takes, estimated injuries, and estimated mortalities of eastern Pacific stock NFSs for the given activities under Alternative 3.

The estimated total direct and indirect mortality from aerial surveys is the same as under Alternative 2. Aerial surveys could be flown at a similar elevation (600 feet) or lower, depending on the survey conditions. Effects from land-based observations taken at a distance by either researchers or remote camera would also be similar to effects under Alternative 2. Additionally, NFSs would be disturbed from *Researcher Presence in View of Animals* during ground-based census activity in the Pribilof Islands and Bogoslof Island. Approximately 45,000 animals would be exposed to the activity. The estimated total direct and indirect mortality from *Researcher Presence in View of Animals* approaches zero (0.1 animals per year) under Alternative 3 (Table 4.8-27).

The estimated total direct and indirect mortality from *Researcher Presence Among Animals* is 20.7 NFSs per year (Table 4.8-28). Census activity on the Pribilof Islands under Alternative 3 would include pup production estimates on a biennial basis, and adult males would be counted annually. Census activity of Bogoslof and Sea Lion Rocks would be less frequent. These mortalities would result from physical trauma, such as trampling of pups or aggressive interaction with other animals, separation of pups from their mothers, pups entering the water prematurely, and overheating from stress. A majority of this mortality would be from activities involving rookery clearing (18.3 animals per year), primarily because of the large number of animals exposed to this disturbance (up to 321,250). Most, if not all, of the predicted mortality would be unobserved (occurring after the researchers leave).

Capture and restraint of individual animals for marking or other procedures is analyzed by four sub-categories of this activity: capture and physical restraint, capture and anesthesia (inhalation agent – isoflurane gas), capture and chemical sedation (injectable valium), and intentional lethal take or permanent removal. The specific effects of individual procedures on animals are discussed in Appendix B. Mortality can occur at the time the animals are being captured and treated (observed mortality), or animals can succumb sometime after release (unobserved mortality).

Based on the authorized number of animals that could be captured and restrained or permanently removed under this alternative and the predicted mortality rate of each activity, the estimated total direct and indirect mortality from *Capture and Restraint activities* is approximately 26.4 animals per year, most of which would be pups. Over 99 percent of this mortality would be due to capture and physical restraint of the animals. Capture and chemical sedation would result in mortality of <0.1 animal per year.

Handling of the animals and conducting sampling procedures after animals have been captured and restrained is also a potential source of mortality. The handling and sampling procedures allowed under this alternative include:

- Relatively low-risk procedures—sampling blood, hair, nails and vibrissae, flipper tag, external instrument attachments, enemas, stomach intubation, fecal loop, stomach pill telemeters; and
- Relatively medium-risk procedures —teeth pull, biopsies, remote biopsies (includes local anesthesia).

The estimated total direct and indirect mortality from *Handling and Sampling Procedures* on animals in the wild would be approximately 0.6 animals per year, primarily from relatively low-risk procedures. A total of over 6,000 procedures could occur because multiple procedures could be performed on each animal. By comparison, only 70 relatively medium-risk procedures are performed on all animals being handled and sampled, which contribute to approximately 0.01 animal mortalities per year. No relatively high-risk procedures are proposed under Alternative 3. Overall, the intensity of the effects of handling and sampling procedures would be considered negligible based on the very low mortality rate. The geographic extent of this activity would be considered moderate because the sampling would be distributed throughout several of the major rookeries.

The estimated total direct and indirect mortality from *Capture*, *Temporary Captivity for Experimentation, and Release* back into the wild is typically very low, and once an animal is captured and sedated, mortality is very low. However, there are no current permits or authorizations for temporary capture of NFSs under this alternative. A mortality rate similar to that of SSLs (0.1 animals per year for 16 animals taken) is assumed.

Total mortality for all research activities on eastern Pacific NFSs under Alternative 3 is estimated at 47.8 animals per year. This represents approximately 0.3 percent of PBR (15,262 animals). Therefore, the magnitude or intensity of the overall effect is considered negligible (see Table 4.4-1 for the impact criteria, and Section 2.5 for a description of PBR as a metric for population-level effects). This effect would be considered likely and would be spread over several rookeries within the major breeding area for this stock, therefore the geographic extent and likelihood would be considered moderate.

Table 4.8-27
Estimated Mortality Due to Researcher Presence in View of Animals. NFS Eastern Pacific Stock - Alternative 3

Activity	Age class	Animals potentially exposed	Type of effect	Estimated proportion of animals affected	Predicted number of animals affected	Estimated mortality rate per affected animal[1]	Predicted mortalities (number of animals)	Mortality subtotal for activity
Aerial survey	pups	0	Observed mortality during activity			0	0.0	
			Alert response	0.01	0	0.0	0.0	
			Enter water	0.0001	0	0.001	0.0	
			Injured during disturbance	0.00005	0	0.05	0.0	
	non-pups	30500	Observed mortality during activity			0	0.0	
			Alert response	0.01	305	0.0	0.0	
			Enter water	0.005	153	0.0001	0.02	
			Injury during disturbance	0.00001	0.3	0.02	0.0	0.0
On land catwalks, tripods, cliff	pups	6500	Observed mortality during activity			0	0.0	
			Alert response	0.05	325	0.0	0.0	
			Enter water	0.0001	1	0.001	0.0	
			Injured during disturbance	0.00005	0	0.05	0.0	
	non-pups	38450	Observed mortality during activity			0	0.0	
			Alert response	0.05	1923	0.0	0.0	
			Enter water	0.005	192	0.0001	0.02	
			Injured during disturbance	0.00001	0.4	0.02	0.01	0.0
Subtotal for estimated mortality due to researcher presence in view of animals								**0.1**

Notes: [1]Mortality rates associated with alert, enter water, and injured reactions account for unobserved or subsequent mortalities attributable to the activity.

Table 4.8-28
Estimated Mortality Due to Researcher Presence among Animals. NFS Eastern Pacific Stock - Alternative 3

Activity	Age class	Animals potentially exposed	Type of effect	Estimated proportion of animals affected	Predicted number of animals affected	Estimated mortality rate per affected animal[1]	Predicted mortalities (number of animals)	Mortality subtotal for activity
Activities involving pup roundups	pups	7,010	Observed mortality during activity			0.00001	0.1	
			Alert response	1	7,010	0.0	0.0	
			Enter water	0.01	70	0.001	0.07	
			Injured during disturbance	0.001	7	0.05	0.4	
	non-pups	3,465	Observed mortality during activity			0.0	0.0	
			Alert response	1	3,465	0.0	0.0	
			Enter water	0.8	2,772	0.0001	0.3	
			Injury during disturbance	0.0005	2	0.02	0.03	0.8
Activities involving clearing rookery/haulout	pups	217,275	Observed mortality during activity			0.00001	2.2	
			Alert response	1	217,275	0.0	0.0	
			Enter water	0.05	10,864	0.0001	1.09	
			Injured during disturbance	0.0005	109	0.05	5.4	
	non-pups	103,975	Observed mortality during activity			0.0	0.0	
			Alert response	1	103,975	0.0	0.0	
			Enter water	0.9	93,578	0.0001	9.4	
			Injured during disturbance	0.0001	11	0.02	0.21	18.3
Incidental disturbance during captures in breeding season[2]	pups	8,420	Observed mortality during activity			0.0	0.1	
			Alert response	1	8,420	0.0	0.0	
			Enter water	0.001	8	0.001	0.01	
			Injured during disturbance	0.001	8.4	0.05	0.4	
	non-pups	20,165	Observed mortality during activity			0.0	0.0	
			Alert response	1	20,165	0.0	0.0	
			Enter water	0.01	202	0.0001	0.0	
			Injury during disturbance	0.001	20	0.02	0.4	0.9
Incidental disturbance during captures outside of breeding season	pups	11,890	Observed mortality during activity			0.0	0.1	
			Alert response	1	11,890	0.0	0.0	
			Enter water	0.05	595	0.0001	0.06	
			Injured during disturbance	0.0005	6	0.05	0.3	
	non-pups	9,905	Observed mortality during activity			0.0	0.0	
			Alert response	1	9,905	0.0	0.0	
			Enter water	0.2	1981	0.0001	0.2	
			Injured during disturbance	0.0001	1.0	0.02	0.02	0.7
Subtotal for estimated mortality due to researcher presence among animals								**20.7**

Notes: [1]Mortality rates associated with alert, enter water, and injured reactions account for unobserved or subsequent mortalities attributable to the activity.
[2]Breeding season: SM prior to 1 August; EP prior to 08 August

Table 4.8-29
Estimated Mortality Due to Capture and Restraint Activities. NFS Eastern Pacific Stock - Alternative 3

Activity	Age class	Number of animals captured	When mortality occurs	Estimated mortality rate per affected animal[1]	Predicted mortalities (number of animals)	Mortality subtotal for activity
Capture/physical restraint	pups	25,535	Observed during activity	0.000	0	
			Unobserved/post-capture	0.001	25.535	
	non-pups	190	Observed during activity	0.004	0.76	
			Unobserved/post-capture	0.0001	0.019	26.3
Capture/chemical anesthesia ' (inhalable agent-isoflurane)	non-pups	0	Observed during activity	0.004	0	
			Unobserved/post-capture	0.0001	0	0.0
Capture/chemical anesthesia '(injectable)	non-pups	0	Observed during activity	0.01	0	
			Unobserved/post-capture	0.001	0	0.0
Capture/chemical sedation (injectable-e.g. valium)	non-pups	660	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0.066	0.066
Intentional lethal take or permanent removal	pups	0	Observed during activity	1	0	
	non-pups	0	Unobserved/post-capture	1	0	0
Subtotal for estimated mortality due to capture and restraint activities						**26.4**

Notes: [1]Mortality rates associated with alert, enter water, and injured reactions account for unobserved or subsequent mortalities attributable to the activity.

Table 4.8-30
Estimated Mortality Due to Handling and Sampling Procedures. NFS Eastern Pacific Stock - Alternative 3

Activity	Age class	Number of procedure-animals	When mortality occurs	Estimated mortality rate per procedure	Predicted mortalities (number of animals)	Mortality subtotal for activity
Permanent mark/hot-cold branding	pups	0	Observed during activity	0.000	0	
			Unobserved/post-capture	0.002	0	
	non-pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0	0.0
Relatively low risk procedures	pups	3,620	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0.362	
	non-pups	2,620	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0.262	0.6
Relatively medium risk procedures	pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.0002	0	
	non-pups	70	Observed during activity	0	0	
			Unobserved/post-capture	0.0002	0.014	0.014
Relatively high risk procedures	pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.001	0	
	non-pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.001	0	0.0
Subtotal for estimated mortality due to handling and sampling procedures						**0.6**

Notes: Low risk - blood/flipper tag/whisker pull/isotopes/eb/BIA/injections/ultrasound/external instruments/enemas/stomach intubate/fecal loop/stomach pill telemeters
Medium risk - teeth pull/biopsies/remote biopsies/(includes local anesthesia)
High risk - implant transmitters, surgeries
No risk - swabs/hair or nail clipping, temp marks, morph measurements, milk sample, external physical exam

Table 4.8-31
Estimated Mortality Due to Temporary Captivity for Experimentation. NFS Eastern Pacific Stock - Alternative 3

Activity	Age class	Number of animals or procedure-animals	When mortality occurs	Estimated mortality rate per affected animal or procedure	Predicted mortalities (number of animals)	Mortality subtotal for activity
Capture, transport, holding, release	pups	0	Observed mortality during activity			
			Unobserved/post-capture mortality			
	non-pups		Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0	0
Chemical sedation (injectable - e.g. valium)	non-pups		Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0	0
Permanent mark/hot branding	non-pups	0	Observed mortality during activity	0	0	
			Unobserved/post-capture mortality	0.0001	0	0.0
Relatively low risk procedures	pups	0	Observed mortality during activity	0	0	
			Unobserved/post-capture mortality	0.0001	0	
	non-pups	0	Observed mortality during activity	0	0	
			Unobserved/post-capture mortality	0.0001	0	0
Relatively medium risk procedures	pups	0	Observed mortality during activity	0	0	
			Unobserved/post-capture mortality	0.0002	0	
	non-pups	0	Observed mortality during activity	0	0	
			Unobserved/post-capture mortality	0.0002	0	0
Relatively high risk procedures	pups	0	Observed mortality during activity	0	0	
			Unobserved/post-capture mortality	0.001	0	
	non-pups	0	Observed mortality during activity	0	0	
			Unobserved/post-capture mortality	0.001	0	0.0
Subtotal for estimated mortality due to temporary captivity for experimentation						**0.0**

Notes: Low risk - blood/flipper tag/whisker pull/isotopes/eb/BIA/injections/ultrasound/external instruments/enemas/stomach intubate/fecal loop/stomach pill telemeters
Medium risk - teeth pull/biopsies/remote biopsies/(includes local anesthesia)
High risk - implant transmitters, surgeries
No risk - swabs/hair or nail clipping, temp marks, morph measurements, milk sample, external physical exam

Sub-Lethal Effects Due to Research

Most animals exposed to research activities do not die as a result; however, they may experience other effects, ranging in intensity from a temporary alteration of normal behavior to a reduction in foraging efficiency due to a painful injury or, at the extreme, to reproductive failure. The mechanisms for this range of potential sub-lethal effects are described in Section 4.8.1 and Appendix B.

As described under Alternative 2, sub-lethal effects could occur as a direct result of the research activity itself or indirectly, due to other contributing factors. The cause is difficult to determine, however, because no specific studies on this topic have been conducted. Research activities could cause disturbance or injury to animals that affect their ability to function normally. The consequences of such research-related effects will depend on a number of environmental conditions that vary seasonally, between years, and among locations. While the result of a disturbance or injury is difficult to predict because of the many complicating factors, the initial disturbance caused by research does play a role in the ultimate effect. Although research-related injuries under Alternative 3 could cause more than momentary pain or discomfort for individual animals, the focus of the analysis is how those injuries contribute to a population-level effect. The sex/age class most susceptible to effects that might decrease overall productivity of the population is breeding-age females, primarily through physiological reactions to stress that cause re-absorption or abortion of fetuses, failure of fertilized embryos to implant, or sterilization. The relevant question for the analysis is how many breeding age females are likely to be affected each year to the extent that they fail to reproduce as a result of research activities.

Total takes of NFSs, from *Researcher Presence in View of Animals* is not likely to affect reproductive success of the population (Table 4.8-27). Of the approximately 30,500 non-pups that would be exposed to aerial survey activity, approximately 450 would be expected to react to the disturbance. However, a smaller portion of these reactions would likely result in some degree of stress, pain, and suffering, and an even smaller number would include physical injuries. Because this type of disturbance would be very short in duration and very limited in frequency, responses would be unlikely to result in effects to reproductive success.

Land-based census activities from cat walks, cliffs, or tripods under this alternative would expose approximately 38,450 adults and juveniles, of which approximately 2,000 would respond to the disturbance in some manner. These responses could include an alert response, a change in behavior, or animals entering the water. These responses could elicit aggressive interactions between animals of neighboring territories. The magnitude or intensity of these reactions would be minor based on numbers. Although the sub-lethal effects on reproduction are unknown, the potential exists for some mechanism that could affect reproductive success or decrease the reproductive life of some individual animals. Responses, however, would be unlikely to result in effects to reproductive success at the population level. Effects are therefore considered minor.

The primary research activity associated with *Researcher Presence Among Animals* includes ground-based census activities. Approximately 382,000 pups and non-pups would be exposed to land or vessel-based activities, including captures. There is some potential for this level of disturbance to have an effect on reproductive success of individual animals. Magnitude or intensity therefore is considered minor; however, the actual intensity of that effect is unknown. Responses would be unlikely to result in effects to reproductive success at the population level.

Outside of the breeding season, captures at rookeries and haulouts could potentially disturb an estimated 21,795 animals (both pups and non-pups). Of the 21,795 NFSs, approximately 2,576 could be driven to the water, and about 7 would be expected to be injured (Table 4.8-28).

Capture and Restraint procedures constitute one of the most stressful incidents in the life of an animal, and intense or prolonged stimulation can induce detrimental responses (Fowler 1986). With NFSs, the primary subjects for capture and restraint are pups. Approximately 25,500 pups would be captured and physically restrained under Alternative 3 (Table 4.8-29). Sub-lethal effects on NFS pups have not been well studied. Because most of the sub-lethal effects in this category is associated with capture and restraint, it is assumed that the greatest amount of sub-lethal effects would occur from capture and restraint. All NFSs captured and restrained would be expected to experience some degree of stress associated with the capture or attempted escape from restraint. Physical injury could also occur. Restraint of the animals for marking or other procedures can result in overexertion, hyperthermia, and breathing problems (Appendix B). Capture myopathy (striated and cardiac muscle damage) is a possible consequence of the stress associated with chase, capture, and handling in numerous mammal species (Fowler 1986). The magnitude or intensity of the effects at the population level is unknown. However, because most of the captured animals would be pups, effects on reproductive success are unlikely by the time they enter the breeding population as adults. Chemical restraint, in the form of anesthesia or sedation, is used by researchers to minimize adverse effects or physical pain on the subject animals and to ensure success of the procedure. Sub-lethal effects of chemical restraint depend on the specific drugs used, and success of the drug is highly dependant on dosage (Appendix B). Adverse reactions and side effects from the range of drugs used for these procedures are not expected to be long-term. However, the effect on reproductive success or length of reproductive life in subsequent years is unknown.

The effects of *Handling and Sampling Procedures* are highly dependent on the experience and knowledge of the technicians performing the procedures and the health and physical condition of the subject animals. Sterile techniques and hygiene at the work site minimize injury to captured animals.

Approximately 6,240 relatively low-risk procedures would be performed on NFSs, about 58% of which would be pups. Collection of physical data on captured NFSs such as weight, length, girth, and use of ultrasound are not expected to have long-term effects on the animals. Collection of biological samples such as hair, nails, vibrissae, blood, fecal loops, enemas, swabs, and intubations result in either no pain or momentary pain.

Few (70) relatively medium-risk procedures would be done on adult NFSs. These procedures would include activities that break the skin in some manner and have a greater potential for adverse effects, in comparison to the relatively low-risk procedures. These procedures would be expected to cause more than momentary pain and have the potential for infection, especially given the unsanitary conditions of the rookeries. Muscle biopsies require a deeper incision and abscess can form in the deep tissue. Other relatively medium-risk procedures include blubber biopsies, skin biopsies, and surgical implantation of instruments. Relatively few of these procedures would be done on adult NFSs (70) under Alternative 3, but would yield valuable information on the condition of the NFS (Table 4.8-30).

It is difficult to estimate how many reproductive failures this level of disturbance would be likely to cause due to uncertainty about several factors:

- The proportion of these disturbed animals that would be reproductive age females.
- The proportions of animals likely to respond in different ways.
- The mechanisms of effect.
- The environmental conditions that would strongly influence the ultimate effect on individual animals.

<u>Conclusion for sub-lethal effects</u>

The magnitude of the total direct and indirect effect of mortality on NFSs under the scope of research under Alternative 3, the Status Quo, is approximately 47.8 animals per year, and would be considered negligible at the population level based on the percent of PBR affected. The geographic extent of this effect would be distributed among several rookeries, but within the major breeding area of this stock, and considered moderate. The magnitude of sub-lethal effects as they relate to population-level changes in reproductive success under Alternative 3 is unknown. Mortality and sub-lethal effects are considered likely with current research techniques, but the geographic extent of the research under Alternative 3 is likely to distribute sub-lethal effects across the range of the population. Frequency of research activities and exposure to this level of disturbance could occur several times during the breeding season and considered moderate.

Contribution to Conservation Objectives

The range of research activities authorized under Alternative 3, the Status Quo, provides the means to address essentially all basic information needs for NFSs that are identified in the Draft Conservation Plan. However, there are some sex/age classes that are underrepresented in the current data sets addressing particular issues. Consistent funding of research activities has been identified as a problem in fulfilling recommendations of the Draft Conservation Plan. Some of these data gaps may also be due to lack of techniques for safely capturing adult animals that researchers are interested in studying, such as pregnant or lactating females. Particular conservation actions recommended by the Draft Conservation Plan under Objective 3 that would be difficult to address adequately for all age/sex classes with currently authorized techniques include:

Conservation Action 3.1.5 – Study Vital Rates

- An expanded tagging and re-sighting program is recommended to obtain improved estimate of age-specific female survival and reproductive rates (once a better tag is tested).
- A study of the long-term survival and reproduction of individually identified females is recommended.
- A study of trends in age structure, age-specific reproductive rates, prey taken by fur seals during the breeding season and in other parts of the range is recommended.

Conclusion for Conservation Objectives

The Alternative 3, Status Quo, research program addresses most priority issues and long-term information needs for the eastern Pacific NFS stock. Based of the magnitude/intensity, long-term nature, and frequency of sampling under the Alternative 3 research program and the data thereby collected, the beneficial contribution towards the conservation objectives in the Draft Conservation Plan is considered moderate.

4.8.2.4 Eastern Pacific Stock - Direct and Indirect Effects of Alternative 4 – Preferred Alternative - Research Program with Full Implementation of Conservation Goals

All research activities authorized under Alternative 4 would meet the statutory and regulatory requirements of the permit process, including criteria for experienced research personnel, the use of “humane” procedures to minimize pain and suffering, and permit conditions to mitigate potentially adverse effects. It is assumed that the resulting research program would be conducted under conditions that would minimize disturbance and the chance of harm to the animals. The following assessment provides an estimate of the effects that would remain even after all reasonable precautions were taken for the scope of research defined under Alternative 4. This alternative would include not only those specific activities currently or previously permitted but any additional research activities or methods that would be needed to implement the Draft NFS Conservation Plan (NMFS 2006b).

Under Alternative 4, NMFS would consider proposals for research that posed a higher risk of injury to individual animals, including intentional mortality of moribund animals or other specified individuals, if the research was bona fide, and had a reasonable chance of providing important data relevant to conservation of the species. Permit issuance criteria would still prohibit research from putting the species at a disadvantage.

Permits and authorizations for incidental and intentional mortality under Alternative 4 would not exceed 15 percent of PBR for the eastern Pacific NFS (i.e., 2,289). The methods and procedures authorized under this research program would include all of those discussed under Alternative 3, plus additional methods as deemed appropriate.

Alternative 4 represents an extensive research program that would be able to address multiple issues over a large geographical area. For the purposes of this EIS, it is assumed that the grants and permits processes will be essentially the same as under the Status Quo. However, if adequate funding were available to implement this expanded research program, it is likely that NMFS would adopt one or more of the measures discussed in Chapter 5 of this document. These measures would expedite the review process and improve communication and coordination, not only between researchers but also between the various branches of NMFS involved in the research program, the Alaska Native communities affected by research, other federal and state agencies, and the public.

Direct and Indirect Mortality Due to Research

Under Alternative 4, there is the potential for use of aerial surveys (new methodology for NFSs) for abundance estimation in NFSs; however, because this is not currently used, this assumption is speculative. If the current takes for aerial surveys incidental to other marine mammal research remain the same as Status Quo, the takes for *Researcher Presence in View of Animals* would be similar to Alternative 3 (Table 4.8-32). Morality would remain at an estimate of 0.1 animals per year. Increased efforts with land-based surveys and direct observations on vital rates of NFSs under Alternative 4 would be likely to double; however, the predicted mortality from these low-intensity methods would be similar to the Status Quo (0.1 animals per year).

Population counts involving researchers among animals would be similar to the Status Quo. The estimated total direct and indirect mortality from *Researcher Presence Among Animals* is 21.7 animals per year (Table 4.8-33). Disturbances associated with recovery of tags and/or reading of tags would likely increase. The take associated with these activities would be expected to double over the Status Quo. Therefore, mortality estimates would increase from 0.9 to 1.9 animals per year. Overall, mortality for this category would increase over the Status Quo by approximately 1 animal per year.

Capture and Restraint of pups and non-pups could be expected to greatly increase compared to the Status Quo. New programs for tagging and pregnancy monitoring are anticipated, as is an increased effort for disease surveillance. Recaptures of animals with implantable passive integrated transponder (PIT) or flipper tags would be necessary if this technology is used. At-sea captures of animals could also be attempted for monitoring the health and condition of the population during the winter migration. As the numbers of animals captured and recaptured increases, the predicted mortality would also be expected to increase by 63 percent, from 26.4 to 42.0 animals per year (Table 4.8-34). Most of the increase would be directly related to capturing and restraining more animals. Six of the animals would be retained permanently for experimentation, which is considered as mortality because the animals are removed from the population.

Handling and Sampling Procedures performed on captured reproductive-age females would substantially increase in number under Alternative 4. The greatest increase would be for relatively medium-risk procedures, increasing from 70 under the Status Quo to 2,180 under Alternative 4 (Table 4.8-35). To monitor natality, an initial assessment could be made in October or November by evaluating circulation of hormone levels, and performing ultrasounds to determine pregnancy rates. The number of procedures per animal would also be likely to increase. For example, the addition of tooth removal of reproductive-age females could occur. Studies to assess the role of disease in pup survival may also be conducted (as described for SSLs). With the increase in numbers of animals handled and number of procedures performed, mortality would increase for handling and sampling from 0.6 under the Status Quo to 3.2 animals per year under Alternative 4.

The estimated total direct and indirect mortality from *Capture, Temporary Captivity for Experimentation, and Release* back into the wild is estimated at <0.1 animals per year (Table 4.8-36). Up to 10 non-pups would likely be taken from the wild for temporary captive research. Approximately 900 procedures would be performed on these animals while in captivity. The low rate of mortality would be due primarily to the controlled environment in which the animals are kept. As with all NMFS permits for research on pinnipeds used in captive experiments, NFSs must be maintained only in APHIS USDA-certified research facilities.

Conclusion for Mortality Effects

Total mortality for all research activities on eastern Pacific NFSs under Alternative 4 is estimated at 67.0 animals per year (Table 4.8-49). This represents 0.4 percent of PBR, and is therefore considered negligible (see Table 4.4-1 for the impact criteria, and Section 2.5 for a description of PBR as a metric for population-level effects). This effect would be considered likely and would be spread over several rookeries within the major breeding area for this stock, therefore the geographic extent and likelihood would be considered moderate.

Table 4.8-32
Estimated Mortality Due to Researcher Presence in View of Animals. NFS Eastern Pacific Stock - Alternative 4

Activity	Age class	Animals potentially exposed	Type of effect	Estimated proportion of animals affected	Predicted number of animals affected	Estimated mortality rate per affected animal[1]	Predicted mortalities (number of animals)	Mortality subtotal for activity
Aerial survey	pups	0	Observed mortality during activity			0	0.0	
			Alert response	0.01	0	0.0	0.0	
			Enter water	0.0001	0	0.001	0.0	
			Injured during disturbance	0.00005	0	0.05	0.0	
	non-pups	30,500	Observed mortality during activity			0	0.0	
			Alert response	0.01	305	0.0	0.0	
			Enter water	0.005	153	0.0001	0.02	
			Injury during disturbance	0.00001	0.3	0.02	0.0	0.0
On land, catwalks, tripods, cliffs	pups	13,000	Observed mortality during activity			0	0.0	
			Alert response	0.05	650	0.0	0.0	
			Enter water	0.0001	1	0.001	0.0	
			Injured during disturbance	0.00005	1	0.05	0.0	
	non-pups	76,900	Observed mortality during activity			0	0.0	
			Alert response	0.05	3,845	0.0	0.0	
			Enter water	0.005	385	0.0001	0.04	
			Injured during disturbance	0.00001	0.8	0.02	0.02	0.1
Subtotal for estimated mortality due to researcher presence in view of animals								**0.1**

Notes: [1]Mortality rates associated with alert, enter water, and injured reactions account for unobserved or subsequent mortalities attributable to the activity.

Table 4.8-33
Estimated Mortality Due to Researcher Presence among Animals. NFS Eastern Pacific Stock - Alternative 4

Activity	Age class	Animals potentially exposed	Type of effect	Estimated proportion of animals affected	Predicted number of animals affected	Estimated mortality rate per affected animal[1]	Predicted mortalities (number of animals)	Mortality subtotal for activity
Activities involving pup roundups	pups	7,010	Observed mortality during activity			0.00001	0.1	
Assume unchanged from Status Quo (Alternative 3) because these are related to censusing, which will be unchanged.			Alert response	1	7,010	0.0	0.0	
			Enter water	0.01	70	0.001	0.07	
			Injured during disturbance	0.001	7	0.05	0.4	
	non-pups	3,465	Observed mortality during activity			0.0	0.0	
			Alert response	1	3,465	0.0	0.0	
			Enter water	0.8	2,772	0.0001	0.3	
			Injury during disturbance	0.0005	2	0.02	0.03	0.8
Activities involving clearing rookery/haulout	pups	217,275	Observed mortality during activity			0.00001	2.2	
			Alert response	1	217,275	0.0	0.0	
			Enter water	0.05	10,864	0.0001	1.09	
			Injured during disturbance	0.0005	109	0.05	5.4	
Assume unchanged from Status Quo (Alternative 3) because these are related to censusing, which will be unchanged.	non-pups	103,975	Observed mortality during activity			0.0	0.0	
			Alert response	1	103,975	0.0	0.0	
			Enter water	0.9	93,578	0.0001	9.4	
			Injured during disturbance	0.0001	10	0.02	0.21	18.3
Incidental disturbance during captures in breeding season[2]	pups	16,840	Observed mortality during activity			0.0	0.2	
			Alert response	1	16,840	0.0	0.0	
			Enter water	0.001	17	0.001	0.02	
			Injured during disturbance	0.001	16.8	0.05	0.8	
	non-pups	40,330	Observed mortality during activity			0.0	0.0	
			Alert response	1	40,330	0.0	0.0	
			Enter water	0.01	403	0.0001	0.0	
			Injury during disturbance	0.001	40	0.02	0.81	1.9
Incidental disturbance during captures outside of breeding season	pups	12,890	Observed mortality during activity			0.0	0.1	
			Alert response	1	12,890	0.0	0.0	
			Enter water	0.05	645	0.0001	0.06	
			Injured during disturbance	0.0005	6	0.05	0.3	
	non-pups	10,905	Observed mortality during activity			0.0	0.0	
			Alert response	1	10,905	0.0	0.0	
			Enter water	0.2	2181	0.0001	0.2	
			Injured during disturbance	0.0001	1.1	0.02	0.02	0.8
Subtotal for estimated mortality due to researcher presence among animals								**21.7**

Notes: [1]Mortality rates associated with alert, enter water, and injured reactions account for unobserved or subsequent mortalities attributable to the activity.
[2]Breeding season: San Miguel stock prior to 1 August; eastern Pacific prior to 08 August

Table 4.8-34
Estimated Mortality Due to Capture and Restraint Activities. NFS Eastern Pacific Stock - Alternative 4

Activity	Age class	Number of animals captured	When mortality occurs	Estimated mortality rate per affected animal[1]	Predicted mortalities (number of animals)	Mortality subtotal for activity
Capture/physical restraint	pups	32,735	Observed during activity	0.000	0	
			Unobserved/post-capture	0.001	32.735	
	non-pups	380	Observed during activity	0.004	1.52	
			Unobserved/post-capture	0.0001	0.038	34.3
Capture/chemical anesthesia (inhalable agent-isoflurane)	non-pups	100	Observed during activity	0.004	0.4	
			Unobserved/post-capture	0.0001	0.01	0.4
Capture/chemical anesthesia (injectable)	non-pups	100	Observed during activity	0.01	1	
			Unobserved/post-capture	0.001	0.1	1.1
Capture/chemical sedation (injectable - e.g. valium)	non-pups	1,520	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0.152	0.152
Intentional lethal take or permanent removal	pups	6	Observed during activity	1	6	
	non-pups	0	Unobserved/post-capture	1	0	6
Subtotal for estimated mortality due to capture and restraint activities						**42.0**

Notes: [1]Mortality rates associated with alert, enter water, and injured reactions account for unobserved or subsequent mortalities attributable to the activity.

Table 4.8-35
Estimated Mortality Due to Handling and Sampling Procedures. NFS Eastern Pacific Stock - Alternative 4

Activity	Age class	Number of procedure-animals	When mortality occurs	Estimated mortality rate per procedure	Predicted mortalities (number of animals)	Mortality subtotal for activity
Permanent mark/hot-cold branding	pups	0	Observed during activity	0.000	0	
			Unobserved/post-capture	0.002	0	
	non-pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0	0.0
Relatively low risk procedures	pups	14,400	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	1.44	
	non-pups	13,080	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	1.308	2.7
Relatively medium risk procedures	pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.0002	0	
	non-pups	2,180	Observed during activity	0	0	
			Unobserved/post-capture	0.0002	0.436	0.436
Relatively high risk procedures	pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.001	0	
	non-pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.001	0	0.0
Subtotal for estimated mortality due to handling and sampling procedures						**3.2**

Notes: Low risk - blood/flipper tag/whisker pull/isotopes/eb/bia/injections/ultrasound/external instruments/enemas/stomach intubate/fecal loop/stomach pill telemeters
Medium risk - teeth pull/biopsies/remote biopsies/(includes local anesthesia)
High risk - implant transmitters, surgeries
No risk - swabs/hair or nail clipping, temp marks, morph measurements, milk sample, external physical exam

Table 4.8-36
Estimated Mortality Due to Temporary Captivity for Experimentation. NFS Eastern Pacific Stock - Alternative 4

Activity	Age class	Number of animals or procedure-animals	When mortality occurs	Estimated mortality rate per affected animal or procedure	Predicted mortalities (number of animals)	Mortality subtotal for activity
Capture, transport, holding, release	pups	0	Observed mortality during activity			
			Unobserved/post-capture mortality			
	non-pups	10	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0.001	0.001
Chemical sedation (injectable - e.g. valium)	non-pups	130	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0.013	0.013
Permanent mark/hot branding	non-pups	0	Observed mortality during activity	0	0	
			Unobserved/post-capture mortality	0.0001	0	0.0
Relatively low risk procedures	pups	0	Observed mortality during activity	0	0	
			Unobserved/post-capture mortality	0.0001	0	
	non-pups	690	Observed mortality during activity	0	0	
			Unobserved/post-capture mortality	0.0001	0.069	0.069
Relatively medium risk procedures	pups	0	Observed mortality during activity	0	0	
			Unobserved/post-capture mortality	0.0002	0	
	non-pups	52	Observed mortality during activity	0	0	
			Unobserved/post-capture mortality	0.0002	0.0104	0.0104
Relatively high risk procedures	pups	0	Observed mortality during activity	0	0	
			Unobserved/post-capture mortality	0.001	0	
	non-pups	10	Observed mortality during activity	0	0	
			Unobserved/post-capture mortality	0.001	0.01	0.0
Subtotal for estimated mortality due to temporary captivity for experimentation						**0.1**

Notes: Low risk - blood/flipper tag/whisker pull/isotopes/eb/BIA/injections/ultrasound/external instruments/enemas/stomach intubate/fecal loop/stomach pill telemeters
Medium risk - teeth pull/biopsies/remote biopsies/(includes local anesthesia)
High risk - implant transmitters, surgeries
No risk - swabs/hair or nail clipping, temp marks, morph measurements, milk sample, external physical exam

Sub-Lethal Effects Due to Research

The estimated scope of research conducted under Alternative 4 could potentially affect many animals in the population through disturbance and capture/handling activities. The mortality assessment tables indicate that a small percentage of animals could die as a result of entering the water and/or being injured during research-related disturbance. Most animals exposed to research activities do not die as a result; however, they may experience other effects, ranging in intensity from a temporary alteration of normal behavior to a reduction in foraging efficiency due to a painful injury or, at the extreme, to reproductive failure. The mechanisms for this range of potential sub-lethal effects are described in Section 4.8.1 and Appendix B.

Sub-lethal effects of aerial surveys would be similar to those discussed under Alternative 3. For land-based surveys and observations (*Researcher Presence in View of Animals*), approximately 90,000 NFSs would be exposed to disturbance during these activities, but only 386 are predicted to respond to the point of entering the water (Table 4.8-32). Physical injury is predicted to affect less than 2 individuals.

Sub-lethal effects of *Researcher Presence Among Animals* resulting from the roundup of pups for census work would be similar to Alternative 3 (Table 4.8-33). The program would continue at the same intensity as under Alternative 3, the Status Quo. Capture during the breeding season would result in disturbance of other animals on the rookery. Approximately 57,000 animals would be exposed to this activity, with 420 potentially suffering some level of sub-lethal effect by escaping to the water. Physical injuries would affect approximately 57 of these animals. After the breeding season, scat collection and other activities would potentially expose approximately 23,800 animals to disturbance. Potentially 2,826 would suffer some level of sub-lethal effects, but physical injury is expected to affect only 7 NFSs.

Effects of *Capture and Restraint* of approximately 32,700 pups for capture/physical restraint are expected to contribute substantially to sub-lethal effects (Table 4.8-34). By comparison, other procedures performed after capture, such as sedation and anesthesia, are done on relatively few animals. Thus, the sub-lethal effect is primarily due to capture and physical restraint of animals. Sub-lethal effects from these activities on reproductive success or the duration of the reproductive life of females as they come into the breeding population are unknown. Sub-lethal effects of chemical restraint, such as anesthesia and sedation, on reproduction are also unknown, but the number of animals affected is relatively small.

Sub-lethal effects of *Handling and Sampling Procedures* would primarily be from relatively low-risk procedures performed on 27,480 pups and non-pups, and relatively medium-risk procedures performed on 2,180 non-pups (Table 4.8-35). This would be a three-fold increase over Status Quo levels; therefore, sub-lethal effects are also expected to be greater. Again, the primary risk to NFSs occurs during capture and restraint; therefore, subsequent procedures are not expected to cause additional risk to the animals.

The estimated total direct and indirect mortality from *Capture, Temporary Captivity for Experimentation, and Release* back into the wild is estimated at 0.1 animals per year (Table 4.8-36). Once NFSs are captured and transported to a facility for further experimentation, sub-lethal effects of subsequent procedures are not as risky as the initial capture. Although the numbers of procedures (approximately 800) may seem high, these procedures are performed on the same small number of animals, and are closely observed and monitored for signs of adverse effects. Magnitude or intensity of these effects is expected to be minor.

Conclusion for sub-lethal effects

The magnitude of the sub-lethal effects on reproduction at the population level is unknown, but would be proportionally higher than Status Quo. Geographic extent of these effects would be the same as under Alternative 3 and considered moderate. Frequency of research activities and exposure to this level of disturbance could occur several times during the breeding season, and is therefore considered moderate.

Contribution to Conservation Objectives

Alternative 4 is designed to allow researchers to address all objectives and conservation actions of the Draft NFS Conservation Plan. The implementation of the alternative would require an increased level of funding compared to the Status Quo. Although such funding levels have not been appropriated through Congress or secured through other sources, Alternative 4 assumes that the full scope of research analyzed previously could be authorized if funding was available. Researchers would be able to develop new capture techniques and drugs that would allow capture/recapture of mature animals to address sex/age class data gaps. In addition, procedures that present a greater risk of injury to individual animals could be permitted if they address essential data needs and have a reasonable chance of succeeding.

The expanded research efforts under Alternative 4 would contribute substantially to the goals and objectives of the NFS Conservation Plan (NMFS 2006b). Development of an overall research plan as part of this effort would be essential for coordinating and maximizing the benefits of the expanded research efforts under Alternative 4. Such an overall research plan would refine research priorities, determine an overall strategy for where, when, and how research efforts should be conducted, and specify how research results should be evaluated and used for management decisions. Development of such a plan would require a substantial and coordinated commitment from NMFS, other federal and state agencies, Alaska Native organizations, academic institutions, environmental groups, the fishing industry, and other interested parties.

Conclusion for conservation objectives

The Alternative 4 research program is focused on full implementation of the Draft Conservation Plan. Because of the magnitude/intensity, duration, long-term nature, and frequency of sampling, and data collected thereby, under this alternative research program, the beneficial contribution towards the conservation objectives in the Draft Conservation Plan is considered major. However, the actual contribution would be highly dependent on funding.

4.8.2.5 Eastern Pacific Stock - Cumulative Effects

Summary of Direct and Indirect Effects

Direct and indirect effects of research activities include disturbance, capture, and handling that could lead to mortality and sub-lethal effects. The alternatives vary in the estimated amount of mortality that would occur under a given scope of research (Sections 4.8.2.1 through 4.8.2.4). For Alternatives 1, 2, and 3, the estimated mortality is less than 10 percent of the PBR and is considered negligible on a population level. The estimated mortality under Alternative 4 is under the target of 15 percent of PBR and is also considered negligible on a population level. For all alternatives (1-4), the estimated mortality represents less than 0.5% of PBR. The magnitude of sub-lethal effects would be negligible for Alternative 1 and is considered unknown for Alternatives 2, 3, and 4 because of several uncertainty factors. In regard to ability to provide research support for the conservation objectives described in the Draft Conservation Plan, Alternative 1 would address very few conservation objectives. Alternative 2 would address only a few additional conservation objectives. Alternative 3 would address a high degree of the important conservation objectives; and Alternative 4 would address all conservation objectives.

Summary of Lingering Past Effects

Commercial harvest of NFSs was a major source of human-induced mortality for over 200 years, and the abundance of NFSs fluctuated greatly in the past largely due to this commercial harvest (NMFS 2006b). Commercial harvest of NFSs peaked in 1961 with over 126,000 animals harvested. The harvest was halted in 1985. Commercial harvests of females from 1956 through 1968, only about two generations ago, probably contributed to the decline of the population from the 1950s to the 1970s, and may have had lingering effects after its cessation (York and Hartley 1981). The population increased slightly in the early 1970s, however, and declines since then are difficult to explain. The level of commercial juvenile male harvests on the Pribilof Islands in the 1970s and 1980s was not believed to have had a deleterious affect on the population. It is therefore unlikely that the present NFS population is now influenced by any residual effects from the past commercial (or subsistence) harvest (NMFS 2006b).

At present, the PBR for this population is 15,262 animals per year (Angliss and Outlaw 2007). Alaska Natives are allowed to harvest NFSs for subsistence purposes, with a range of take determined by annual household surveys. From 1999 to 2003, the average annual subsistence take was 869 from St. Paul and St. George in the Pribilof Islands. This represents less than 6 percent of PBR. Only juvenile males are taken in the subsistence hunt, which minimizes the impact of the hunt on population growth. Subsistence take in other areas besides the Pribilofs is known to occur, but is thought to be minimal (Angliss and Outlaw 2005). Intentional killing of NFSs by commercial fishermen, sport fishermen, and others probably occurs, but the magnitude of this mortality is not known. Intentional take is illegal under the MMPA except for subsistence uses of Alaska Natives or bona fide research.

Incidental take of NFSs from the foreign and joint venture groundfish fisheries averaged 22 animals per year from 1978 to 1988 (Perez and Loughlin 1991). The high seas driftnet fisheries killed thousands of NFSs every year, including an estimated 5,200 NFSs in 1991, the last year before these fisheries were outlawed by United Nations Resolution (46/215) (Hill and DeMaster 1999). Illegal driftnet fishing apparently continues at low levels, but no quantitative information is available on incidental take. Based on self-reported mortalities, state-managed salmon fisheries took an average of 15 NFSs per year from 1990 to 1998. Most of these mortalities came from the Bristol Bay salmon drift gillnet fishery.

Commercial fisheries may have affected NFSs indirectly by affecting the quality of their marine habitat and the availability of their prey species. The removal of large numbers of fish and other marine species from NFS marine habitat may have changed the composition of the fish community, thereby altering the abundance and distribution of prey available for NFSs (NMFS 2006 unpublished).

Another mechanism for incidental take of NFSs is through entanglement with fishing gear, packing bands, and other debris lost or ejected from fishing vessels, shipping vessels, and shoreside sources (Angliss and Outlaw 2005). Some gear may continue to circulate in the environment for many years. The numbers of animals entangled at sea that never make it back to land are not known, but this issue has been cited as making a significant contribution to the decline of the population in the 1970s and early 1980s (Fowler 1987). Surveys of NFSs on St. Paul indicated that the proportion of animals with debris wrapped around part of their bodies decreased from 0.4 percent in 1976-1985 to 0.2 percent in 1988-1992 and 1995-1997, and increased to 2.8 in 1998-2002 (Angliss *et al.* 2001; Angliss and Outlaw 2005). Between 1995 and 2000, responsibility for entanglement studies of NFSs shifted gradually from NMML to the Tribal Government of St. Paul's Ecosystem Conservation Office (ECO). ECO has managed the entanglement studies under a co-management agreement with NOAA for NFSs since 2000.

Analysis of Reasonably Foreseeable Future Actions

Many of the lingering past effects are expected to continue in the foreseeable future. These effects include incidental take from foreign fisheries outside the U.S. EEZ, where NFSs are widely dispersed. State-managed fisheries take small numbers of NFSs (approximately 15 per year) including the Prince William Sound drift gillnet fishery, Alaska Peninsula and Aleutian Island salmon gillnet fisheries, and the Bristol Bay salmon fisheries (Angliss and Outlaw 2007). Subsistence will continue to be a major source of mortality in the future but is limited to the Pribilof Islands. Levels of take are expected to be well below 10 percent of PBR for this species. The effects of global climate change or long-term regime shifts on NFSs are difficult to predict, but could potentially have either a beneficial or adverse effect on survival and reproductive success. The future spatial/temporal concentration of commercial fisheries could affect the abundance and distribution of important prey species for NFSs, specifically pollock and cod, and potentially contribute to their nutritional stress. Vessel traffic associated with commercial shipping and tourism could increase as these industries expand, but outside of the breeding season, NFSs are generally dispersed over a large area and this effect is likely to be minimal.

Cumulative Effects

A number of internal and external factors have been identified that could contribute to overall mortality and a range of sub-lethal effects, primarily through disturbance. Mortality from research activities under Alternatives 1 and 2 is very small and approaches zero. Therefore, there would be no cumulative effects expected under these alternatives. Under Alternatives 3 and 4, research activities would likely contribute approximately 48 to 67 animals per year, respectively, to the overall cumulative mortality. Sub-lethal effects from research activities are identified for Alternatives 2, 3, and 4. These effects are difficult to quantify but if reproductive success were to be affected, the effect would be a very small contribution to the overall cumulative effect.

Mortality Effects

The population of the eastern Pacific stock of NFSs has been in decline in recent years (Angliss and Outlaw 2007). The most recent estimate for the number of NFSs in the eastern Pacific stock, based on the pup counts from 2002 on Sea Lion Rock, from 2004 on the Pribilof islands, and from 2005 on Bogoslof Island is 721,395 (Angliss and Outlaw 2007). The cumulative effect of human-caused mortality from internal and external factors is considered negligible based on the large size of the NFS populations and existing levels of human-caused mortality (below the PBR of 15,262). The contribution of research, under all of the alternatives, to the cumulative effect of mortality is considered negligible.

Sub-Lethal Effects

Disturbance from research activities, marine vessel traffic, air traffic, fishing operations, tourism, and other sources can cause physical and physiological effects in NFSs that may range from temporary alterations of behavior, abandonment of haulout sites, painful injuries, inability to forage normally, or reproductive failure. The intensity of response to disturbance can vary according to numerous physical factors and individual condition of the animals. The alternatives vary in the amount of research-related disturbance and potential injuries that they would contribute to the cumulative sub-lethal effects. Alternative 1 would contribute to no disturbance and, therefore, there would be no cumulative effect on sub-lethal effects. The other alternatives represent an increasing scope and intensity of contributed disturbance from Alternative 2 to Alternative 4. However, because the population-level effect of disturbance and handling procedures from all of these alternatives is unknown, their contribution to the cumulative sub-lethal effects is also unknown.

Conservation Objectives

Alternatives 1 through 4 would contribute varying amounts of research effort in support of the objectives in the Draft Conservation Plan. Alternative 1 would contribute no new field work; its contribution to the cumulative conservation efforts would therefore be very minimal. The other alternatives can be ranked in increasing scope and intensity of contributed research from Alternative 2 to Alternative 4. While each of these alternatives could contribute to the scientific basis for management decisions to varying extents, the use of these data to implement meaningful conservation measures would depend on many factors, such as funding, scientific interest, and socioeconomic factors.

4.8.2.6 San Miguel Island Stock – Direct and Indirect Effects of Alternative 1 - No Action: No New Permits or Authorizations

Under Alternative 1, No Action, the scope of research on the San Miguel Island would be limited to analysis of existing data and samples collected in the past, behavioral observations from distant vantage points that would not result in any disturbance of the animals, and aerial surveys at an elevation that would not elicit a response from individuals at the rookery.

Direct and Indirect Mortality Due to Research

Because there would be no research-related takes of NFSs from the San Miguel Island NFS stock, there would be no mechanism for research-related injury or mortality.

Sub-Lethal Effects Due to Research

Because there would be no research-related takes of NFSs from the San Miguel Island NFS stock, there would be no mechanism for research-related injury or mortality.

Conclusion for sub-lethal effects

Lacking a mechanism for research-related mortality or sub-lethal effect on San Miguel Island NFSs, effects of the Alternative 1 research program would be negligible.

Contribution to Conservation Objectives

Because the San Miguel Island stock of the NFS is not listed as threatened or endangered under the ESA or listed as depleted under the MMPA, there is currently no recovery plan or conservation plan for this stock. However, NMFS must still fulfill MMPA requirements to determine the status of this stock. Based on currently available data, the estimated annual level of total human-caused mortality and serious injury is zero. Therefore, human-caused mortality does not exceed the PBR of 219 for this stock, and the San Miguel Island stock of the NFS is not classified as a strategic stock (NMFS 2003).

4.8.2.7 San Miguel Island Stock - Alternative 2 – Research Program without Capture or Handling

Under Alternative 2, the scope of research on the San Miguel Island stock of NFSs would be limited to survey activities (>1,000 feet elevation), land-based census activities from a distance, behavioral observations, scat samples from the rookery during the non-breeding season, and other activities that would not involve the capture or handling of animals or the presence of researchers on rookeries during the breeding season.

Direct and Indirect Mortality Due to Research

The estimated number of takes and mortality assessments for these activities are described in Tables 4.8-37 and 4.8-38. Permits would be issued for incidental disturbance during aerial survey activity on this stock and incidental disturbance from survey activity on other species. The mortality assessment table indicates that the effects of *Researcher Presence in View of Animals* would be relatively low (350) and the estimated mortality from this type of research activity would be zero.

Land-based and vessel-based census activity on this stock could be conducted as long as no disturbance occurs on the rookeries. Scat collections would be allowed during the non-breeding season. Total take would be approximately 3,750 (approximately half of which would be pups), but the predicted mortality from research under this alternative is also expected to be zero (Table 4.8-38).

Conclusion for mortality effects

Based on the low-level of research activity under Alternative 2, mortality from research activities is unlikely and considered negligible.

Table 4.8-37
Estimated Mortality Due to Researcher Presence in View of Animals. NFS San Miguel Stock - Alternative 2

Activity	Age class	Animals potentially exposed	Type of effect	Estimated proportion of animals affected	Predicted number of animals affected	Estimated mortality rate per affected animal1	Predicted mortalities (number of animals)	Mortality subtotal for activity
Aerial survey	pups	0	Observed mortality during activity			0	0.0	
			Alert response	0	0	0.0	0.0	
			Enter water	0	0	0.001	0.0	
			Injured during disturbance	0	0	0.05	0.0	
	non-pups	350	Observed mortality during activity			0	0.0	
			Alert response	0	0	0.0	0.0	
			Enter water	0	0	0.0001	0.00	
			Injury during disturbance	0	0	0.02	0.0	0.0
On land, catwalks, tripods, cliffs	pups	1,300	Observed mortality during activity			0	0.0	
			Alert response	0.05	65	0.0	0.0	
			Enter water	0.0001	0	0.001	0.0	
			Injured during disturbance	0.00005	0	0.05	0.0	
	non-pups	2,450	Observed mortality during activity			0	0.0	
			Alert response	0.05	123	0.0	0.0	
			Enter water	0.005	12	0.0001	0.00	
			Injured during disturbance	0.00001	0	0.02	0.00	0.0
Subtotal for estimated mortality due to researcher presence in view of animals								**0.0**

Notes: [1]Mortality rates associated with alert, enter water, and injured reactions account for unobserved or subsequent mortalities attributable to the activity.

Table 4.8-38
Estimated Mortality Due to Researcher Presence among Animals. NFS San Miguel Alternative 2

Activity	Age class	Animals potentially exposed	Type of effect	Estimated proportion of animals affected	Predicted number of animals affected	Estimated mortality rate per affected animal[1]	Predicted mortalities (number of animals)	Mortality subtotal for activity
Haulouts, rookeries non-breeding (scat collection, resights, ground counts)	pups	0	Observed mortality during activity			0.00001	0.0	
			Alert response	1	0	0.0	0.0	
			Enter water	0.05	0	0.0001	0.0	
			Injured during disturbance	0.0005	0	0.05	0.0	
	non-pups	0	Observed mortality during activity			0	0.0	
			Alert response	1	0	0.0	0.0	
			Enter water	0.9	0	0.0001	0.00	
			Injured during disturbance	0.0001	0	0.02	0.0	0.0
Subtotal for estimated mortality due to researcher presence among animals								**0.0**

Notes: [1]Mortality rates associated with alert, enter water, and injured reactions account for unobserved or subsequent mortalities attributable to the activity.

Sub-Lethal Effects Due to Research

Sub-lethal Effects from *Researcher Presence in View of Animals* under this alternative are expected to range from a mild alert response and vocalization to being forced into the water. Neither of these responses would be expected to result in any long-term effects on reproductive success of females.

Research of NFSs on San Miguel Island reports little if any disturbance effect from aerial or vessel-based surveys (Bengston *et al.* 2005). No mortalities are predicted for this scope of work under Alternative 2. The sub-lethal effects of the low level of research activities allowed under Alternative 2 are expected to have a negligible effect on reproductive success.

Conclusion for sub-lethal effects

The geographic extent of research activities would be considered major in that it would potentially affect much of the breeding population on San Miguel Island. Although there would be some mechanism for sub-lethal effects to occur, the magnitude or intensity of these effects is unknown. However, considered the limited research activity under Alternative 2, effects are unlikely to result in reduced reproductive success and are considered negligible.

Contribution to Conservation Objectives

Because the San Miguel Island stock of NFSs is not listed as threatened or endangered under the ESA or listed as depleted under the MMPA, there are currently no conservation objectives.

4.8.2.8 San Miguel Island Stock - Direct and Indirect Effects of Alternative 3 - Status Quo Research Program

Under Alternative 3, the Status Quo, the scope of research on the San Miguel Island stock of NFSs depends substantially on the amount of available funding. The level of NFS take authorized by January 2006 is used as a proxy for the level and types of research programs under this alternative. Under Alternative 3, new permits would replace old permits, such that the levels and types of research activities would continue to the extent that funding would allow.

Direct and Indirect Mortality Due to Research

The estimated number of takes and mortality assessments for research activities under Alternative 3 is approximately 5 animals per year (Tables 4.8-49). For *Researcher Presence in View of Animals,* the number of animals exposed to an aerial survey activity on the San Miguel Island stock of NFSs would be essentially the same as under Alternative 2 (Table 4.8-39). Effects of researcher presence in view of animals would be considered negligible.

Effects of the land-based research program, *Researcher Presence Among Animals*, on San Miguel Island under Alternative 3, would be associated with pup roundups, rookery-clearing activities, and animals incidentally disturbed during captures of other individual animals (Table 4.8-40). This level of activity is predicted to result in mortality of approximately 0.6 animals per year. These mortalities would be the result of physical trauma, such as trampling of pups or aggressive interaction between other animals on the rookery.

Of the 2,165 takes permitted for *Capture and Restraint* under Alternative 3, there would be an estimated mortality of 3.7 animals per year (Table 4.8-41). Mortality of 1.4 animals is predicted for capture and anesthesia using injectable agents (used on less than 6 percent of the subject animals), and this typically occurs during the procedure. With injectable anesthetic the proper dosage is vital. Determining the proper dosage, primarily a function of age, weight, and health, is often difficult in the field and could result in increased risk of mortality. Actual capture and physical restraint of the animals would contribute the highest mortality (2.3 animals per year), and this mortality is predicted to occur during the post-capture period (unobserved mortality).

Potential multiple captures of a single animal are treated as separate captures but could increase the risk of mortality to individual animals. Some pups may be recaptured up to five separate times for some procedures, which can contribute to the overall mortality.

The primary source of mortality for *Handling and Sampling Procedures* would be the relatively low-risk procedures, which would be performed on over 6,000 animals (Table 4.8-42). Total mortality is estimated at 0.6 animals per year. By comparison, relatively medium-risk procedures would be performed on only 550 animals, with an approximate mortality of 0.1 animals per year. No high-risk procedures are proposed under Alternative 3. Total estimated mortality for these research procedures is very low and projected to be less than one animal per year (0.7 animals per year).

Temporary Capture for Experimentation includes capture of individual animals for transport to a research facility for an extended period of time. The number of animals captured for these purposes is typically very low and once captured and sedated, mortality is very low. However, there are no current permits which authorize the temporary capture of San Miguel Island NFS stock (Table 4.8-43).

<u>Conclusion for mortality effects</u>

Total mortality for all research activities on San Miguel Island NFSs under Alternative 3 is estimated at 5 animals per year (Table 4.8-49). This represents 2.3 percent of PBR, and is therefore considered negligible (see Table 4.4-1 for the impact criteria, and Section 2.5 for a description of PBR as a metric for population-level effects).

Table 4.8-39
Estimated Mortality Due to Researcher Presence in View of Animals. NFS San Miguel Stock - Alternative 3

Activity	Age class	Animals potentially exposed	Type of effect	Estimated proportion of animals affected	Predicted number of animals affected	Estimated mortality rate per affected animal[1]	Predicted mortalities (number of animals)	Mortality subtotal for activity
Aerial survey	pups	0	Observed mortality during activity			0	0.0	
			Alert response	0	0	0.0	0.0	
			Enter water	0	0	0.001	0.0	
			Injured during disturbance	0	0	0.05	0.0	
	non-pups	350	Observed mortality during activity			0	0.0	
			Alert response	0	0	0.0	0.0	
			Enter water	0	0	0.0001	0.00	
			Injury during disturbance	0	0	0.02	0.0	0.0
On land catwalks, tripods, cliffs	pups	1,300	Observed mortality during activity			0	0.0	
			Alert response	0.05	65	0.0	0.0	
			Enter water	0.0001	0	0.001	0.0	
			Injured during disturbance	0.00005	0	0.05	0.0	
	non-pups	2,450	Observed mortality during activity			0	0.0	
			Alert response	0.05	123	0.0	0.0	
			Enter water	0.005	12	0.0001	0.00	
			Injured during disturbance	0.00001	0	0.02	0.00	0.0
Subtotal for estimated mortality due to researcher presence in view of animals:								**0.0**

Notes: [1]Mortality rates associated with alert, enter water, and injured reactions account for unobserved or subsequent mortalities attributable to the activity.

Table 4.8-40
Estimated Mortality Due to Researcher Presence among Animals. NFS San Miguel Stock - Alternative 3

Activity	Age class	Animals potentially exposed	Type of effect	Estimated proportion of animals affected	Predicted number of animals affected	Estimated mortality rate per affected animal[1]	Predicted mortalities (number of animals)	Mortality subtotal for activity
Activities involving pup roundups	pups	3,000	Observed mortality during activity			0.00001	0.0	
			Alert response	1	3,000	0.0	0.0	
			Enter water	0.01	30	0.001	0.03	
			Injured during disturbance	0.001	3	0.05	0.2	
	non-pups	1,575	Observed mortality during activity			0.0	0.0	
			Alert response	1	1,575	0.0	0.0	
			Enter water	0.8	1,260	0.0001	0.1	
			Injury during disturbance	0.0005	0.7875	0.02	0.02	0.4
Activities involving clearing rookery/haulout	pups	0	Observed mortality during activity			0.00001	0.0	
			Alert response	1	0	0.0	0.0	
			Enter water	0.05	0	0.0001	0.00	
			Injured during disturbance	0.0005	0	0.05	0.0	
	non-pups	500	Observed mortality during activity			0.0	0.0	
			Alert response	1	500	0.0	0.0	
			Enter water	0.9	450	0.0001	0.0	
			Injured during disturbance	0.0001	0.05	0.02	0.00	0.0
Incidental disturbance during captures in breeding season	pups	1,630	Observed mortality during activity			0.0	0.0	
			Alert response	1	1,630	0.0	0.0	
			Enter water	0.001	1.63	0.001	0.00	
			Injured during disturbance	0.001	1.63	0.05	0.1	
	non-pups	2,260	Observed mortality during activity			0.0	0.0	
			Alert response	1	2,260	0.0	0.0	
			Enter water	0.01	22.6	0.0001	0.0	
			Injury during disturbance	0.001	2.26	0.02	0.05	0.1
Incidental disturbance during captures outside of breeding season	pups	710	Observed mortality during activity			0.0	0.0	
			Alert response	1	710	0.0	0.0	
			Enter water	0.05	35.5	0.0001	0.0	
			Injured during disturbance	0.0005	0.355	0.05	0.0	
	non-pups	595	Observed mortality during activity			0.0	0.0	
			Alert response	1	595	0.0	0.0	
			Enter water	0.2	119	0.0001	0.0	
			Injured during disturbance	0.0001	0.0595	0.02	0.00	0.0
Subtotal for estimated mortality due to researcher presence among animals								**0.6**

Notes: [1]Mortality rates associated with alert, enter water, and injured reactions account for unobserved or subsequent mortalities attributable to the activity.

Table 4.8-41
Estimated Mortality Due to Capture and Restraint Activities. NFS San Miguel Stock - Alternative 3

Activity	Age class	Number of animals captured	When mortality occurs	Estimated mortality rate per affected animal[1]	Predicted mortalities (number of animals)	Mortality subtotal for activity
Capture/physical restraint	pups	1,900	Observed during activity	0.000	0	
			Unobserved/post-capture	0.001	1.9	
	non-pups	100	Observed during activity	0.004	0.4	
			Unobserved/post-capture	0.0001	0.01	2.3
Capture/chemical anesthesia '(inhalable agent-isoflurane)	pups	0	Observed during activity	0.004	0	
			Unobserved/post-capture	0.0001	0	0.0
Capture/chemical anesthesia (injectable)	non-pups	125	Observed during activity	0.01	1.25	
			Unobserved/post-capture	0.001	0.125	1.4
Capture/chemical sedation (injectable-e.g. valium)	non-pups	40	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0.004	0.004
Intentional lethal take or permanent removal	pups	0	Observed during activity	1	0	
	non-pups	0	Unobserved/post-capture	1	0	0
Subtotal for estimated mortality due to capture and restraint activities						**3.7**

Notes: [1]Mortality rates associated with alert, enter water, and injured reactions account for unobserved or subsequent mortalities attributable to the activity.

Table 4.8-42
Estimated Mortality Due to Handling and Sampling Procedures. NFS San Miguel Stock - Alternative 3

Activity	Age class	Number of procedure-animals	When mortality occurs	Estimated mortality rate per procedure	Predicted mortalities (number of animals)	Mortality subtotal for activity
Permanent mark/hot-cold branding	pups	0	Observed during activity	0.000	0	
			Unobserved/post-capture	0.002	0	
	non-pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0	0.0
Relatively low risk procedures	pups	4225	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0.4225	
	non-pups	1795	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0.1795	0.6
Relatively medium risk procedures	pups	100	Observed during activity	0	0	
			Unobserved/post-capture	0.0002	0.02	
	non-pups	450	Observed during activity	0	0	
			Unobserved/post-capture	0.0002	0.09	0.11
Relatively procedures	pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.001	0	
	non-pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.001	0	0.0
Subtotal for estimated mortality due to handling and sampling procedures						**0.7**

Notes: Low risk - blood/flipper tag/whisker pull/isotopes/eb/BIA/injections/ultrasound/external instruments/enemas/stomach intubate/fecal loop/stomach pill telemeters
Medium risk - teeth pull/biopsies/remote biopsies/(includes local anesthesia)
High risk - implant transmitters, surgeries
No risk - swabs/hair or nail clipping, temp marks, morph measurements, milk sample, external physical exam

Table 4.8-43
Estimated Mortality Due to Temporary Captivity for Experimentation. NFS San Miguel Stock - Alternative 3

Activity	Age class	Number of animals or procedure-animals	When mortality occurs	Estimated mortality rate per affected animal or procedure	Predicted mortalities (number of animals)	Mortality subtotal for activity
Capture, transport, holding, release	pups	0	Observed mortality during activity			
			Unobserved/post-capture mortality			
	non-pups		Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0	0
Chemical sedation (injectable-e.g. valium)	non-pups		Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0	0
Permanent mark/hot branding	non-pups	0	Observed mortality during activity	0	0	
			Unobserved/post-capture mortality	0.0001	0	0.0
Relatively low risk procedures	pups	0	Observed mortality during activity	0	0	
			Unobserved/post-capture mortality	0.0001	0	
	non-pups	0	Observed mortality during activity	0	0	
			Unobserved/post-capture mortality	0.0001	0	0
Relatively medium risk procedures	pups	0	Observed mortality during activity	0	0	
			Unobserved/post-capture mortality	0.0002	0	
	non-pups	0	Observed mortality during activity	0	0	
			Unobserved/post-capture mortality	0.0002	0	0
Relatively high risk procedures	pups	0	Observed mortality during activity	0	0	
			Unobserved/post-capture mortality	0.001	0	
	non-pups	0	Observed mortality during activity	0	0	
			Unobserved/post-capture mortality	0.001	0	0.0
Subtotal for estimated mortality due to temporary captivity for experimentation						**0.0**

Notes: Low risk - blood/flipper tag/whisker pull/isotopes/eb/BIA/injections/ultrasound/external instruments/enemas/stomach intubate/fecal loop/stomach pill telemeters
Medium risk - teeth pull/biopsies/remote biopsies/(includes local anesthesia)
High risk - implant transmitters, surgeries
No risk - swabs/hair or nail clipping, temp marks, morph measurements, milk sample, external physical exam

Sub-Lethal Effects Due to Research

The estimated scope of research conducted under Alternative 3 could potentially affect most, if not all, of the San Miguel Island stock of NFSs, due to disturbance from vessel-based and land-based surveys and other research activities. In addition to the small rate of mortality from these research procedures, the vast majority of animals would experience other sub-lethal effects, ranging in intensity from alarm, to temporary alteration of normal behavior, to a reduction in foraging efficiency or, at the extreme, to reproductive failure. From a population-level perspective, the most important effects are those that could decrease overall productivity.

Sub-lethal effects of *Researcher Presence in View of Animals* due to land-based surveys under Alternative 3, the Status Quo, would potentially expose approximately 3,750 animals to this short-term or intermittent disturbance (Table 4.8-39). Effects are expected to include a mild alert response and vocalization (123 non-pups), being forced into the water (12 animals) or sub-lethal injuries (<0.1 animal). There would be some potential for effects on reproductive success of individual animals, but the magnitude of the effect is unknown. Because of the low response and injury rate, sub-lethal effects are expected to be negligible and would not be likely to affect reproductive success.

Rookery clearing, pup counts in the rookeries, and incidental disturbance during capture of NFSs for marking or sampling can result in a range of sub-lethal effects on both pups and non-pups. For *Researcher Presence among Animals,* approximately 9,000 animals would be exposed to these disturbances during the breeding season and approximately 1,764 of these (mostly non-pups) would be disturbed enough to enter the water (Table 4.8-40). Physical injury would be expected for about 8 animals. Another 1,300 would be disturbed after the breeding season during scat collections. The extent of any long-term effects of these responses on reproduction in subsequent years is unknown. Sub-lethal effects on pups would not be expected to influence reproductive success due to the 4-5 years required to reach maturity.

Approximately 1,900 pups and 265 non-pups would be captured and restrained for various procedures (Table 4.8-41). Anesthesia and sedations would be used on some of these animals. Effects of these activities on subsequent reproductive success are unknown. Sub-lethal effects on pups would not be expected to influence reproductive success due to the 4-5 years required to reach maturity. Sub-lethal effects on the relatively low number of adults captured would not be expected to affect reproductive success of the rookery.

For *Handling and Sampling Procedures,* once the animals are captured, approximately 5,100 relatively low-risk procedures and 550 relatively medium-risk procedures would be performed (Table 4.8-42). Most of the relatively low-risk procedures would be performed on pups, whereas most of the relatively medium-risk procedures would be on non-pups. No Relatively high-risk procedures, such as surgical implantations, are anticipated. Some of these animals would suffer some degree of sub-lethal effects as a result of the procedures in addition to the effects of capture; however long-term effects on later reproductive success are unknown. Sub-lethal effects on the relatively low number of adults captured would not be expected to affect reproductive success of the stock.

Temporary Capture for Experimentation includes capture of individual animals for transport to a research facility for an extended period of time. The numbers of animals captured for these purposes is typically very low, and once captured and sedated, mortality is very low. However, there are no current permits that authorize the temporary capture of NFSs from the San Miguel Island stock (Table 4.8-43).

Conclusion for sub-lethal effects

Although there are mechanisms for sub-lethal effects to occur from research activities under Alternative 3, the magnitude and intensity of these effects on reproductive success are unknown. The geographic extent would be major in that it is concentrated at one site: San Miguel Island, the only breeding area for this stock. The duration and frequency of effects would be considered relatively minor. Effects of research activities on reproductive success of this stock are considered unknown.

Contribution to Conservation Objectives

Because the San Miguel Island stock of NFS is not listed as threatened or endangered under the ESA or listed as depleted under the MMPA, there are currently no conservation objectives.

4.8.2.9 San Miguel Island Stock - Direct and Indirect Effects of Alternative 4 – Research Program with Full Implementation of Conservation Goals

The scope of research under the Alternative 4 research program for the San Miguel Island stock of NFSs would be essentially the same as under Alternative 3, the Status Quo. Because this stock is not listed under the ESA or considered depleted under the MMPA, there are no recovery or conservation plans for this species.

Mortality

Total mortality for all research activities on San Miguel Island NFSs under Alternative 4 is estimated at 5 animals per year (Table 4.8-49). This represents 2.3 percent of PBR (219 animals), and is therefore considered negligible (see Table 4.4-1 for the impact criteria, and Section 2.5 for a description of PBR as a metric for population-level effects).

Table 4.8-44
Estimated Mortality Due to Researcher Presence in View of Animals. NFS San Miguel Stock - Alternative 4

Activity	Age class	Animals potentially exposed	Type of effect	Estimated proportion of animals affected	Predicted number of animals affected	Estimated mortality rate per affected animal[1]	Predicted mortalities (number of animals)	Mortality subtotal for activity
Aerial survey	pups	0	Observed mortality during activity			0	0.0	
			Alert response	0	0	0.0	0.0	
			Enter water	0	0	0.001	0.0	
			Injured during disturbance	0	0	0.05	0.0	
	non-pups	350	Observed mortality during activity			0	0.0	
			Alert response	0	0	0.0	0.0	
			Enter water	0	0	0.0001	0.00	
			Injury during disturbance	0	0	0.02	0.0	0.0
On land, catwalks, tripods, cliff	pups	1300	Observed mortality during activity			0	0.0	
			Alert response	0.05	65	0.0	0.0	
			Enter water	0.0001	0	0.001	0.0	
			Injured during disturbance	0.00005	0	0.05	0.0	
	non-pups	2450	Observed mortality during activity			0	0.0	
			Alert response	0.05	123	0.0	0.0	
			Enter water	0.005	12	0.0001	0.00	
			Injured during disturbance	0.00001	0	0.02	0.00	0.0
Subtotal for Table 1 - Estimated mortality due to researcher presence in view of animals								**0.0**

Notes: [1]Mortality rates associated with alert, enter water, and injured reactions account for unobserved or subsequent mortalities attributable to the activity.

Table 4.8-45
Estimated Mortality Due to Researcher Presence among Animals. NFS San Miguel Stock - Alternative 4

Activity	Age class	Animals potentially exposed	Type of effect	Estimated proportion of animals affected	Predicted number of animals affected	Estimated mortality rate per affected animal[1]	Predicted mortalities (number of animals)	Mortality subtotal for activity
Activities involving pup roundups	pups	3,000	Observed mortality during activity			0.00001	0.0	
			Alert response	1	3,000	0.0	0.0	
			Enter water	0.01	30	0.001	0.03	
			Injured during disturbance	0.001	3	0.05	0.2	
	non-pups	1575	Observed mortality during activity			0.0	0.0	
			Alert response	1	1,575	0.0	0.0	
			Enter water	0.8	1,260	0.0001	0.1	
			Injury during disturbance	0.0005	0.7875	0.02	0.02	0.4
Activities involving clearing rookery/haulout	pups	0	Observed mortality during activity			0.00001	0.0	
			Alert response	1	0	0.0	0.0	
			Enter water	0.05	0	0.0001	0.00	
			Injured during disturbance	0.0005	0	0.05	0.0	
	non-pups	500	Observed mortality during activity			0.0	0.0	
			Alert response	1	500	0.0	0.0	
			Enter water	0.9	450	0.0001	0.0	
			Injured during disturbance	0.0001	0.05	0.02	0.00	0.0
Incidental disturbance during captures in breeding season[2]	pups	1,630	Observed mortality during activity			0.0	0.0	
			Alert response	1	1,630	0.0	0.0	
			Enter water	0.001	1.63	0.001	0.00	
			Injured during disturbance	0.001	1.63	0.05	0.1	
	non-pups	2,260	Observed mortality during activity			0.0	0.0	
			Alert response	1	2,260	0.0	0.0	
			Enter water	0.01	22.6	0.0001	0.0	
			Injury during disturbance	0.001	2.26	0.02	0.05	0.1
Incidental disturbance during captures outside of breeding season	pups	710	Observed mortality during activity			0.0	0.0	
			Alert response	1	710	0.0	0.0	
			Enter water	0.05	35.5	0.0001	0.00	
			Injured during disturbance	0.0005	0.355	0.05	0.0	
	non-pups	595	Observed mortality during activity			0.0	0.0	
			Alert response	1	595	0.0	0.0	
			Enter water	0.2	119	0.0001	0.0	
			Injured during disturbance	0.0001	0.0595	0.02	0.00	0.0
Subtotal for Table 2 - Estimated mortality due to researcher presence among animals								**0.6**

Notes: [1]Mortality rates associated with alert, enter water, and injured reactions account for unobserved or subsequent mortalities attributable to the activity.
[2]Breeding season: San Miguel stock prior to 1 August; eastern Pacific prior to 08 August

Table 4.8-46
Estimated Mortality Due to Capture and Restraint Activities. NFS San Miguel Stock - Alternative 4

Activity	Age class	Number of animals captured	When mortality occurs	Estimated mortality rate per affected animal[1]	Predicted mortalities (number of animals)	Mortality subtotal for activity
Capture/physical restraint	pups	1900	Observed during activity	0.000	0	
			Unobserved/post-capture	0.001	1.9	
	non-pups	100	Observed during activity	0.004	0.4	
			Unobserved/post-capture	0.0001	0.01	2.3
Capture/chemical anesthesia (inhalable agent-isoflurane)	non-pups	0	Observed during activity	0.004	0	
			Unobserved/post-capture	0.0001	0	0.0
Capture/chemical anesthesia (injectable)	non-pups	125	Observed during activity	0.01	1.25	
			Unobserved/post-capture	0.001	0.125	1.4
Capture/chemical sedation (injectable - e.g. valium)	non-pups	40	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0.004	0.004
Intentional lethal take or permanent removal	pups	0	Observed during activity	1	0	
	non-pups	0	Unobserved/post-capture	1	0	0
Subtotal for estimated mortality due to capture and restraint activities						**3.7**

Notes: [1]Mortality rates associated with alert, enter water, and injured reactions account for unobserved or subsequent mortalities attributable to the activity.

Table 4.8-47
Estimated Mortality Due to Handling and Sampling Procedures. NFS San Miguel Stock - Alternative 4

Activity	Age class	Number of procedure-animals	When mortality occurs	Estimated mortality rate per procedure	Predicted mortalities (number of animals)	Mortality subtotal for activity
Permanent mark/hot-cold branding	pups	0	Observed during activity	0.000	0	
			Unobserved/post-capture	0.002	0	
	non-pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0	0.0
Relatively low risk procedures	pups	4225	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0.4225	
	non-pups	1,795	Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0.1795	0.6
Relatively medium risk procedures	pups	100	Observed during activity	0	0	
			Unobserved/post-capture	0.0002	0.02	
	non-pups	450	Observed during activity	0	0	
			Unobserved/post-capture	0.0002	0.09	0.11
Relatively high risk procedures	pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.001	0	
	non-pups	0	Observed during activity	0	0	
			Unobserved/post-capture	0.001	0	0.0
Subtotal for estimated mortality due to handling and sampling procedures						**0.7**

Notes: Low risk - blood/flipper tag/whisker pull/isotopes/eb/bia/injections/ultrasound/external instruments/enemas/stomach intubate/fecal loop/stomach pill telemeters
Medium risk - teeth pull/biopsies/remote biopsies/(includes local anesthesia)
High risk - implant transmitters, surgeries
No risk - swabs/hair or nail clipping, temp marks, morph measurements, milk sample, external physical exam

Table 4.8-48
Estimated Mortality Due to Temporary Captivity for Experimentation. NFS San Miguel Stock - Alternative 4

Activity	Age class	Number of animals or procedure-animals	When mortality occurs	Estimated mortality rate per affected animal or procedure	Predicted mortalities (number of animals)	Mortality subtotal for activity
Capture/transport/holding/release	pups	0	Observed mortality during activity			
			Unobserved/post-capture mortality			
	non-pups		Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0	0
chemical sedation (injectable-e.g. valium)	non-pups		Observed during activity	0	0	
			Unobserved/post-capture	0.0001	0	0
Permanent mark/hot branding	non-pups	0	Observed mortality during activity	0	0	
			Unobserved/post-capture mortality	0.0001	0	0.0
Relatively low risk procedures	pups	0	Observed mortality during activity	0	0	
			Unobserved/post-capture mortality	0.0001	0	
	non-pups	0	Observed mortality during activity	0	0	
			Unobserved/post-capture mortality	0.0001	0	0
Relatively medium risk procedures	pups	0	Observed mortality during activity	0	0	
			Unobserved/post-capture mortality	0.0002	0	
	non-pups	0	Observed mortality during activity	0	0	
			Unobserved/post-capture mortality	0.0002	0	0
Relatively high risk procedures	pups	0	Observed mortality during activity	0	0	
			Unobserved/post-capture mortality	0.001	0	
	non-pups	0	Observed mortality during activity	0	0	
			Unobserved/post-capture mortality	0.001	0	0.0
Subtotal for estimated mortality due to temporary captivity for experimentation						**0.0**

Notes: Lowrisk - blood/flipper tag/whisker pull/isotopes/eb/BIA/injections/ultrasound/external instruments/enemas/stomach intubate/fecal loop/stomach pill telemeters
Medium risk - teeth pull/biopsies/remote biopsies/(includes local anesthesia)
High risk - implant transmitters, surgeries
No risk - swabs/hair or nail clipping, temp marks, morph measurements, milk sample, external physical exam

Sub-Lethal Effects Due to Research

Under Alternative 4, the research program would be essentially the same as under Alternative 3; therefore, direct and indirect sub-lethal effects are expected to be similar to those discussed under Alternative 3. Additional methods and procedures could be authorized as appropriate but protocols are not known at this time.

The direct and indirect effects of the scope of research under Alternative 4 would be the same as under Alternative 3. The magnitude or intensity of these effects are considered unknown.

Contribution to Conservation Objectives

Because the San Miguel Island stock of NFSs is not listed as threatened or endangered under the ESA or listed as depleted under the MMPA, there are currently no recovery objectives.

4.8.2.10 San Miguel Island Stock - Cumulative Effects

Summary of Direct and Indirect Effects

Direct and indirect effects of research activities include disturbance, capture, and handling that could lead to mortality and sub-lethal effects. The alternatives vary in the estimated amount of mortality that would occur under a given scope of research (Sections 4.8.2.6 through 4.8.2.9). For all the alternatives, the estimated mortality is less than 10 percent of PBR for Alternatives 1, 2, and 3 and less than 15 percent of PBR under Alternative 4. Mortality is considered negligible on a population level for all alternatives. The magnitude of sub-lethal effects would be negligible for Alternative 1 and is considered unknown for Alternatives 2, 3, and 4 because of several uncertainty factors.

Lingering Past Effects

El Niño events, which occur periodically along the California coast, affect population growth of NFSs at San Miguel Island and are an important regulatory mechanism for this population (DeLong and Antonelis 1991; Melin and DeLong 1994, 2000; Melin *et al.* 1996). The El Niño events in 1982-1983, 1992-1993, and 1997-1998 (largest) resulted in both short-term and longer-term reductions in the population. Recovery from the 1998 decline has been slowed by the adult female mortality that occurred, in addition to the high pup mortality in 1997 and 1998 (Melin and DeLong 2000).

NMFS considers any takes of NFSs by commercial fisheries in waters off California, Oregon, and Washington as being from the San Miguel Island stock (NMFS 2003). The three observed fisheries that may have interacted with NFSs include the thrasher shark and swordfish drift gill net fisheries, the halibut/angel shark set net fishery, and the Washington, Oregon, or California groundfish fisheries. There were no reported mortalities of NFSs in any observed fishery along the west coast of the continental U.S. during the period from 1990-1996. However, reporting requirements have been scaled back, so the information on actual mortality is incomplete (NMFS 2003). Based on currently available data, the estimated annual total of human-caused mortality and serious injury is 1 animal per year. This amount, therefore, does not exceed the PBR (219).

Analysis of Reasonably Foreseeable Future Actions

Potential mortality of the San Miguel Island stock from future foreseeable factors is likely to occur from commercial fisheries, continuing recreational boating and vessel traffic, and marine pollution. The effects of global climate change or long-term regime shifts on San Miguel Island NFSs are difficult to predict, but could potentially have either a beneficial or adverse effect on survival and reproductive success. Future El Niño events are likely to continue to adversely affect NFSs reproduction and overall numbers. Vessel traffic associated with commercial shipping and tourism with its underwater noise could increase with increased industrial activity, but the effect on NFS mortality is likely to be minimal.

Cumulative Effects

Mortality

Direct and indirect affects of NFS research and external factors have been identified that could cause disturbance and mortality to San Miguel Island NFSs. The population of this stock is on the increase and is currently at 63.4 percent of the 1997 levels (NMFS 2003). The cumulative effects for this stock do not appear to include any adverse population-level effects and are therefore considered to be minor. Because there are no direct or indirect effects associated with Alternative 1, there would be no cumulative effect. The direct and indirect effects associated with Alternatives 2, 3, and 4 are considered negligible. Overall human-caused mortality is well below 10 percent of PBR, so the contribution of research activities to mortality of the San Miguel Island stock of the NFSs is considered negligible.

Sub-Lethal Effects

Disturbance from research activities, as well as other human-caused disturbance, can cause physical and physiological effects that may include temporary alterations of behavior, physical injuries, decreased ability to forage, or reproductive failure. Research alternatives under Alternatives 1 through 4 vary in the amount of research-related disturbance and potential injuries that they would contribute to the cumulative sub-lethal effects. Alternative 1 would contribute to no disturbance and therefore there would be no cumulative effect. The other alternatives represent an increasing scope and intensity of contributed disturbance from Alternative 2, 3, and 4. However, because the population-level effect of disturbance and handling procedures from these alternatives is unknown, their contributions to the cumulative sub-lethal effects are also unknown.

Table 4.8-49
Summary of Estimated Mortality - All Alternatives

Source of mortality	Alternative 1	Alternative 2	Alternative 3	Alternative 4
SSL - Western DPS				
Researcher presence in view of animals		0.9	0.9	4.1
Researcher presence among animals		2.5	5.8	9.8
Capture and restraint			5.6	12.4
Handling and sampling procedures			2.4	3.3
Temporary captivity for experimentation			0.1	0.2
Total estimated mortality for SSL WDPS (animals)	**0**	**3.4**	**14.8**	**29.8**
Estimated mortality as a percent of PBR (234)	**0**	**1.45%**	**6.32%**	**12.74%**
SSL - Eastern DPS				
Researcher presence in view of animals		1.9	1.9	1.9
Researcher presence among animals		1.3	11.5	11.5
Capture and restraint			8.6	8.6
Handling and sampling procedures			3.5	3.5
Temporary captivity for experimentation			0	0
Total estimated mortality for SSL EDPS (animals)	**0**	**3.2**	**25.5**	**25.5**
Estimated mortality as a percent of PBR (2000)	**0**	**0.16%**	**1.27%**	**1.27%**
NFS - Eastern Pacific stock				
Researcher presence in view of animals		0.1	0.1	0.1
Researcher presence among animals		1.1	20.7	21.7
Capture and restraint			26.4	42
Handling and sampling procedures			0.6	3.2
Temporary captivity for experimentation			0	0.1
Total estimated mortality for NFS EP (animals)	**0**	**1.2**	**47.8**	**67**
Estimated mortality as a percent of PBR (15,262)	**0**	**<< 1%**	**< 1%**	**0.44%**
NFS - Sam Miguel stock				
Researcher presence in view of animals		0	0	0
Researcher presence among animals		0	0.6	0.6
Capture and restraint			3.7	3.7
Handling and sampling procedures			0.7	0.7
Temporary captivity for experimentation			0	0
Total estimated mortality for NFS SM (animals)	**0**	**0**	**5**	**5**
Estimated mortality as a percent of PBR (219)	**0**	**0**	**2.28%**	**2.28%**

4.8.3 Killer Whales

Under all of the alternatives, no apparent mechanisms of effect have been identified for resident killer whales; therefore, resident killer whales are not included in the effects analysis. Resident killer whales do not feed on marine mammals as transient killer whales do, and other than the southern resident stock, resident whale populations are neither depleted nor appear to be adversely affected by human disturbance. As for the endangered southern resident stock, it inhabits inland waterways of Puget Sound, outside of important SSL and NFS habitat. Because transient killer whales feed on marine mammals and are implicated in the decline of SSLs and NFSs, they are included in the effects analysis. The current status of killer whale stocks are described in Section 3.2.3, and the predicted direct and indirect effects of research activities under the alternative research programs are discussed below. The intent of this analysis is to provide an overall assessment of the species' population-level response to its environment as it is influenced by SSL and NFS research activities. Representative direct and indirect effects used in this analysis include reduced survival or reproductive success, and disturbance (Table 4.4-2). Past, present, and future actions external to the project alternatives described in this analysis are also presented in detail in the Alaska Groundfish Fisheries Final Programmatic Supplemental Environmental Impact Statement (SEIS) (NMFS 2004a).

4.8.3.1 Direct and Indirect Effects of Alternative 1 – No Action: No New Permits or Authorizations

Direct and Indirect Reduced Survival or Reproductive Success Due to SSL and NFS Research

Since there would be no research-related take or disturbance of SSLs and NFSs under Alternative 1, there would be no research-related disturbance of killer whales incidental to studies on SSLs and NFSs. However, research on the role of killer whales in the population dynamics of SSLs and NFSs, which does not require authorization for incidental take or disturbance of SSLs and NFSs, would occur under this alternative. This research would involve documenting killer whale feeding behavior via witness accounts, observer data, or surveys conducted from marine vessels. Marine vessels could potentially strike and cause injury or death to individual killer whales. However, vessel strikes on killer whales and other marine mammals are rare, and few research vessels would approach killer whales under this alternative. Marine vessels can also produce discharges and increased turbidity; however, the result is generally localized short-term changes in water quality that are unlikely to affect the survival and reproductive success of killer whales. Because vessel strikes on killer whales would be rare, it is unlikely that there would be a measurable reduction in the overall survival or reproductive success of killer whales.

The diet of transient killer whales consists of marine mammals. Since there would be no research-related take or disturbance of SSLs or NFSs under Alternative 1, the abundance and distribution of killer whale prey species would not be affected. The effects of Alternative 1 on the survival and reproductive success of killer whales are considered negligible.

Direct and Indirect Effects of Disturbance Due to SSL and NFS Research

As described above, research on the role of killer whales in the population dynamics of SSLs and NFSs would be permitted under this alternative, although this would not include authorizations for incidental take or disturbance of SSLs or NFSs. This type of research generally involves researchers documenting killer whale feeding behavior via witness accounts, observer data, or surveys conducted from marine vessels. Marine vessels that closely approach killer whales could potentially cause disturbance through visual cues and noise pollution. The effects of this disturbance could include avoidance behavior and displacement. Noise pollution could also interfere with whale communication and echolocation used to detect prey (Barrett-Lennard *et al.* 1996). Because the effects would depend on vessels passing very close to killer whales, the geographic extent of the effects would be in the vicinity of the marine vessel. Given that few research vessels would approach killer whales under this alternative and would do so for only short periods of time, the effects of disturbance would be short-term and there would be no measurable effects on the overall population or distribution of killer whales. Therefore, the effects of disturbance on killer whales under Alternative 1 are considered negligible.

Conclusions

Direct and indirect effects of research directed at killer whales and their role in the population dynamics of SSLs and NFSs, as permitted under Alternative 1, would be associated with short-term disturbance of killer whales from marine vessels. However, the low level of research activity under Alternative 1 would result in very little or no disturbance of killer whales. Vessel strikes of killer whales are also unlikely. Overall, the effects of disturbance and reduced survival and reproductive success of killer whales under Alternative 1 are considered negligible.

4.8.3.2 Direct and Indirect Effects of Alternative 2 – Research Program without Capture or Handling

Direct and Indirect Reduced Survival or Reproductive Success Due to SSL and NFS Research

As described under Alternative 1, research on the role of killer whales in the population dynamics of SSLs and NFSs would involve researchers documenting killer whale feeding behavior from marine vessels. However, the level of this type of research under Alternative 2 would potentially increase in magnitude and frequency because authorizations for incidental take or disturbance of SSLs and NFSs would be permitted. Vessel surveys of SSLs and NFSs would also be permitted under Alternative 2, which could increase the presence of marine vessels in the vicinity of killer whales.

Marine vessels used in research on killer whales, as well as research on SSLs and NFSs, could potentially cause vessel strikes and result in injury or death to individual killer whales. However, vessel strikes on killer whales and other marine mammals are rare, and few research vessels would approach killer whales under this alternative. Marine vessels can also produce discharges and increase turbidity; however, the result is generally localized, short-term changes in water quality that are unlikely to affect the survival and reproductive success of killer whales. Because vessel strikes on killer whales would be rare, it is unlikely that there would be a measurable reduction in the overall survival or reproductive success of killer whales.

Aerial, vessel, and land-based survey activities associated with research on SSLs and NFSs would result in minor, short-term disturbance of SSLs and NFSs under this alternative. This could temporarily increase the availability of these animals as prey for killer whales if SSLs and NFSs were to enter the water in response to research activities. Although killer whales can occur in areas of high marine mammal density, such as SSL and NFS haulouts and rookeries, killer whales forage over vast areas and prey on many species other than SSLs and NFSs. In addition, with respect to SSLs, the number and distribution of rookeries affected by research compared to the total number of rookeries for the population is small; therefore, an incremental change in the numbers of SSLs in the water at a particular time and rookery is unlikely to affect the overall foraging success of killer whales. The overall effects on the survival and reproductive success of killer whales are considered negligible.

Direct and Indirect Effects of Disturbance Due to SSL and NFS Research

As described above, research on the role of killer whales in the population dynamics of SSLs and NFSs under Alternative 2 would involve researchers documenting killer whale feeding behavior from marine vessels. Vessel surveys of SSLs and NFSs would also be permitted under Alternative 2.

Marine vessels that closely approach killer whales could potentially cause disturbance through visual cues and noise pollution. The effects of this disturbance could include avoidance behavior and displacement. Noise pollution could also interfere with whale communication and echolocation used to detect prey (Barrett-Lennard *et al.* 1996). Because the effects would depend on vessels passing very close to killer whales, the geographic extent of the effects would be in the vicinity of the marine vessel. Given that few research vessels would approach killer whales under this alternative and would do so for only short periods of time, the effects of disturbance would be short-term and would produce no measurable effects on the overall population or distribution of killer whales. The overall effects of disturbance on killer whales are considered negligible.

Conclusions

Direct and indirect effects of research on SSLs, NFSs, and killer whales would be associated with short-term disturbance of killer whales from marine vessels. Because these effects would be infrequent and limited in geographical extent, it is unlikely that there would be a measurable effect on the abundance and distribution of killer whales. Vessel strikes on killer whales are unlikely, and SSL and NFS research activities causing animals to enter the water is unlikely to increase the killer whale predation on SSLs or NFSs. Overall, the effects of disturbance and reduced survival and reproductive success of killer whales under Alternative 2 are considered negligible.

4.8.3.3 Direct and Indirect Effects of Alternative 3 – Status Quo Research Program

Direct and Indirect Reduced Survival or Reproductive Success Due to SSL and NFS Research

Research on the role of killer whales in the population dynamics of SSLs and NFSs would continue under the Status Quo and could increase in magnitude and frequency, including authorizations for incidental disturbance of SSLs and NFSs. Vessel surveys of SSLs and NFSs would also be permitted under Alternative 3 and are likely to increase in magnitude and frequency. Marine vessels used in this type of research could potentially cause vessel strikes and result in injury or death to individual killer whales. However, vessel strikes on killer whales and other marine mammals are rare, and few research vessels would approach killer whales under this alternative. Marine vessels can also produce discharges and increase turbidity; however, the result is generally localized, short-term changes in water quality that is unlikely to affect the survival and reproductive success of killer whales. Because vessel strikes on killer whales would be rare, it is unlikely that there would be a measurable reduction in the overall survival or reproductive success of killer whales.

Research activities under the Status Quo would result in numerous short-term disturbances of SSLs and NFSs that would intentionally and incidentally cause many animals to enter the water. Some of these animals could be injured incidental to research activities and, therefore, would be less able to avoid killer whale predation. This could temporarily increase the availability of these animals as prey for killer whales around rookeries and haulouts, especially at sites where intrusive research activities occur. Although killer whales can occur in areas of high marine mammal density, such as SSL and NFS rookeries, killer whales forage over vast areas and prey on many species other than SSLs and NFSs. In addition, with respect to SSLs, the number and distribution of rookeries affected by research compared to the total number of rookeries for the population is small; therefore, an incremental change in the numbers of SSLs in the water at a particular time and rookery is unlikely to affect the overall foraging success of killer whales. Research under this alternative is assumed to be unlikely to affect the foraging success of killer whales. The overall effects of Alternative 3 on the survival and reproductive success of killer whales are negligible.

Direct and Indirect Effects of Disturbance Due to SSL and NFS Research

As described above, research on SSLs, NFSs, and killer whales would continue under the Status Quo and could increase in magnitude and frequency. Marine vessels that closely approach killer whales could potentially cause disturbance through visual cues and noise pollution. The effects of this disturbance could include avoidance behavior and displacement. Noise pollution could also interfere with whale communication and echolocation used to detect prey (Barrett-Lennard *et al.* 1996). Because the effects would depend on vessels passing very close to killer whales, the geographic extent of the effects would be in the vicinity of the marine vessel. Given that few research vessels would approach killer whales under this alternative and would do so for only short periods of time, the effects of disturbance would be short-term and would produce no measurable effects on the overall population or distribution of killer whales. Therefore, the effects of disturbance on killer whales under Alternative 3 are considered negligible.

Conclusions

Direct and indirect effects of research on SSLs, NFSs, and killer whales would be associated with short-term disturbance of killer whales from marine vessels. Because these effects would be infrequent and limited in geographical extent, it is unlikely that there would be a measurable effect on the abundance and distribution of killer whales. Vessel strikes on killer whales are unlikely and SSL and NFS research activities causing animals to enter the water is unlikely to increase killer whale predation on SSLs or NFSs. Overall, the effects of disturbance and reduced survival and reproductive success of killer whales under Alternative 3 are considered negligible.

4.8.3.4 Direct and Indirect Effects of Alternative 4 – Research Program with Full Implementation of Conservation Goals

Direct and Indirect Reduced Survival or Reproductive Success Due to SSL and NFS Research

Although the level of research on SSLs and NFSs and research directed at killer whales under Alternative 4 would increase from current levels, the effects of vessel strikes on the survival and reproductive success of killer whales would be similar in nature to those described under Alternative 3. The effects of Alternative 4 on killer whales are considered negligible.

Under Alternative 4, the effects of disturbance and injury on SSLs and NFSs would increase over current levels. However, this incremental change is unlikely to affect the foraging success of killer whales and would, therefore, have negligible effects on their chance of survival or their reproductive success.

Direct and Indirect Effects of Disturbance Due to SSL and NFS Research

Although the level of research on SSLs and NFSs and research directed at killer whales under Alternative 4 would increase from current levels, the effects of disturbance on killer whales from marine vessels would be similar in nature to those described under Alternative 3. The effects of disturbance on killer whales under Alternative 4 are considered negligible.

Conclusions

Direct and indirect effects of research on SSLs, NFSs, and killer whales would be associated with short-term disturbance of killer whales from marine vessels. Because these effects would be infrequent and limited in geographical extent, it is unlikely that there would be a measurable effect on the abundance and distribution of killer whales. Vessel strikes on killer whales are unlikely and SSL and NFS research activities causing animals to enter the water is unlikely to increase killer whale predation on SSLs or NFSs. Overall, the effects of disturbance and reduced survival and reproductive success of killer whales under Alternative 4 are considered negligible.

4.8.3.5 Cumulative Effects

The cumulative effects on killer whales are dominated by factors external to research activities on SSLs and NFSs. The following analysis of lingering past and present effects and RFFAs is the same for all alternatives.

Summary of Direct and Indirect Effects

The effects of disturbance and reduced survival and reproductive success due to research on SSLs and NFSs, or research directed at killer whales, are expected to have a negligible effect on the killer whale population under all alternatives.

Summary of Lingering Past Effects

Marine vessel traffic associated with commercial fisheries, commercial shipping, private recreation, tourism, and scientific research have disturbed killer whales in the past but the lingering effects, if any, are unknown. Injury and mortality of killer whales has been documented in several federal and state-managed commercial fisheries and there is evidence of intentional shootings (Angliss and Outlaw 2005). There has been no determination about whether or not these animals were from resident or transient stocks, but it is likely that most, if not all, were resident types foraging on fish. Resident killer whales are well documented to prey on fish being brought up by commercial fishing boats (Angliss and Outlaw 2005), and these interactions are a source of concern for fishery managers. Killer whales are also susceptible to injury or mortality through vessel strikes. One killer whale was reported killed when struck by the propeller of a Bering Sea/Aleutian Island (BSAI) groundfish trawl vessel in 1998 (Angliss and Lodge 2002). The Exxon Valdez Oil Spill (EVOS) resulted in the loss of half of the individual killer whales from the AT1 transient group in Prince William Sound (PWS) (Matkin *et al.* 1999). This group of killer whales has been designated as “depleted” under the Marine Mammal Protection Act (MMPA).

Results of modeling exercises suggest that the removal of great whales from the Bering Sea-GOA ecosystem during commercial whaling has resulted in a shift in the diet of transient killer whales, which has played a role in the decline of SSL populations and other marine mammals consumed by killer whales (Springer *et al.* 2003). Because marine mammals are the primary prey of transient killer whales, the factors identified as having affected the abundance or distribution of cetaceans, pinnipeds, and sea otters could indirectly affect these killer whales. Such factors include: competition with commercial fisheries, commercial and subsistence harvest, intentional shootings, incidental take in all fisheries, marine pollution, climate change, and regime shifts. Declines in harbor seals in PWS after the EVOS could have affected the AT1 group of transient killer whales through the food supply (Matkin *et al.* 1999).

Analysis of RFFAs

Injury and mortality to transient killer whales from RFFAs is likely, including from commercial fisheries, intentional shooting, vessel traffic, and marine pollution, particularly bioaccumulating pollutants such as DDT and PCBs (Matkin *et al.* 1999). The effects of global climate change or long-term regime shifts on transient killer whales are difficult to predict, but could potentially have either a beneficial or adverse effect on survival and reproductive success. The future spatial/temporal concentration of commercial fisheries could affect the abundance and distribution of important prey species for transient killer whales. Vessel traffic associated with commercial shipping and tourism could increase as these industries expand. Disturbance and underwater noise pollution from many types of marine vessels could potentially interfere with communication and echolocation, which could affect the whales' foraging behavior.

Information from scientific research on killer whale physiology and behavior could beneficially affect the survival and reproductive success of killer whales, if it contributes to identifying or resolving conservation problems.

Cumulative Effects

A number of factors have been identified that could cause disturbance and/or affect the survival and reproductive success of killer whales. The population trends of transient killer whale stocks appear to be increasing, with the exception of the AT1 transient stock which is considered depleted. Cumulative effects for the GOA and West Coast transient stocks do not appear to be adverse at the population level, and are, therefore, considered to be minor. The cumulative effects for the AT1 stock are dominated by the EVOS, and are considered major. The direct and indirect effects associated with all alternatives are considered negligible; therefore, the contribution of research activities on SSLs and NFSs to overall cumulative effects on killer whales would be negligible.

4.8.4 Other ESA-Listed Species

The current status of the ESA-listed San Miguel Island fox, Guadalupe fur seal, sea otter, and great whales are described in Section 3.2.4. ESA-listed whales include humpback, blue, bowhead, fin, right, Sei, and sperm whales. Under the alternatives, no apparent mechanisms have been identified for affecting the San Miguel Island fox and the Guadalupe fur seal, and therefore those species are not included in the effects analysis. The southern resident stock of killer whales is also listed under the ESA (Section 3.2.3) and not included in the effects analysis because there are no apparent mechanisms of effect identified for resident killer whales. The status of all killer whale stocks are described in Section 3.2.3 and the direct, indirect, and cumulative effects analysis of transient killer whales is presented in Section 4.8.3. ESA-listed bird species are described in Section 3.2.7.3 and the corresponding direct, indirect, and cumulative effects analysis is presented in Section 4.8.6.

ESA-listed whales and sea otter stocks are carried forward in the effects analysis because of their potential presence in the vicinity of SSL and NFS research activities. Although the southwest Alaska and California (or southern) sea otter stocks have been designated under the ESA, this effects analysis can be applied broadly to all sea otter stocks in the project area. The intent of this analysis is to provide an overall assessment of the species' population-level response to its environment as it is influenced by SSL and NFS research activities. Representative direct and indirect effects used in this analysis include reduced survival or reproductive success and disturbance. Past, present, and future actions external to the project alternatives that are described in this analysis are also presented in detail in the Alaska Groundfish Fisheries Final Programmatic Supplemental Environmental Impact Statement (SEIS) (NMFS 2004a).

4.8.4.1 Direct and Indirect Effects of Alternative 1 – No Action: No New Permits or Authorizations

Direct and Indirect Reduced Survival or Reproductive Success Due to SSL and NFS Research

No apparent mechanisms that could affect the survival or reproductive success of ESA-listed whale or sea otter populations have been identified under this alternative; therefore, the direct and indirect effects of Alternative 1 are considered negligible.

Direct and Indirect Effects of Disturbance Due to SSL and NFS Research

No apparent mechanisms of disturbance to ESA-listed whale or sea otter populations have been identified under this alternative; therefore, the direct and indirect effects of Alternative 1 are considered negligible.

Conclusions

Because no apparent mechanisms for population change have been identified, there are no measurable effects associated with Alternative 1. The direct and indirect effects of Alternative 1 are considered negligible.

4.8.4.2 Direct and Indirect Effects of Alternative 2 – Research Program without Capture or Handling

Direct and Indirect Reduced Survival or Reproductive Success Due to SSL and NFS Research

Marine vessels used for conducting research on SSLs and NFSs could cause vessel strikes, particularly during high-speed transit to and from survey locations, and result in injury or mortality to individual animals. Of the ESA-listed whales, humpback whales are most often seen in nearshore habitats, and therefore are more likely to encounter research vessels. Vessel strikes on marine mammals, however, are rare and it is also unlikely that vessels associated with SSL and NFS research would intentionally approach whales or sea otters. Any contact between marine research vessels and other marine mammals would be incidental to the research activity. Therefore, it is unlikely that vessel strikes would cause a measurable reduction in the overall survival or reproductive success of any species. Marine vessels can also produce discharges and increased turbidity; however the result is generally localized, short-term changes in water quality unlikely to affect the survival and reproductive success of whales and sea otters.

Direct and Indirect Effects of Disturbance Due to SSL and NFS Research

Marine vessels used for conducting research on SSLs and NFSs could potentially cause disturbance of ESA-listed whales if any are in the vicinity. Of the ESA-listed whales, humpback whales are most often seen in nearshore habitats, and therefore are more likely to be disturbed by research vessels. Marine vessels can generate underwater noise pollution that can interfere with whale communication and echolocation used by whales to locate prey. Other behavior changes associated with disturbance from marine vessels include avoidance and modifications to surfacing, respiration, and diving cycles, all of which can be accompanied by stress. The effects of disturbance on these whales, however, would depend on vessels passing very close to the animals.

Although ESA-listed whales are not targeted during aerial surveys of SSLs and NFSs, opportunistic sighting surveys could be conducted. Low altitude aerial surveys could cause behavioral changes to a few individual whales, including avoidance and modifications to surfacing, respiration, and diving cycles. Because overflights of whales during SSL and NFS research would be infrequent and cause minimal disturbance, the effects of disturbance are considered negligible.

Sea otters could be visually disturbed by aerial surveys and marine research vessels in the immediate area of haulouts and rookeries where SSL and NFS research is concentrated. Because sea otters could be in the vicinity of haulouts and rookeries, some animals could be potentially disturbed by SSL and NFS research activities. However, duration of these events would be short-term and would be unlikely to have any measurable effects on local sea otter populations. Therefore, the effects of disturbance on sea otters under Alternative 2 are considered negligible.

Conclusions

Direct and indirect effects of research activities under Alternative 2 would be associated with short-term disturbance of ESA-listed whales and sea otters from marine vessels or aircraft used to conduct research on SSLs and NFSs, and potential injury or mortality from vessel strikes. Because marine research vessels or aircraft are unlikely to intentionally approach whales, and few individual sea otters would be disturbed by human presence, there would be no measurable effects on the abundance and distribution of whales and sea otters. Overall, reduced survival and reproductive success and the effects of disturbance on ESA-listed whales and sea otters under Alternative 3 are considered negligible.

4.8.4.3 Direct and Indirect Effects of Alternative 3 – Status Quo Research Program

Direct and Indirect Reduced Survival or Reproductive Success Due to SSL and NFS Research

The frequency and geographic extent of marine vessel use for the purposes of researching SSLs an NFSs could increase. Although more research vessels could increase the potential for vessel strikes on whales and sea otters, vessels strikes on marine mammals are uncommon, and it is not likely that research vessels would approach these animals. Therefore, Alternative 3 would be similar to Alternative 2 with regard to effects on the survival or reproductive success of whales and sea otters. The effects of Alternative 3 on the survival and reproductive success of whales and sea otters are considered negligible.

Direct and Indirect Effects of Disturbance Due to SSL and NFS Research

The scope of research activities under the status quo would be greater than that under Alternative 2, and therefore the frequency and geographic extent of marine vessel and aircraft use for the purposes of researching SSLs and NFSs could increase. However, because little or no marine vessels or aircraft would seek out or occur in the vicinity of whales under this alternative, there would be no measurable effects of disturbance. Therefore, the effects of disturbance on whales under Alternative 3 are considered negligible.

Because site access and subsequent shoreline disturbance would increase under Alternative 3, there could potentially be an increase in the level of and the geographic extent of disturbance on sea otters. However, few sea otters are likely to occupy areas where research activities occur, and therefore there would be no measurable effects of disturbance on the population. Therefore, the effects of disturbance on sea otters under Alternative 3 are considered negligible.

Conclusions

Direct and indirect effects of research activities under Alternative 3 would be associated with short-term disturbance of whales and sea otters from marine vessels or aircraft used to conduct research on SSLs and NFSs, and potential injury or mortality from vessel strikes. Because marine research vessels or aircraft are unlikely to intentionally approach whales, and few individual sea otters would be disturbed by human presence, there would be no measurable effects on the abundance and distribution of whales and sea otters. Overall, reduced survival and reproductive success and the effects of disturbance on ESA-listed whales and sea otters under Alternative 3 are considered negligible.

4.8.4.4 Direct and Indirect Effects of Alternative 4 – Research Program with Full Implementation of Conservation Goals

Direct and Indirect Reduced Survival or Reproductive Success Due to SSL and NFS Research

The frequency and magnitude of research activities under Alternative 4 would be greater than current levels, but would be similar in nature with regard to the effects on the survival and reproductive success of ESA-listed whales and sea otters, to those described for Alternative 3. The effects of Alternative 4 on the survival and reproductive success of ESA-listed whales and sea otters are considered negligible.

Direct and Indirect Effects of Disturbance Due to SSL and NFS Research

The frequency and magnitude of research activities under Alternative 4 would be greater than current levels, but would be similar in nature with regard to the effects of disturbance on ESA-listed whales and sea otters, to those described for Alternative 3. The effects of disturbance on ESA-listed whales and sea otters under Alternative 4 are considered negligible.

Conclusions

Direct and indirect effects of research activities under Alternative 4 would be associated with short-term disturbance of whales and sea otters from marine vessels or aircraft used to conduct research on SSLs and NFSs, and potential injury or mortality from vessel strikes. Because marine research vessels or aircraft are unlikely to intentionally approach whales, and few individual sea otters would be disturbed by human presence, there would be no measurable effects on the abundance and distribution of whales and sea otters. Overall, reduced survival and reproductive success and the effects of disturbance on ESA-listed whales and sea otters under Alternative 4 are considered negligible.

4.8.4.5 Cumulative Effects

The cumulative effects on whales and sea otters are dominated by factors external to research activities on SSLs and NFSs. The following analysis of lingering past effects and RFFAs is the same for all alternatives.

Summary of Direct and Indirect Effects

The effects of disturbance and reduced survival and reproductive success of whales and sea otters are expected to be negligible to the populations under all alternatives.

Summary of Lingering Past Effects

Past effects on great whales included commercial whaling; incidental take and entanglement in foreign, Joint Venture, and federal and state-managed fisheries; and ship strikes. Commercial whaling in the 1900s severely depleted the populations of blue, fin, Sei, humpback, and right whales, and the effects continue to linger. A discussion of the effects of commercial whaling on baleen whales is presented in Section 3.8.9 of the Alaska Groundfish Fisheries Final Programmatic SEIS (NMFS 2004a). In the past, subsistence whaling has resulted in disturbance and mortality of the bowhead whales, which are now harvested under International Whaling Commission quotas and co-managed by NOAA Fisheries and the Alaska Eskimo Whaling Commission. The current quota allows the landing of up to 255 bowhead whales between 2003 and 2007. Ship strike injuries of fin whales, humpback whales, and bowhead whales have also been reported, but appear to be rare.

Commercial harvest of sea otter pelts dating from the mid-1700s to the late-1800s had a major impact on the population and nearly resulted in extinction (Bancroft 1959; Lensink 1962). Although protective measures instituted in 1911 have helped to reestablish sea otters, residual effects from this early harvest likely persist in several areas. The subsistence harvest of sea otters for pelts and meat by Alaska Natives has occurred throughout history. Current harvest from southwest Alaska villages averages fewer than 100 otters per year. Sea otters have been incidentally taken by commercial fisheries, particularly by the Aleutian Island Black Cod Pot Fishery. The 1971 Cannikin nuclear test explosion at Amchitka Island in the Aleutian Islands, Alaska, killed thousands of sea otters. The Exxon Valdez Oil Spill (EVOS) resulted in the death of an estimated 2,800 sea otters, and many more probably died and were not recovered (Garrott *et al.* 1993; Loughlin *et al.* 1996). Infectious diseases caused from streptococcus bovis/equinus, vibrio parahaemolyticus, domoic acid, and toxoplasmosis have also resulted in sea otter mortality. Additionally, it has been suggested that the declining sea otter population is due to increased predation by killer whales (Estes *et al.* 1998). This shift in predator-prey relationships could be linked to the decline in killer whale prey species, including great whales and SSLs.

Analysis of Reasonable Foreseeable Future Actions

Potential future sources of injury and mortality to ESA-listed whales include commercial fisheries, vessel traffic, and subsistence harvest of bowhead whales. The effects of global climate change or long-term regime shifts on ESA-listed whales are difficult to predict, but could potentially have either a beneficial or adverse effect on survival and reproductive success. The future spatial/temporal concentration of commercial fisheries could affect the abundance and distribution of important prey species for ESA-listed whales. Vessel traffic associated with commercial shipping and tourism could increase as these industries expand. Disturbance and underwater noise pollution from many types of marine vessels could potentially interfere with communication and echolocation, which could affect the whales' foraging behavior.

Potential future sources of injury and mortality to sea otters include subsistence harvest, marine pollutants, and disease. Similar to the case of great whales, the effects of global climate change or long-term regime shifts on sea otters are difficult to predict and could result in either a beneficial or adverse effect on survival and reproductive success. Subsistence harvest of sea otters is likely to continue at current harvest levels. Marine pollutants, such as oil from oil spills, can soil otter fur and lower its ability to insulate, resulting in hypothermia and death. The number of oil spills and volume of oil spilled in the project area is likely to be similar to that of the present. The concentrated dumping of fish offal and sewage could attract sea otters and result in the transmission of diseases and parasites. Although it is unknown whether or not mortality caused by infectious diseases will increase, the current levels of disease transmission are likely to continue in future population-level effects.

Scientific research on ESA-listed whale and sea otter physiology and behavior could beneficially affect the survival and reproductive success of the animals by identification of potential threats and protection measures. In addition, the establishment of critical habitat for ESA-listed species (e.g., northern right whale critical habitat designation in July 2006) could provide protection from potential anthropogenic sources of injury and mortality.

Cumulative Effects

Few internal factors, and a number of external factors, have been identified that could cause disturbance and affect the survival and reproductive success of both ESA-listed whales and sea otters. It is believed that lingering effects from past actions have caused the decline of and/or are preventing de-listing of these species. Therefore, the cumulative effects for the ESA-listed whales and sea otters are dominated by these past actions and are considered major. Because there would be no direct or indirect effects associated with Alternative 1, this alternative would not contribute to cumulative effects on great whales or sea otters. The direct and indirect effects associated with Alternatives 2, 3, and 4 are considered negligible; therefore, the contribution of research activities on SSLs and NFSs to the overall cumulative effect on ESA-listed whales and sea otters is negligible.

4.8.5 Other Marine Mammals (Cetaceans, Pinnipeds)

Under all of the alternatives, no apparent mechanisms have been identified for affecting the marine mammal species listed in Section 3.2.5, other than the California sea lion, because of their overall abundance and distribution. Therefore, these marine mammals are not included in the effects analysis. The California sea lion, however, competes with the SSL for food and habitat in areas where their ranges overlap. Breeding areas of the California sea lion for example, can occur in the vicinity of SSL and NFS haul-outs and rookeries off California, Oregon, and Washington. The California sea lion is also of particular importance because it has been used as a surrogate species for SSLs in the past for testing new instrumentation devices and procedures. The predicted direct and indirect effects of SSL and NFS research activities on the California sea lion under the alternative research programs are discussed below. The intent of this analysis is to provide an overall assessment of the species' population-level response to its environment as it is influenced by SSL and NFS research activities. Representative direct and indirect effects used in this analysis include reduced survival or reproductive success and disturbance.

4.8.5.1 Direct and Indirect Effects of Alternative 1 – No Action: No New Permits or Authorizations

Direct and Indirect Reduced Survival or Reproductive Success Due to SSL and NFS Research

Because there would be no research-related take of SSLs under Alternative 1, it would be considered practical under these circumstances to conduct research on California sea lions as a surrogate species for SSLs. At this point, it is not known exactly what research would be conducted on California sea lions as surrogate species, but it would be likely to involve many of the procedures currently conducted on SSLs, as described in Section 3.2.1. In general, it is assumed that California sea lions would be removed from the wild and held in short-term captivity during experimentation and data collection. It is also assumed that the number of California sea lions captured would be limited because of the high costs associated with caring for the animals. Marine mammals used in captive experiments must be held in APHIS, USDA-certified research facilities, and all research protocols must be IACUC approved. Capture techniques would vary with location, but in all cases, previously permitted methods would be used. Chemical immobilization would be used when necessary to ensure the safety of both the sea lions and the human handlers.

It is unlikely that captive experiments on California sea lions would result in mortality, although there is some risk associated with procedures conducted on these animals, including anesthesia, sedations, and invasive procedures (Appendix B). Because this research would be performed by qualified personnel who would minimize disturbance and cease activity on acutely stressed animals, the potential for injuries is minimal.

The capture of California sea lions in the wild could result in short-term disturbance to other sea lions in the immediate vicinity. At rookeries, this disturbance can cause a stampede as sea lions rush to the water, potentially resulting in injury and death to pups. However, because California sea lion haulouts and rest areas are widely distributed, it is unlikely that capture of a California sea lion would occur on a rookery. Animals that enter the water to escape could also be subjected to killer whale predation, although predation by killer whales is unlikely to result in a measurable effect on the population of California sea lions. Therefore, the effects of Alternative 1 on the survival and reproductive success of California sea lions are considered negligible.

Direct and Indirect Effects of Disturbance Due to SSL and NFS Research

Capture of California sea lions in the wild could result in short-term disturbance to other sea lions in the immediate vicinity (animals in view of researchers). The direct and indirect effects of this disturbance include changes in behavior and injury. Behavioral changes associated with disturbance are flight, increased vigilance, cessation of an activity, or changes in swimming behavior. Physiological responses associated with stress are also likely. Animals that are stressed can also incur injuries in their attempts to avoid capture. Given that few California sea lions would be captured and used in captive experiments, disturbance from capture and release would be periodic and the geographic extent of the effects would be limited to the immediate vicinity of the activity. This activity would have no measurable effect on the abundance or distribution of the California sea lion, and therefore is considered negligible.

Conclusions

Direct and indirect effects of research on California sea lions as a surrogate species for SSLs would be associated with short-term disturbance of other animals during capture activities, injuries to animals incurred during capture, potential morality or injury to pups from stampede, and increased risk of predation by killer whales. The effects of capture and restraint are unlikely to result in a measurable effect on the population of California sea lions. Overall, the effects of disturbance and reduced survival and reproductive success of California sea lions under Alternative 1 are considered negligible.

4.8.5.2 Direct and Indirect Effects of Alternative 2 – Research Program without Capture or Handling

Direct and Indirect Reduced Survival or Reproductive Success Due to SSL and NFS Research

Because of the restrictions on research involving the capture and handling of SSLs under Alternative 2, the research of California sea lions as a surrogate species for SSLs would be considered. Similar to that described under Alternative 1, the direct and indirect mortality associated with this research is unlikely to result in a measurable effect on the survival of the California sea lion.

Aerial, vessel, and land-based survey activities associated with SSL and NFS research could result in short-term disturbances to California sea lions. At rookeries, this disturbance can cause a stampede as sea lions rush to the water, potentially resulting in injury and death to pups. However, because California sea lion haulouts and rest areas are widely distributed, it is unlikely that capture of a California sea lion would occur on a rookery. Animals that enter the water to escape could also be subjected to killer whale predation, although California sea lions are abundant and predation by killer whales is unlikely to result in a measurable effect on the population of California sea lions. Therefore, the effects of Alternative 2 on the survival and reproductive success of California sea lions are considered negligible.

Direct and Indirect Effects of Disturbance Due to SSL and NFS Research

Research of California sea lions as a surrogate species for SSLs would continue under Alternative 2, and the effects of disturbance associated with this research would be similar to Alternative 1. Short-term disturbance to California sea lions would also occur from the aerial, vessel, and land-based survey activities associated with SSL and NFS research. The direct and indirect effects of this disturbance include changes in behavior and injury. Behavioral changes associated with disturbance are flight, increased vigilance, cessation of an activity, or changes in swimming behavior. Physiological responses associated with stress are also likely. Animals that are stressed can also incur injuries in their attempts to avoid capture. Given that California sea lions are abundant and widely distributed, the effects of disturbance on California sea lions under Alternative 2 would produce no measurable effects on the population and are considered negligible.

Conclusions

Direct and indirect effects of research on SSLs, NFSs, and capture of California sea lions as a surrogate species for SSLs, would be associated with short-term disturbance of other animals during research activities, injuries to animals incurred during capture, potential morality or injury to pups from stampede, and increased risk of predation by killer whales. The direct and indirect effects of Alternative 2 are unlikely to result in a measurable effect on the population of California sea lions. Overall, the effects of disturbance and reduced survival and reproductive success on California sea lions under Alternative 2 are considered negligible.

4.8.5.3 Direct and Indirect Effects of Alternative 3 – Status Quo Research Program

Direct and Indirect Reduced Survival or Reproductive Success Due to SSL and NFS Research

Because captive experimentation could be performed on SSLs under the Status Quo, use of California sea lions as a surrogate to SSLs would be likely to be limited to testing new monitoring instrumentation and associated procedures. This research would require capture and removal of the animal from the wild, using previously permitted capture methods, and short-term APHIS and IACUC-approved captivity during experimentation. The direct and indirect mortality associated with this research is similar to that described for Alternatives 1 and 2, and is unlikely to result in a measurable effect on the survival of the California sea lion.

The aerial, vessel, and land-based survey activities associated with SSL and NFS research would increase in frequency and magnitude under the Status Quo, but the potential for injury and mortality to California sea lions would be similar in nature to that described for Alternative 2. The overall effects on the survival and reproductive success of California sea lions under Alternative 3 are considered negligible.

Direct and Indirect Effects of Disturbance Due to SSL and NFS Research

Because captive experimentation could be performed on SSLs under the Status Quo, use of California sea lions as a surrogate to SSLs would likely be limited to testing new monitoring instrumentation and associated procedures. This research would require capture and removal of the animal from the wild, using previously permitted capture methods, and short-term APHIS and IACUC-approved captivity during experimentation. Given that few California sea lions would be captured and used in captive experiments, disturbance from capture and release would be periodic and the geographic extent of the effects would be limited to the immediate vicinity of the activity. This disturbance would have no measurable effect on the abundance or distribution of the California sea lion.

The aerial, vessel, and land-based survey activities associated with SSL and NFS research would increase in frequency and magnitude under the Status Quo, but the effects of disturbance on California sea lions would be similar in nature to that described for Alternative 2. The overall effects of disturbance on California sea lions under Alternative 3 are considered negligible.

Conclusions

Direct and indirect effects of research on SSLs, NFSs, and capture of California sea lions as a surrogate species for SSLs, would be associated with short-term disturbance of other animals during research activities, injuries to animals incurred during capture, potential morality or injury to pups from stampede, and increased risk of predation by killer whales. The direct and indirect effects of Alternative 3 are unlikely to result in a measurable effect on the population of California sea lions. Overall, the effects of disturbance and reduced survival and reproductive success of California sea lions under Alternative 3 are considered negligible.

4.8.5.4 Direct and Indirect Effects of Alternative 4 – Research Program with Full Implementation of Conservation Goals

Direct and Indirect Reduced Survival or Reproductive Success Due to SSL and NFS Research

The frequency and magnitude of research activities under Alternative 4 would be greater than current levels, but would be similar in nature with regard to the effects on the survival and reproductive success of California sea lions as described for Alternative 3. The effects of Alternative 4 on the survival and reproductive success of California sea lions are negligible.

Direct and Indirect Effects of Disturbance Due to SSL and NFS Research

The frequency and magnitude of research activities under Alternative 4 would be greater than current levels, but would be similar in nature with regard to the effects of disturbance on California sea lions as described for Alternative 3. The effects of disturbance on California sea lions under Alternative 4 are considered negligible.

Conclusions

Direct and indirect effects of research on SSLs, NFSs, and capture of California sea lions as a surrogate species for SSLs, would be associated with short-term disturbance of other animals during research activities, injuries to animals incurred during capture, potential morality or injury to pups from stampede, and increased risk of predation by killer whales. The direct and indirect effects of Alternative 4 are unlikely to result in a measurable effect on the population of California sea lions. Overall, the effects of disturbance and reduced survival and reproductive success of California sea lions under Alternative 4 are considered negligible.

4.8.5.5 Cumulative Effects

The following analysis of lingering past effects and RFFAs is the same for all alternatives.

Summary of Direct and Indirect Effects

The effects of disturbance, injury, or mortality to California sea lions from SSL and NFS research activities or the use of California sea lions as a surrogate species to SSLs, are expected to be negligible on the population under all alternatives.

Summary of Lingering Past Effects

With the current population of California sea lions estimated at 240,000 animals and a minimum population estimate of 138,881 animals, it does not appear that present external actions have had any lingering effect on the population. However, relevant historical depletions of the California sea lion population are described below in order to fully assess potential cumulative effects.

California sea lions were commercially harvested for blubber, hides, and oil in the 1800s and early 1900s, and until the latter half of the 1900s in parts of California for pet food and other uses. Lowry *et al.* (1992) stated that there were few historical records to document the effects of such exploitation on sea lion abundance. Because prey species of the California sea lion are commercially fished, there have been interactions between sea lions and fisheries, including documented cases of sea lion injury and mortality. The largest number of California sea lions are killed incidentally in set and drift gillnet fisheries, particularly the California set gillnet fishery for halibut and angel shark, which kills an average of 1,267 sea lions each year (Carretta *et al.* 2004). The California driftnet fishery for sharks and swordfish and the Washington and Oregon salmon net pen fishery kill an average of 81 and 11 California sea lions each year, respectively (Carretta *et al.* 2004). Entanglement in troll, purse seine, trawl, commercial passenger fishing vessel hook and line fisheries, and other man-made debris have also resulted in injury and mortality to California sea lions. Commercial fishermen were permitted, up until 1995, to injure or kill a sea lion that was in the act of damaging their fishing gear and catch. Although it is now illegal to intentionally kill a sea lion, illegal shootings of California sea lions are reported. Subsistence harvest, collision with marine vessels, and entrainment in power plants are other sources of sea lion mortality.

California sea lions are preyed upon by killer whales, as well as great white, hammerhead, and blue sharks, and succumb to diseases such as pneumonia and leptospirosis. High pup mortality has been observed on San Miguel Island, and is associated with a high incidence of hookworm infections. Consumption of domoic acid toxin produced by a harmful algal bloom has been linked to many sea lion deaths along the central California coast (Carretta *et al.* 2004; Scholin *et al.* 2000). Environmental pollutants, such as DDT, and changes in the food supply as a result of El Niño events could also have had adverse effects on the sea lions. Documented characteristics of El Niños are decreased pup production, higher pup and juvenile mortality rates, and fewer females being recruited into the adult population (Carretta *et al.* 2004).

NMFS has issued permits for the scientific research of California sea lions. Hundreds of thousands of California sea lions have been harassed incidental to this research, and to a lesser degree, from research on cetaceans and other pinnipeds.

Analysis of Reasonably Foreseeable Future Actions

Injury and mortality of California sea lions from RFFAs is likely to continue, including from commercial fisheries, vessel traffic, intentional shooting, marine pollution, and disease. The future spatial/temporal concentration of commercial fisheries could result in increased interactions with California sea lions. These interactions could increase illegal shootings if the animals destroy nets or fish or increase injury or mortality from entanglement in nets. Disturbance from vessel traffic and injury and mortality from vessel strikes associated with commercial shipping and tourism could increase as these industries expand. The effects of global climate change or long-term regime shifts on California sea lions are difficult to predict, but could potentially have either a beneficial or adverse effect on survival and reproductive success. Because short-term regime shifts such as El Niño have decreased the California sea lions net productivity, future El Niño events could affect the growth rate of the sea lion population.

Scientific research on California sea lions will result in disturbance to the species, but information from scientific research on California sea lion physiology and behavior could beneficially affect the survival and reproductive success of California sea lions if it contributes to identifying or resolving conservation problems.

Cumulative Effects

A number of internal and future external factors have been identified that could cause disturbance, injury, or mortality. The current population of California sea lions, estimated at around 240,000 animals (minimum population estimate of 138,881 animals), does not appear to be affected by past or present actions, including the disturbance of hundreds to thousands of California sea lions incidental to research on the species. The disturbance to California sea lions associated with the research activities under all alternatives would be negligible, comparatively. In addition, the number of California sea lions removed from the wild for research as a surrogate to SSLs would not approach the species' PBR of 8,333 sea lions per year. Therefore, the contribution of SSL and NFS research activities under all alternatives to the overall cumulative effect on California sea lions would be considered negligible.

4.8.6 Seabirds

The scope of research activities under the following research alternatives would include several activities that would potentially affect seabirds. These include observations from distant vantage points adjacent to SSL and NFS rookeries or haul-outs, aerial surveys; vessel-based surveys and support-vessel landings; and human activity on rookeries or haul-outs before, during, and after the breeding season. During the breeding season, potentially the most disruptive activities would be those that require clearing of the rookeries for pup counts; pup roundup; and capture and restraint of pups, juveniles, and adults for marking, measurements, and collection of biological samples. Activities after the breeding season, such as scat collections, would be expected to be less disruptive to birds.

Potential effects on birds would primarily be to the many seabird species that nest on the same remote offshore rocks and islands that provide habitat to SSL and NFS for breeding rookeries and haul-outs. Seabird colonies are associated with SSL (both DPS) rookeries and haul-outs through their range from the Aleutian Islands to Port Orford and Rogue Reefs in Oregon and Cape St. George in Northern California (Sowls et al. 1978, Varoujean, 1979). Very large seabird colonies are associated with the NFS rookeries in the Pribilof Islands and Bogoslof Island (Sowls et al 1978). The time period when seabirds are most vulnerable is during the seabird nesting season, May through August.

SSL and NFS researchers who operate on Alaska Maritime Refuge lands in Alaska must get a special use permit from USFWS, which contains stipulations to avoid and minimize disturbance of bird colonies and marine mammals. The USFWS's research vessel, *R/V Tiglax*, often provides logistical support to marine mammal researchers in Alaska and provides some guidance to researchers for avoiding disruptive activities near nesting seabirds.

Some vessel activity is required in most locations for support of research or is sometimes used for SSL or NFS census activity. These activities could also potentially result in direct and indirect effects on breeding seabirds that nest in close proximity to these research sites.

4.8.6.1 Direct and Indirect Effects of Alternative 1 – No Action: No New Permits or Authorizations

Direct and Indirect Reduced Survival or Reproductive Success Due to SSL and NFS Research

Under Alternative 1, direct and indirect effect of the limited research program would most likely be from individual observers gaining access to high ground above the SSL and NFS rookeries for behavioral observation or installation/maintenance of remote sensing equipment.

This response would not be expected to reduce survival of nestlings or adult seabirds of any species. These effects would not be expected to result in mortality of eggs or chicks and would not affect reproductive success.

Direct and Indirect Effects of Disturbance Due to SSL and NFS Research

If access near the SSL or NFS rookery would require a vessel, small numbers of bird could be displaced from nearshore foraging areas, depending on the proximity of the individual landing locations to nesting areas. Effects would be short-term, but would not be expected to influence foraging success or feeding of nestlings.

Aerial surveys would be conducted at elevations high enough to not disturb marine mammals; therefore, effects on seabirds would be unlikely. Helicopter activity near the colony could occur during the nesting season for maintenance of remote camera or electronic equipment or to re-supply remote camps for observers. Helicopter would have to land in areas where SSL would not be disturbed. Helicopters are noisy and produce a variety of sounds that are disturbing to seabirds and can cause panic flight and egg loss (Fjeld et al. 1988).

Scat collection at vacated rookeries and haul-outs after the breeding season would potentially disturb roosting or loafing birds. Disturbance and displacement of non-breeding seabirds or seabirds foraging near a sample site would be expected to be of very short duration and considered negligible.

Conclusions

Overall, the low level of research activity under Alternative 1 would result in very little or no disturbance to nesting seabirds. Some potential disturbance would be associated with remote observations of SSL or NFS, depending on the routes taken to their observation sites or blinds. Avoidance of areas with nesting seabirds by researchers would greatly minimize effects of this disturbance.

Installation and maintenance of remote camera equipment could also cause some disturbance to nesting seabirds if they occur in the area, especially if the use of helicopters is required.

4.8.6.2 Direct and Indirect Effects of Alternative 2 – Research Program without Capture or Handling

Direct and Indirect Reduced Survival or Reproductive Success Due to SSL and NFS Research

Direct and indirect impact on seabirds would primarily be from aerial surveys of trend sites for both western and eastern DPS SSLs, as aerial surveys are typically not used for NFSs. Survey planes are required to approach the rookery or haul-out from a kilometer or more offshore at slow air speeds (100-150 knots) without banking, maintain altitudes greater than 150 m, so they are within hearing range of the plane for 1-2 minutes (NMFS 2005e). This also reduces the disturbance to nesting seabirds in areas around the rookeries or haul-out.

These aerial surveys have the potential to cause panic flights at seabird colonies near the rookeries and haul-outs (Anderson and Keith, 1980; Chardine and Mendenhall 1998). Panic flights can result in and can lead to egg or young chicks being dislodged from the nests or ledges and lost, particularly in murres, which do not build a nest (Carney and Sydeman 1999, Chardin and Mendenhall, 2001). Panic flight can also lead to premature fledging of young birds and resulting in injury or potential mortality (Dixon 1997). Unattended nest after adults leave are subject to nest predation by gulls and ravens (Carney and Sydeman 1999, Chardin and Mendenhall, 2001).

Surveys outside the breeding season in the late fall or early spring could potentially result in momentary disturbance to wintering flock of Steller's eiders in their nearshore winter habitat on the Alaska Peninsula and Aleutian Islands. However, the surveys would be conducted at an elevation (150 meters) that would be unlikely to adversely affect behavior or foraging. Spectacled eiders and short-tailed albatross would not be affected by aerial surveys of SSLs due to the lack of overlap in their distribution.

Bald eagles commonly occur in coastal areas throughout the range of the SSL. Aerial survey could potential elicit some response from nesting eagles that are overflown during these surveys but the elevation of the surveys is relatively high and any adverse response is unlikely. Marbled, Kitlitz's and the Xantus' murrelets (crevice nesters), all special status species, are solitary nesters and would not likely be adversely affected by higher altitude aerial surveys near SSL rookeries and haul-outs or NFS rookeries of either the eastern Pacific or San Miguel Island stocks.

California brown pelicans, an endangered species, nest on San Miguel Island and are known to be sensitive to human disturbance near these colonies (Anderson 1988). Aerial surveys would need to avoid areas of nesting pelicans to minimize disturbance. Land-based surveys would not be in the vicinity of nesting pelicans, although these birds occur throughout the area. Disturbance effects on nesting pelicans are anticipated. Effects on California brown pelicans are considered negligible.

Land-based observations from distant cliffs or blinds would be permitted under Alternative 2, as long as SSLs or NFS are not disturbed. In some cases, gaining access to these observation sites would involve walking close to nesting seabirds and potentially would require frequent trips to the site. Responses to these disturbances by researchers from the nesting birds could range from temporary changes in behavior, such as alert or alarm postures and alarm calling, to changes in their internal state, such as increased heart rate/breathing rate (Wilson et al. 1991, Nimon et al. 1995, Carney and Sydeman 1999). Flushing or panic flights could also result in temporary abandonment of nest sites and reduced attendance by adults (Olsson and Gabrielsen 1990). However, the likelihood of these adverse effects from people walking near a seabird colony is very low.

Disturbance of colonial ground nesting species, such as gulls and terns, can result in chicks wandering into adjacent territories, where they are often attacked by neighbors and potentially injured or killed (Chardine and Mendenhall 1998).

Direct and Indirect Effects of Disturbance Due to SSL and NFS Research

Adding to the general disturbance from the intermittent presence of researchers at the SSL and NFS rookeries during the breeding season, scat collections and associated vessel support at vacated rookeries and haul-outs after the breeding season would also potentially result in short-term disturbance/displacement of feeding, roosting or loafing seabirds. At sites in Alaska, these birds would typically be cormorants, several species of gulls, and possibly bald eagles. At rookeries and haul-outs in the southern portions of the study area, common birds would be cormorants, brown pelicans, California brown pelicans (at San Miguel), and several species of gulls. Disturbance of non-breeding seabirds at roosts had not been shown to have more than short-term effects (Carney and Sydeman 1999). Because these birds would be non-breeders at this time of the year, there would be no impact on reproduction. Magnitude/intensity and duration of disturbance, if any, would be negligible. The duration of any disturbance effects associated with scat collection would be short-term and considered negligible.

Conclusions

Direct and indirect effects of the scope of research under Alternative 2 on seabirds would be primarily associated with short-term disturbance from aerial survey overflights and land-based observations. There is a potential for some small loss of eggs or chicks from panic flights but this is highly dependent on factors such as timing of the surveys, elevation of the aircraft, locations of the seabird colonies in reference to the rookeries and haul-outs, past habituation to human disturbance (ground, vessel or aircraft), and proximity of researcher to colonies. Effects on reproductive success would be negligible. Adverse effects are unlikely for any seabird species. Overall effects are considered negligible.

4.8.6.3 Direct and Indirect Effects of Alternative 3 – Status Quo Research Program

Direct and Indirect Reduced Survival or Reproductive Success Due to SSL and NFS Research

Effects on seabirds from aerial surveys would be the same as under Alternative 2, although the intensity, frequency and locations of surveys would vary to some degree. The increase in aerial surveys at trend sites and additional non-trend sites for western DPS SSLs in the Bering Sea/Aleutian Islands would increase the level of disturbance at nesting colonies of several species of cliff-nesting and crevice-nesting seabirds. Aerial surveys of rookeries and hauls in Oregon and California would continue at the current level of effort and frequency.

There would be little risk of mortality for adult seabirds or young-of-the-year that have already fledged. The geographic scope of potential effects would be considerable in that it affects seabird colonies over the range of the SSL, and at the breeding areas of both stocks of NFS would be affected.

Vessel activity near rookeries during the research activities would be within close proximity to a rookery or haul-outs for more than two to three days at a time. Vessel operation would be expected to have a negligible effect on breeding seabirds in nearby colonies

Land-based census activities or intensive sampling would potentially increase general disturbance to nesting seabirds in adjacent areas. The degrees of disturbance would depend on many site factors, such as the distance from researcher to nesting seabirds, species affected, time of season, and level of disturbance for the activity. The duration of effects would depend on the number of time the birds are disturbed and would range from a one-time momentary event to a protracted period of intermittent disturbance (over several day) during intensive sampling or census activities. The likelihood of adverse effects to reproductive success from land-based activities would be very low. Effects of disturbance from research activity on seabirds would be negligible to minor.

Direct and Indirect Effects of Disturbance Due to SSL and NFS Research

Adding to the general disturbance from the intermittent presence of researchers at the SSL and NFS rookeries during the breeding season, scat collections and associated vessel support at vacated rookeries and haul-outs after the breeding season would also potentially result in short-term disturbance/displacement of feeding, roosting or loafing seabirds. At sites in Alaska, these birds would typically be cormorants, several species of gulls, and possibly bald eagles. At rookeries and haul-outs in the southern portions of the study area, common birds would be cormorants, brown pelicans (California brown pelicans at San Miguel), and several species of gulls. Disturbance of non-breeding seabirds at roosts has not been shown to have adverse effects (Carney and Sydeman 1999). Because these birds would be non-breeders at this time of the year, there would be no impact on reproduction. Magnitude/intensity and duration of disturbance, if any, would be negligible. The duration of any disturbance effects associated with scat collection would be short-term and is considered negligible.

Conclusions

Direct and indirect effects of the scope of research under Alternative 3 on seabirds would be primarily associated with short-term disturbance from aerial survey overflights, vessel based surveys, and land-based census activities and intensive sampling activities. Effects on survival or reproductive success would be negligible to minor. For disturbance, effects on breeding birds would be considered minor for geographic extend and frequency of occurrence. For non-breeding birds at roosts, effects would be negligible. Adverse effects are unlikely for any seabird species. Overall effects are considered negligible to minor.

4.8.6.4 Direct and Indirect Effects of Alternative 4 – Research Program with Full Implementation of Conservation Goals

Direct and Indirect Reduced Survival or Reproductive Success Due to SSL and NFS Research

Effects on seabirds from aerial surveys would be the same as under Alternatives 2 and 3, although the intensity, frequency and locations of surveys would vary to some degree. The increase in aerial surveys at trend sites and additional non-trend sites for western DPS SSL in the Bering Sea/Aleutian Islands would increase the level of disturbance at nesting colonies of several species of cliff-nesting and crevice-nesting seabirds. Aerial survey of rookeries and haul-outs in Oregon and California would continue at the current level of effort and frequency.

Direct and Indirect Effects of Disturbance Due to SSL and NFS Research

Any increase in ground-based census activities or intensive sampling could potentially increase general disturbance to nesting seabirds in adjacent areas. The degrees of disturbance would depend on many site factors: the distance from researcher to nesting seabirds, species affected, time of year, and level of disturbance for the activity. The geographic scope of the disturbance would be considerable in that it would affect birds over the range of both SSL stocks and the breeding areas of both the eastern Pacific NFS stock and the San Miguel Islands stock. The duration of effects would depend on the number of time the birds are disturbed and would range from a one-time momentary event to protracted periods of intermittent disturbance (over several days) during intensive sampling or census activities. The likelihood of adverse effects from land-based activities would be negligible.

Conclusions

Direct and indirect effects of the scope of research under Alternative 4 on seabirds would be similar to Alternative 3 with a potential increase in ground-based and intensive sampling. Adverse effects are unlikely for any seabird species. The overall effects on survival and reproductions and effects of disturbance would be negligible to minor.

4.8.6.5 Cumulative Effects

Summary of Direct and Indirect Effects.

Because research activities allowed under Alternative 1 would be limited to observations on SSLs and NFLs behavior at a distance, the likelihood of affecting the survival or reproductive success of nesting seabirds as a result of these activities would be negligible. Any unscheduled maintenance to remote camera equipment would be infrequent and would not be likely to affect survival or reproductive success. Alternative 2 would result in disturbance of nesting seabirds from aerial surveys, but the overall effect on seabird survival would be negligible. Alternatives 3 and 4 would result in disturbance of nesting seabirds from both aerial and ground-based research activities, but the overall effect on seabird survival would be negligible.

Summary of Lingering Past Effects.

Past sources of reduced survival that may continue to have an effect on these species include subsistence hunting and egging in Alaska, incidental take in a variety of foreign and U.S. federal and state-managed fisheries, oil spills and other pollution, and introduced species such as the Norway rat in the Aleutian Islands (Ebbert and Byrd 2002), black rats on San Miguel Island, or fox farming ventures in Alaska (Bailey 1993, Williams, et al 2003). Oceanographic and climatic events (e.g., El Niño Southern Oscillation [ENSO], Pacific Decadal Oscillation [PDO]) have also caused intermittent episodes of mass starvation (Napp and Hunt 2001, Banduini et al. 2001). Disturbance from research activities appears to have contributed relatively little to the mortality of these species in the past. Eggshell thinning and/or elevated levels of DDT were documented in eggs of ashy storm-petrels, Cassin’s auklets, Xantus’ murrelets, and other seabird species in the Southern California Bight (Fry 1994). Brown pelican populations have decreased in the past as a result of eggshell thinning (USFWS 1995).

Analysis of Reasonably Foreseeable Future Actions

Mortality or reduced survival/reproductive success from RFFAs is identified for the continuing federal and state-managed commercial fisheries, subsistence harvest in Alaska (including egging), tourism and recreation, boat traffic near rookeries, eradication programs for introduced fox and rats (Aleutian Islands, Pribilof Islands, San Miguel Island), and marine pollution. All of the mortality factors identified in the previous section are likely to continue in the future. There are active efforts to keep rats off of the Pribilof Islands (USFWS 2006). While these potentially catastrophic events could happen at any time, several laws and programs are in place to mitigate the likelihood of their occurrence.

The greatest sources of human-caused mortality from the past include oil spills and incidental take in longline and drift net fisheries. These are likely to remain the largest factors in the future.

The effects of global climate change or long-term regime shifts on sea birds are difficult to predict, but could potentially have either a beneficial or adverse effect on survival and reproductive success. El Nino events can result in very large die-offs of sea birds in both Alaska and the west coast.

Cumulative Effects

The seabird groups in this analysis represent a wide diversity of niches, all of which have experienced infrequent mortality events in the recent past. All are also susceptible to future human-caused mortality factors. Contribution from activities associated with SSL and NFS research, however, is considered negligible. Because the direct and indirect effects associated with Alternative 1 approach zero, it would not contribute to the overall cumulative effects on any species. Alternatives 2, 3 and 4 would involve additional disturbance to a large geographic area from aerial surveys. The magnitude/intensity and duration of these effects are considered negligible. Overall, the contribution to an overall cumulative effect from any of the alternatives is considered negligible.

4.9 Social and Economic Environment

While the proposed alternatives are largely focused on the potential methods and strategies employed by SSL and NFS researchers under a variety of conditions, there may be social and economic effects associated with any one of these alternatives. These effects may be felt in the local Alaskan communities where regular interactions between residents and research staff take place or in other contexts where interactions between SSL and NFS research and other activities, such as commercial fishing, may take place. In the case of commercial fisheries, this could involve entities based in Alaska and beyond. In terms of potential localized community effects, Chapter 3 discussed the existing conditions surrounding the interactions between research efforts and communities, outlining the economic, non-economic, and sociocultural dimensions of these interactions. This section analyzes how community members would be affected by each alternative through the interpretation of how different SSL and NFS research methodologies would alter existing interactions or result in new levels or types of interactions between visiting research staff and local residents. This includes a discussion dealing with the effects each proposed alternative may have on subsistence harvesters. Also included is a discussion concerning direct community interactions as they relate to the local economy, education, and sociocultural environment. Finally, an Environmental Justice section is included; it discusses the potential for effects that may be disproportionately experienced by minority populations and/or low-income populations.

4.9.1 Subsistence Harvesting

The analysis in this section is based upon existing-conditions information presented in Chapter 3, which includes discussion of ADF&G surveys concerning SSL and NFS subsistence harvest levels and regional variation, as well as detailed narratives from academic publications that outline hunting strategies. Because SSL and NFS subsistence harvesting varies greatly in region, scope, and method, it is appropriate for the purpose of this analysis to deal with SSL and NFS subsistence separately. Because discussions concerning different SSL and NFS stocks weigh little in the analysis of how the proposed alternatives might potentially affect subsistence harvesting, information concerning different stocks will not be included in this analysis.

In the context of subsistence harvesting, effects include any actions that would (1) decrease the number of potential SSLs or NFSs for subsistence hunting; (2) threaten the geographic availability of SSLs or NFSs available for subsistence hunting; (3) threaten the success of traditional methods used to procure SSLs or NFSs during subsistence hunting; or (4) threaten the usability of SSLs or NFSs for the purposes of subsistence or traditional handicrafts. Any of these possible effects could become major if the magnitude of the effect is great enough to threaten the viability of subsistence harvesting as a general practice or to affect the specific cultural contexts surrounding the subsistence harvest in any specific local community.

4.9.1.1 SSL Subsistence Harvesting

The geographic range of SSL subsistence harvesting spans approximately 2,000 miles of coastal Alaska, ranging from western AI communities to southeast panhandle communities. Generally, subsistence harvests are greatest in the AI, the North Pacific Rim, and the Pribilof Islands regions. Methods, however, vary by region, with hunting in the AI and the North Pacific Rim being typically done by two to three individual hunters operating from skiffs in open water. In contrast, hunters in the Pribilof Islands typically hunt from land, targeting mid-size SSL males swimming near shore in a system that eventually results in the wind and sea bringing the SSL carcass to shore, precluding the need to use a skiff under what may be difficult conditions. A more detailed account of the methods used by SSL subsistence hunters can be found in Section 3.4.1.

<u>Direct and Indirect Effects of Alternative 1 – No Action: No New Permits or Authorization</u>

Under Alternative 1, the No Action Alternative, no new permits would be issued, nor could existing permits be extended to allow for modifications. For a complete description of permitted research methodologies under Alternative 1, please refer to Section 2.6.

It is unlikely that there would be any direct effects on the subsistence harvest related to the research methods possible under Alternative 1. The analysis of existing data and samples would not directly affect subsistence hunters. Bio-sampling agreements under co-management would necessarily include subsistence hunters, but participation in any donation agreement is voluntary and can be withdrawn at any time. Remote sensing techniques (including aerial surveys) would be done in a manner that would not directly affect the behavior of the SSL population being studied and therefore would not affect the subsistence harvest. Behavioral observations, too, would take place from a remote location such that the SSL population would not be affected. Finally, scat collection from empty haulouts and rookeries would not directly affect the practice of hunting from land (particularly in the Pribilof Islands) because scat collection and subsistence harvesting would be done at different times. None of the research methods permitted under Alternative 1 would directly affect the four criteria outlined in Section 4.9.1 substantially. Therefore, direct effects associated with the implementation of Alternative 1 are considered to be negligible.

Indirect effects, however, may be minor. Scientific research would still be done on SSL populations under Alternative 1, but it is doubtful that the same types of research questions could be addressed under this alternative that could be addressed under existing conditions (or under Alternatives 2, 3, and 4). With SSL populations in decline, scientific investigation is designed, in part, to play a key role in explaining the cause of this phenomenon and suggesting strategies for SSL recovery. As discussed briefly in Section 2.8, it is unlikely that research conducted under Alternative 1 would provide answers to these research questions in an expedited manner, potentially compromising the ability of NMFS to meet their obligation under the ESA to manage the resource for recovery. As the contribution to SSL conservation objectives are described in Section 4.8.1.1, what research could be done from existing data would become increasingly outdated as environmental conditions and status of population change, and arguments other than scientific research results would be considered for the conservation of the species. To the extent that the implementation of Alternative 1 plays a role in failing to stop or reverse a decrease in the number of potential SSLs available for subsistence hunting on a general or localized basis, indirect effects associated with the implementation of Alternative 1 would be minor, depending on the ultimate biological consequences of the lack of research. Section 4.8.1.1 describes the contribution of Alternative 1 to SSL conservation objectives.

Conclusion for Direct and Indirect Effects

None of the research methods permitted under Alternative 1 would directly affect the subsistence harvesting of SSLs. Direct effects are likely to be negligible. Depending on the ultimate biological consequences of the research permitted under Alternative 1, however, the indirect effects associated with its implementation could be minor.

Direct and Indirect Effects of Alternative 2 – Research Program without Capture or Handling

Under Alternative 2, which would result in a research program without the capture or handling of SSLs, permits would be issued to researchers whose methods do not involve capture, restraint, tissue sampling, or intentionally forcing SSLs to leave rookeries during the breeding season. For a complete description of permitted research methodologies under Alternative 2, please refer to Section 2.6.

It is unlikely that there would be any direct effects on the subsistence harvest related to the research methods possible under Alternative 2. The methods permitted under Alternative 2 include those permitted under Alternative 1, which have been determined to not directly affect the subsistence harvest of SSLs in a substantial way. The additional methods of closer aerial, vessel-based, and land-based surveys allowed under Alternative 2 could directly affect subsistence harvesting methods and strategies through a disturbance to the animals, but these disturbances would be unlikely to affect subsistence harvesting for an extended period of time. Permits issued for the maintenance and husbandry of captive animals would not directly affect the subsistence harvest. Like the analysis of existing data and samples, the maintenance and husbandry of captive animals is likely to be done miles away from any subsistence harvesting and could, in no way, directly affect the hunt. Additionally, incidental mortality at or below 5 percent of PBR for each stock would not reduce SSL stocks to a point that would directly affect subsistence hunting. None of the research methods permitted under Alternative 2 would directly affect the four criteria related to subsistence hunting outlined in Section 4.9.1 substantially. Therefore, direct effects associated with the implementation of Alternative 2 are considered to be negligible.

Indirect effects, however, may be minor. Scientific research would still be done on SSL populations under Alternative 2, but it is unclear that the same types of research questions could be addressed under this alternative that could be addressed under existing conditions (or under Alternatives 3 and 4). With SSL populations in decline, scientific investigation is, in part, designed to play a key role in explaining the cause of this phenomenon and suggesting strategies for SSL recovery. It is more likely that research conducted under Alternative 2 would provide answers to these research questions in a manner more productive than under Alternative 1, but less productive than research done under Alternatives 3 and 4. As discussed in Section 4.8.1.2, it is unlikely that the methods permitted under Alternative 2 would contribute to all of the conservation objectives under the Draft Recovery Plan although its implementation would be considered to have a moderate effect on the ability to provide relevant information to support these objectives. Some research under Alternative 2 would become outdated as environmental conditions and status of population change, while other research would not be reinforced or supplemented by histological or physiological research. To the extent that the implementation of Alternative 2 plays a role in failing to stop or reverse a decrease in the number of potential SSLs available for subsistence hunting on a general or localized basis, indirect effects associated with the implementation of Alternative 2 would be minor, depending on the ultimate biological consequences of the reduced scope of research. Section 4.8.1.2 describes the contribution of Alternative 2 to SSL conservation objectives.

Conclusion for Direct and Indirect Effects

None of the research methods permitted under Alternative 2 would directly affect the subsistence harvesting of SSLs. Direct effects are likely to be negligible. Depending on the ultimate biological consequences of the research permitted under Alternative 2, however, the indirect effects associated with its implementation could be minor.

Direct and Indirect Effects of Alternative 3 – Status Quo Research Program

Under Alternative 3, which would reinstate the Status Quo research program, permits would be issued to researchers in the same way that existed before the court order vacated them in May 2006. For a complete description of permitted research methodologies under Alternative 3, please refer to Section 2.6.

Under Alternative 3, a variety of methods could be potentially employed, including those permitted under Alternatives 1 and 2, which have been determined to not have a substantial direct affect on the subsistence harvest of SSLs. The additional methods available under Alternative 3 involving the capture and restraint of SSLs vary in their effect on subsistence hunting activities. Among the methods not considered to directly affect the subsistence harvest are the collection of morphometric measurements, body composition measurements, and tissue samples. Additionally, incidental mortality at or below 10 percent of PBR for each stock would not reduce SSL stocks to a point that would directly affect subsistence hunting. Other methods permitted under Alternative 3, however, do directly affect the usability of SSLs for the purposes of subsistence or traditional handicrafts. These methods include chemical and drug injections, the application of permanent markings, and the application of various scientific instruments. The injection of chemicals and the application of scientific instruments (specifically the injection of subdermal transmitters) impact the physical body of the SSL in ways potentially adverse to humans who use SSLs in a subsistence capacity. Additionally, permanent markings to the skin of SSLs can affect traditional craftsmen/women who rely on an unmarred, natural animal for their traditional handicrafts. In short, Alternative 3 theoretically has the potential to substantially affect the usability of SSLs for the purposes of subsistence or traditional handicrafts. In practical terms, however, it is likely that few, if any, of the same individual SSLs used for research would be included in the subsistence harvest due to the wide geographic dispersion of both SSL research efforts and subsistence hunting efforts and because of the relatively small number of animals taken for either research or subsistence. In practice, the level of effect is dependent on the level of overlap between SSL subsistence populations and those studied by researchers. Thus, it is likely that direct effects associated with the implementation of Alternative 3 would be negligible.

The types of scientific research done on SSL populations under Alternative 3 would be similar to those conducted before the court order in May 2006. With SSL populations in decline, scientific investigation is, in part, designed to play a key role in explaining the cause of this phenomenon and suggesting strategies for SSL recovery. Previous research done with the methods permitted under Alternative 3 have provided productive answers to the problems surrounding SSLs. Section 4.8.1.3 describes the contribution of Alternative 3 to SSL conservation objectives and suggests that it is likely that continued research of this type would essentially meet the basic information needs outlined in the Draft Recovery Plan, ostensibly providing scientists and lawmakers an appropriate course of action for the preservation and recovery of SSLs as a species. Research results developed under Alternative 3 could provide a way to preserve SSL numbers for the subsistence harvest similar to what is occurring under existing conditions and in a timelier manner than would be the case under Alternatives 1 and 2. Alternative 3 may result in positive minor indirect effects to the four criteria outlined in Section 4.9.1. Therefore, indirect effects associated with the implementation of Alternative 3 are considered positive and minor.

Conclusion for Direct and Indirect Effects

While Alternative 3 could theoretically affect subsistence, it is likely that only a few, if any, of the same individual SSLs used for research would be included in the subsistence harvest. Thus, direct effects related to the implementation of Alternative 3 are considered to be negligible. Because the methods under Alternative 3 would address the basic information needs outlined in the Draft Recovery Plan, and would likely result in minor positive indirect effects.

Direct and Indirect Effects of Alternative 4 – Research Program with Full Implementation of Conservation Goals

Alternative 4 would fully implement conservation goals and permits would be issued to researchers engaged in activities working toward the 78 substantive actions outlined in the Draft SSL Recovery Plan. For a complete description of permitted research methodologies under Alternative 4, please refer to Section 2.6.

Under Alternative 4, a variety of methods could be potentially employed, including those permitted under Alternatives 1, 2, and 3 that have been determined to have no substantial direct affect on the subsistence harvest of SSLs. Additionally, incidental mortality at or below 15 percent of PBR for each stock would not reduce SSL stocks to a point that would directly affect subsistence hunting. However, because Alternative 4 is similar to Alternative 3 in methodology, but greater in intensity, the same methods that could result in effects under Alternative 3 are of concern under Alternative 4. These methods include chemical and drug injections, the application of permanent markings, and the application of various scientific instruments.

Interviews conducted with local community members and subsistence hunters (discussed in detail in Section 3.5), specifically suggested that the injection of chemicals affect the physical body of the SSL in ways potentially adverse to humans who use SSLs in a subsistence capacity. It is also possible that the application of scientific instruments (specifically the injection of subdermal transmitters) would have similar effects. Finally, permanent markings to the skin of SSLs can theoretically affect traditional craftsmen/women who rely on an unmarred, natural animal for their traditional handicrafts. Practically, however, it is unlikely that the same individual SSLs used for research would be included in the subsistence harvest.

In correspondence (Appendix H), NMML suggested that SSL research would be geographically spread throughout the range of the SSL western stock, involving an aerial survey of the entire western stock, expanded vessel surveys, and the addition of new branding of animals from the rookeries in the central-western AI. Other permitted researchers might conduct research in this geographic area as well, as it is largely seen as the place where research on SSLs is needed the most, but expansion of effort in other areas is also possible. Due to the wide geographic nature of both SSL research and subsistence hunting, the level of significance is ultimately dependent on the level of overlap between SSL subsistence populations and those studied by researchers. Increased use of aerial and vessel-based surveys could directly affect the process of hunting to a point depending on volume and frequency of disturbance. These surveys may affect movement patterns of SSLs, potentially driving them from rookeries important to subsistence harvesters or away from areas utilized by hunters. To the extent that Alternative 4 has the potential to directly threaten the success of traditional methods used to procure SSLs during subsistence hunting, effects could result, depending on the degree of disturbance. Therefore, direct effects associated with the implementation of Alternative 4 could be moderate.

The types of scientific research done on SSL populations under Alternative 4 would be similar to those conducted before the court order in May 2006, but greater in intensity and scope. Research activity under Alternative 4 would be an aggressive implementation of the Draft SSL Recovery Plan. With SSL populations in decline, scientific investigation is designed, in part, to play a key role in explaining the cause of this phenomenon and suggesting strategies for SSL recovery. Previous research done with the methods permitted under Alternative 4 have provided productive answers to the problems surrounding SSLs. It is likely that continued research of this type would contribute to the formulation of an appropriate course of action for the preservation and recovery of the SSL as a species. As suggested in Section 4.8.1.4, Alternative 4 would have a major positive effect in terms of its potential contribution of meeting research goals. Further, Alternative 4 could provide a way to preserve SSL numbers for the subsistence harvest in a timelier manner than could Alternatives 1, 2, or 3. As a result, indirect effects associated with the implementation of Alternative 4 are considered positive and minor with respect to the four criteria outlined in Section 4.9.1.

Conclusion for Direct and Indirect Effects

The projected intensity and wide geographic nature of permitted research under Alternative 4 have the possibility to affect the subsistence harvest in a direct and moderate manner, depending on the level of overlap between SSL subsistence populations and those studied by researchers. Because the methods permitted under Alternative 4 would directly address the needs outlined under the Draft Recovery Plan, however, indirect effects are considered positive and minor in magnitude.

SSL Subsistence Harvesting Cumulative Effects

Summary of Direct and Indirect Effects

Depending on the alternative implemented, there are a number of potentially substantial direct and indirect effects to the subsistence harvest of SSLs. Under Alternatives 1 and 2, while there are no direct effects related to the research methods permitted, there is a minor indirect effect related to the decreased ability to conduct scientific research that speaks to environmental and population concerns over time.

Alternatives 3 and 4 do not entail the indirect effects associated with Alternatives 1 and 2, because the research methodologies under both alternatives would satisfy the research needs of the Draft Recovery Plan. The increased intensity and geographic reach of the proposed research agenda under Alternative 4, however, have the possibility of disturbing the subsistence harvest, but the level of disturbance is ultimately dependent on the level of overlap between SSL subsistence populations and those studied by researchers.

Summary of Lingering Past Effects

While a number of past effects tied to various management actions, such as the MMPA, have continued to shape subsistence hunting of SSLs in Alaska, lingering past effects regarding subsistence use of SSLs are largely tied to the biological vitality, and thus the availability of, stocks for subsistence use. As noted elsewhere (Section 4.10.5.2), the complexity, indirect nature, and cumulative effects of the factors negatively affecting the western population segment of SSLs have made it difficult to determine which factors were responsible for the population decline and which are primary threats to recovery. Additionally, despite impetus for further research funding based on pressure to mitigate potential negative consequences to commercial fisheries from unduly restrictive

SSL protection measures, federal appropriation for SSL research and management has shown an overall declining trend.

Analysis of Reasonably Foreseeable Future Actions

The following is an analysis of direct effects to the subsistence harvest of SSLs based on the RFFAs described in Section 4.5.2. Because the success of SSL subsistence harvest is directly related to the number of SSLs available in the wild, it is understood that any RFFA that would directly affect the general population of SSLs and their historical distribution would indirectly affect the subsistence harvest. For an analysis of how RFFAs would affect SSL populations in these ways, please refer to Section 4.8.1.5. This analysis, instead, will concentrate on how RFFAs would directly affect the act of subsistence harvesting.

Many of the RFFAs described have the potential to affect SSL numbers, migration patterns, or physiology. As such, the RFFAs have the potential to substantially affect the subsistence harvest. This is because a successful subsistence harvest relies on the presence of a healthy number of available SSLs, migrating in historically similar patterns, and exhibiting a non-diseased physiology. These considerations are discussed in Section 4.8.1. Beyond these factors, however, it is possible that increased commercial fishing, shipping, and other economic development could affect the subsistence harvest by disrupting traditional hunting areas or by increasing employment available to subsistence harvesters during the harvest season, resulting in a reduced number of people who harvest in the local community and potentially endangering the continued viability of the cultural practice.

Cumulative Effects

Alternative 1 – No Action: No New Permits or Authorization

For subsistence hunters living in small communities, the implementation of Alternative 1 has the potential to create minor cumulative effects. Local business owners would lose a minor amount of business as a direct effect under Alternative 1. While this loss of revenue would not be of substantial magnitude in larger communities, a drop in economic interaction in smaller communities would be of greater magnitude. It is possible, however, that this minor direct effect could be offset by growth of tourism and other industries, as mentioned in Section 4.5.2. Paradoxically, increases in economic activity can have the effect of making the subsistence harvest more productive (through making access to more expensive, more productive technologies financially more accessible), but it can also decrease the level of participation (as more people have employment conflicts during the harvest season). How individual hunters or communities articulate greater or lesser degrees of economic success with the subsistence harvest is quite variable. Thus, it is unknown to what specific degree economic effects will have on subsistence in any particular community, but they are likely to be minor overall.

Regardless, economic activity will accumulate with the foreseeable continuation of the subsistence harvest and the subsistence-related indirect effects of Alternative 1, which would potentially result in research that would become outdated as environmental conditions and the status of SSL populations change. A decrease in the number of potential SSLs available for the subsistence harvest on a general or localized basis could have a minor affect on subsistence depending on the ultimate biological consequences of the lack of research. Depending on how economic change is negotiated, for small communities that rely heavily on the SSL subsistence harvest, the minor direct and indirect effects related to the implementation of Alternative 1 could result in cumulative effects of minor magnitude to subsistence.

Alternative 2 – Research Program without Capture or Handling

For all communities within the study area, the implementation of Alternative 2 has the potential to create minor cumulative effects related to the subsistence harvest. Local business owners are expected to lose a negligible amount of business as a direct effect under Alternative 1. It is possible, however, that Alternative 2 will indirectly result in a minor increase in economic interaction between research staff and local community members. Coupled with a foreseeable growth in tourism and other industries (as described in Section 4.5.2), local communities may experience minor cumulative economic effects. Paradoxically, increases in economic activity can have the effect of making the subsistence harvest more productive (through making access to more expensive, more productive technologies financially more accessible), but it can also decrease the level of participation (as more people have employment conflicts during the harvest season). How individual hunters or communities articulate greater or lesser degrees of economic success with the subsistence harvest is quite variable. Thus, it is unknown to what specific degree economic effects will have on subsistence in any particular community, but they are likely to be minor overall.

Regardless, Alternative 2 has the potential to affect the subsistence harvest because its implementation would potentially result in research that would become outdated as factors change over time or that would not be supported by other types of more direct research on SSLs. A minor decrease in the number of potential SSLs available for the subsistence harvest on a general or localized basis could have a minor effect on subsistence depending on the ultimate biological consequences of the lack of research. An increased use of aerial surveys could also disturb the act of the harvest in a minor way. If this minor effect is combined with a decrease in number of SSLs, then it is somewhat likely that the subsistence harvest could be threatened. Depending on how economic change is negotiated, for small communities that rely heavily on the SSL subsistence harvest, the minor effects related to the implementation of Alternative 2 could result in cumulative effects of minor magnitude to subsistence.

Alternative 3 – Status Quo Research Program

For all communities within the study area, the implementation of Alternative 3 is considered to result in negligible cumulative effects. As Alternative 3 would reinstate the activities permitted before the court order, it is generally assumed that subsistence activities and community interactions would return to levels present before the permits were vacated. As such, there would not likely be a change from the existing conditions outlined in Chapter 3. Thus, the implementation of Alternative 3 is considered to result in negligible cumulative effects to subsistence.

Alternative 4 – Research Program with Full Implementation of Conservation Goals

For smaller communities within the study area, the implementation of Alternative 4 has the potential to create cumulative subsistence effects that may range from minor to major in magnitude depending on community type. Major effects are more likely for smaller, rural communities and other communities that, under Alternative 4, would experience interactions with research staff for the first time. Interactions with research staff would include economic interactions, which are considered to be minor in magnitude. However, depending on the level of other economic growth (in the form of tourism or the growth of other industries as described in Section 4.5.2), local communities may experience minor cumulative economic effects. Economic activity can have the effect of making the subsistence harvest more productive (through the use of more expensive, more productive technologies now within the financial range of subsistence hunters), but it can also threaten the level of participation (as more people are employed during the harvest season). How members of each community negotiate economic success (or lack thereof) with the subsistence harvest is unique. Thus, it is unknown to what degree minor economic effects will have on subsistence.

Regardless, subsistence harvesters of SSLs could be affected directly in ways ultimately dependent on the level of overlap between SSL subsistence populations and those studied by researchers. These direct moderate effects related to subsistence would combine with the increased economic interactions that are possible under Alternative 4, which could create a range of effects, from moderate to major, with major effects being of higher probability for smaller, more rural communities. These effects are combined with the positive, indirectly minor effects related to subsistence. These effects accumulate, regardless of their perceived negative or positive outcomes, in communities that play host to SSL research. Thus, the implementation of Alternative 4 is considered to have the potential to result in moderate to major cumulative effects to subsistence, with major cumulative effects being more possible in small communities.

4.9.1.2 Northern Fur Seal Subsistence Harvesting

The geographic range of NFS subsistence harvesting is relatively constrained to the Pribilof Islands and the communities of St. George and St. Paul. Only three other communities (Akutan, Nikolski, and Unalaska) show any level of harvest for any ADF&G survey year. The numbers in these three communities are low, however, accounting for 1 percent or less of the total community subsistence take.

As discussed in Chapter 3, hunting of NFSs in the Pribilof Islands is a direct outgrowth of the commercial harvest that began in historic times and has continued for generations. In contrast to the SSL harvesting strategies outlined in Chapter 3, NFS subsistence harvesting in the Pribilof Islands is an organized, land-based, group activity. The subsistence harvest usually begins with a harvest crew entering the haulout under the direction of a harvest foreman. This foreman directs the harvest crew in a strategy to isolate a number of two- to four-year-old male NFSs from the rest of the pod. A certified veterinarian acts as a Humane Observer during this process. Once the Humane Observer determines that the seals are sufficiently rested and cooled, experienced harvesters deliver a swift blow to the back of the head to render the animal unconscious and others subsequently humanely disable the heart of the seal. The meat is processed, distributed, and frozen for future use as soon as possible to prevent spoilage. Subsistence harvests take place throughout the authorized season to meet subsistence demands.

Direct and Indirect Effects of Alternative 1 – No Action: No New Permits or Authorizations

The research methods that would be permitted for NFSs under Alternative 1 are the same as would be permitted for SSL research. Thus, it is unlikely that any direct effects on the subsistence harvest of NFSs would occur related to the methods possible under Alternative 1. The analysis of existing data and samples, bio-sampling, remote sensing, behavioral observations, and scat collection would be conducted in a manner that would not interfere with subsistence harvesting. Therefore, direct effects associated with the implementation of Alternative 1 are considered negligible.

In contrast to SSLs, NFS numbers are not drastically declining and there is less concern for rebuilding NFS numbers in the Pribilof Islands than for the recovery of SSLs in western Alaska. Therefore, restricted scientific inquiry is not likely to result in a threatened NFS population. Thus, indirect effects associated with the implementation of Alternative 1 are negligible.

Conclusion for Direct and Indirect Effects

None of the research methods permitted under Alternative 1 would directly or indirectly affect the subsistence harvesting of NFSs. All effects, direct or indirect, are considered to be negligible under Alternative 1.

Direct and Indirect Effects of Alternative 2 – Research Program without Capture or Handling

The research methods that would be permitted for NFSs under Alternative 2 are the same as would be permitted for SSL research. Thus, it is likely that negligible direct effects on the subsistence harvest of NFSs would occur related to the methods possible under Alternative 2. These methods include closer aerial and vessel-based surveys, closer land-based observations, and the husbandry of captive NFSs. Even with consideration of an incidental mortality at or below 5 percent of PBR, Alternative 2 would only directly affect the four criteria related to subsistence hunting outlined in Section 4.9.1 to a negligible degree. Therefore, direct effects associated with the implementation of Alternative 2 are considered negligible.

In contrast to SSLs, NFS numbers are not drastically declining and there is less concern for rebuilding NFS numbers in the Pribilof Islands than for the recovery of SSLs in western Alaska. Therefore, restricted scientific inquiry is not likely to result in a threatened NFS population. Thus, indirect effects associated with the implementation of Alternative 2 are considered negligible.

Conclusion for Direct and Indirect Effects

None of the research methods permitted under Alternative 2 would directly or indirectly affect the subsistence harvest of NFSs. All effects, direct or indirect, are considered to be negligible under Alternative 1.

Direct and Indirect Effects of Alternative 3 – Status Quo Research Program

The research methods that would be permitted for NFSs under Alternative 3 are the same as would be permitted for SSL research. Thus, it is unlikely that there would be any direct effects on the subsistence harvest of NFSs related to the methods possible under Alternative 3. Additionally, incidental mortality at or below 10 percent of PBR for each stock would not reduce NFS stocks to a point that would directly affect subsistence hunting. As with SSLs, other methods permitted under Alternative 3, however, would theoretically directly affect the usability of NFSs for the purposes of subsistence or traditional handicrafts. These methods include chemical and drug injections, the application of permanent markings, and the application of various scientific instruments. In practice, however, it is unlikely that the same individual NFSs used for research would be included in the subsistence harvest due to the cooperative nature of in-place co-management agreements, the proportionately small number of NFSs affected by the research methods, and a specific subsistence harvesting methodology that would presumably allow the harvesters to more easily identify and avoid the taking of research animals. Thus, direct effects associated with the implementation of Alternative 3 are considered negligible.

In contrast to SSLs, NFS numbers are not drastically declining and there is less concern for rebuilding NFS numbers in the Pribilof Islands than for the recovery of SSLs in western Alaska. Therefore, scientific inquiry similar to that done under the Status Quo is not likely to indirectly result in any substantial change in NFS stock populations. Thus, positive or negative indirect effects associated with the implementation of Alternative 3 are considered negligible.

Conclusion for Direct and Indirect Effects

Although Alternative 3 could theoretically affect subsistence, it is likely that few, if any, of the same individual NFSs used for research would be included in the subsistence harvest. This is especially true if cooperative co-management agreements continue into the future. Thus, direct effects and indirect effects related to the implementation of Alternative 3 are considered negligible.

Direct and Indirect Effects of Alternative 4 – Research Program with Full Implementation of Conservation Goals

The research methods permitted for NFSs under Alternative 4 are the same as would be permitted for SSL research as is described previously. Whereas Alternative 4 resulted in direct effect of moderate magnitude for SSL, it is unlikely that there would be any direct effects on the subsistence harvest of NFSs related to the methods possible under Alternative 4. Additionally, incidental mortality at or below 15 percent of PBR for each stock would not reduce NFS stocks to a point that would directly affect subsistence hunting. As is the case with SSLs, however, other methods permitted under Alternative 3 could theoretically directly affect the usability of NFSs for the purposes of subsistence or traditional handicrafts. These methods include chemical and drug injections, the application of permanent markings, and the application of various scientific instruments. In practice, however, it is unlikely that the same individual NFSs used for research would be included in the subsistence harvest due to the cooperative nature of in-place co-management agreements, the proportionately small number of NFSs affected by the research methods, and a specific subsistence harvesting methodology that would presumably allow the harvesters to more easily identify and avoid the taking of research animals. These same considerations would also minimize any effect increased aerial or vessel-based observations may have. Chemical injections, permanent markings, and more intrusive surveying techniques could potentially result in minor effects if left unchecked; however, these effects would most likely be mitigated with continued cooperation between research staff and co-management authorities. Therefore, direct effects associated with the implementation of Alternative 4 are considered negligible.

In contrast to SSLs, NFS numbers are not drastically declining and there is less concern for rebuilding NFS numbers in the Pribilof Islands than for the recovery of SSLs in western Alaska. Therefore, scientific inquiry similar to that done under the Status Quo is not likely to indirectly result in any substantial difference in NFS stock populations. Thus, indirect effects associated with the implementation of Alternative 4 are considered negligible.

Conclusion for Direct and Indirect Effects

Although Alternative 4 could theoretically affect subsistence, it is likely that few, if any, of the same individual NFSs used for research would be included in the subsistence harvest. This is especially true if cooperative co-management agreements continue into the future. Thus, direct effects related to the implementation of Alternative 4 are considered negligible. Additionally, Alternative 4 would have a negligible indirect effect on the subsistence harvest of NFSs.

Northern Fur Seal Subsistence Harvesting Cumulative Effects

Summary of Direct and Indirect Effects

There are negligible direct and indirect effects associated with any of the proposed alternatives in reference to the NFS subsistence harvest.

Summary of Lingering Past Effects

While a number of past effects tied to various management actions, such as the MMPA, have continued to shape subsistence hunting of NFSs in Alaska, lingering past effects regarding subsistence use of NFSs are largely tied to the biological vitality, and thus the availability of, stocks for subsistence use. Although the structure of the current NFS subsistence harvest can be traced back to Russian times, with the forced relocation of indigenous residents of the Aleutian Chain to the Pribilof Islands, the harvest today remains most directly shaped by changes seen in the transition away from a commercially oriented harvest, which began in the early 1980s with the lapse of the Fur Seal Convention. While availability of NFSs for subsistence has not historically been a problem in the Pribilof Islands where this activity has been centered, NFS research funding was substantially reduced after the lapse of the Fur Seal Convention, as noted in Section 4.10.5.2, Recently, however, there has been an increase in funding due, at least in part, to the fact that NFS populations in the Pribilof Islands show no signs of recovery from recent declines.

Analysis of Reasonably Foreseeable Future Actions

The analysis of RFFAs for NFS subsistence harvesting is similar to that previously outlined for SSL subsistence harvesting. Please refer to Section 4.9.1.1 for this discussion.

Cumulative Effects

Alternative 1 – No Action: No New Permits or Authorization

For subsistence hunters living in small communities, the implementation of Alternative 1 has the potential to create minor cumulative effects. Local business owners would lose a minor amount of business as a direct effect under Alternative 1. While this loss of revenue would be of negligible magnitude in larger communities, a drop in economic interaction in smaller communities would be of greater magnitude. It is possible, however, that this minor direct effect would be offset by a growth of tourism and other industries, as mentioned in Section 4.5.2. Paradoxically, increases in economic activity can have the effect of making the subsistence harvest more productive (through making access to more expensive, more productive technologies financially more accessible), but it can also decrease the level of participation (as more people have employment conflicts during the harvest season). How individual hunters or communities articulate greater or lesser degrees of economic success with the subsistence harvest is quite variable. Thus, it is unknown to what specific degree economic effects will have on subsistence in any particular community, but they are likely to be minor overall.

Regardless, economic activity will accumulate with the foreseeable continuation of the subsistence harvest and the NFS subsistence-related direct and indirect effects of Alternative 1, which are considered negligible in magnitude. Depending on how economic change is negotiated, for small communities that rely heavily on the NFS subsistence harvest, the minor direct and indirect economic effects and RFFAs related to economic growth and the negligible effects related to the implementation of Alternative 1 could be synergistic and result in minor cumulative effects to subsistence.

Alternative 2 – Research Program without Capture or Handling

For all communities within the study area, the implementation of Alternative 2 has the potential to create minor cumulative effects to the subsistence harvest. Local business owners are expected to lose a negligible amount of business as a direct effect under Alternative 2. It is possible, however, that Alternative 2 will indirectly result in a minor increase in economic interaction between research staff and local community members. Coupled with a foreseeable growth in tourism and other industries (as described in Section 4.5.2), local communities may experience minor cumulative economic effects. Paradoxically, increases in economic activity can have the effect of making the subsistence harvest more productive (through making access to more expensive, more productive technologies financially more accessible), but it can also decrease the level of participation (as more people have employment conflicts during the harvest season). How individual hunters or communities articulate greater or lesser degrees of economic success with the subsistence harvest is quite variable. Thus, it is unknown to what specific degree economic effects will have on subsistence in any particular community, but they are likely to be minor overall.

Regardless, economic activity will accumulate with the foreseeable continuation of the subsistence harvest and the NFS subsistence-related direct and indirect effects of Alternative 2, which are considered negligible in magnitude. Depending on how economic change is negotiated, for small communities that rely heavily on the NFS subsistence harvest, the interaction between minor indirect economic effects and RFFAs related to economic growth and the negligible effects related to the implementation of Alternative 2 could be synergistic and result in cumulative effects of minor magnitude for the subsistence harvest.

Alternative 3 – Status Quo Research Program

For all communities within the study area, the implementation of Alternative 3 is considered to result in negligible cumulative effects. As Alternative 3 would reinstate the activities permitted before the court order, it is generally assumed that subsistence activities and community interactions would return to levels present before the permits were vacated. As such, there would not likely be a change from the existing conditions outlined in Chapter 3. Thus, the implementation of Alternative 3 is considered to result in negligible cumulative effects to subsistence.

Alternative 4 – Research Program with Full Implementation of Conservation Goals

For smaller communities within the study area, the implementation of Alternative 4 has the potential to create cumulative effects related to direct interactions that may range from minor to major in magnitude depending on community type. Major effects are more likely for smaller, rural communities and other communities that, under Alternative 4, would experience interactions with research staff for the first time. Interactions with research staff would include economic interactions, which are considered to be moderate in magnitude. Depending on the level of other economic growth (in the form of tourism or the growth of other industries as described in Section 4.5.2), local communities may experience major cumulative economic effects. Economic activity can have the effect of making the subsistence harvest more productive (through the use of more efficient technologies now within the financial range of subsistence hunters), but it can also potentially decrease the level of participation (as more people may experience employment conflicts during the harvest season). How members of each community negotiate economic success (or lack thereof) with the subsistence harvest is variable. Thus, it is unknown to what degree these economic effects will have on subsistence.

Regardless, subsistence harvesters of NFSs could theoretically be affected directly in ways that are ultimately dependent on the level of overlap between NFS subsistence populations and those studied by researchers. This possibility, however, could be minimized through co-management agreements and harvesting methodologies to a point of negligibility. These direct effects related to subsistence, which are considered to be negligible in magnitude, would combine with the increased economic interactions that are possible under Alternative 4, which could create a range of effects, from moderate to major, with major effects being of higher probability for smaller, more rural communities. These effects are combined with the positive, indirect minor effects related to subsistence. These effects accumulate, regardless of their perceived negative or positive outcomes, in communities that play host to NFS research. Thus, the implementation of Alternative 4 is considered to have the potential to result in moderate to major cumulative effects to subsistence, with major cumulative effects being more possible in small communities.

4.9.2 Direct Interactions with Communities during Research-Related Activities

The analysis in this section is based upon information in Chapter 3, which includes a general summary of a series of interviews conducted with SSL- and NFS-permitted scientists and their staff. Through these interviews, it became clear that direct interactions between local community members and SSL/NFS researchers manifested in three distinct ways: economic interactions, educational/training interactions, and general sociocultural interactions. It also became clear through these interviews that the general nature of SSL research is markedly different from NFS research. Thus, the community interactions surrounding these different types of research are varied. Due to this difference, it is appropriate to deal with the community interactions surrounding primarily SSL research separately from the community interactions surrounding primarily NFS research. Because discussions concerning different SSL and NFS stocks weigh little in the analysis of how the proposed alternatives might potentially affect general community interaction, discourse concerning different stocks will not be included in this analysis.

Effects, in the context of community interaction between research staff and local community members, are related to the three distinct interaction types previously mentioned: economic, educational/training, and sociocultural. For economic interactions, a major effect would be seen by individual business entities if there was a substantial decrease (>10 percent) in revenue. From that, major effects would be seen at the community level if there was a substantial decrease in public revenue. For educational/training interactions, major effects would include any substantial decline in community members engaged in assisting or learning from visiting research staff or a substantial decline in the quality of this interaction. Sociocultural interactions and related possible major effects are difficult to quantify, however, because sociocultural interactions can encompass positive and negative events, often take place in informal settings, and are typically not well documented, if they are documented at all. That these types of interactions are of concern to the communities, however, may be gleaned from input given during the public participation process for this EIS and from the August 2006 focus group meetings in particular. As an example, various attendees at those meetings commented on the need for better coordination with communities, analysis of social and cross-cultural effects to communities, and development of a protocol for researchers interacting with rural communities to promote culturally appropriate behavior and to ensure local tribes and organizations are adequately informed of research and are given the opportunity to benefit from research results. Beyond these specific comments, it was also noted that not all potentially affected communities have the opportunities provided by co-management agreements and that there is, in general, an overarching need for upfront involvement and communication with Alaska Native communities. For the purposes of this analysis, effects are expected to increase if there is a substantial increase in research programs without accompanying input from the local community or some other community involvement program.

Direct and Indirect Effects of Alternative 1 – No Action: No New Permits or Authorizations

It is unknown what precise effect Alternative 1 would directly have on the volume of researchers visiting local communities, the frequency local communities may experience visiting researchers, or the duration visiting researchers may stay in each community during field research. It is generally assumed, however, that volume, frequency, and duration of SSL and NFS research would be substantially less than was experienced under the research permitting process in place prior to the court order. If this is indeed the case, then interaction between research team members and local community residents would be reduced. For all communities that experience visiting researchers, whether or not they are related primarily to SSL or NFS research, the commercial interactions outlined in Chapter 3 would decrease. As aerial and vessel-based surveys are allowed under Alternative 1 (with the caveat that these surveys would be conducted in a manner that did not result in takes), occasional airplane and vessel charters would be likely, but not in the numbers present before the court order. For the relatively economically diversified communities largely associated with SSL research, this decrease in economic interaction is not likely to result in any major loss of revenue due to the proportionately small amount of money brought in by visiting researchers compared to other economic sectors, such as the fishing and, in some cases, the tourism industry. Smaller communities, such as St. George and St. Paul, may experience a greater effect from a decrease in economic interaction, but even this decrease would be minor in comparison to the larger economic sphere present in these communities. Thus, direct economic effects associated with the implementation of Alternative 1 are considered minor.

Similar to economic interactions, it is generally assumed that the frequency and quality of educational interactions would decrease under Alternative 1. For all communities that experience visiting researchers, whether they are related primarily to SSL or NFS research, the educational interactions outlined in Chapter 3 would decrease. This would include the decrease in formal presentations and may also include a decrease in media presence by researchers. Alternative 1 would also likely decrease the number of informal conversations between local community members and research staff. For the larger communities associated largely with SSL research, the loss of formal presentations, informal meetings, and other non-economic interactions outlined in Chapter 3 is negligible due to the relatively small proportion of the local population affected by these interactions in the first place. In the smaller communities of St. George and St. Paul, however, these informal meetings and exchanges of information are more socially significant due to the relatively small population of the communities. Additionally, researchers regularly take on volunteers, including children, in a conscious effort to educate young people about biology, ecology, and the general principles of science. As described in Chapter 3, this educational outreach gives children (many of whom are Alaska Native) the opportunity to engage with wildlife in a way that complements the traditional understanding of nature passed down by their ancestors. Even though these volunteer opportunities are relatively short-lived and infrequent, researchers stressed the importance of providing education to local children in a conscious effort to instill in future generations an understanding and interest in science, so that one day local community members could conduct research on their own. Under Alternative 1, it is likely that this educational outreach would decrease. Therefore, direct educational effects associated with the implementation of Alternative 1 are considered to be moderate for people living in the communities of St. George and St. Paul.

Like economic and educational interactions, it is generally assumed that sociocultural interactions would decrease under Alternative 1. For all communities that experience visiting researchers, whether or not they are related primarily to SSL or NFS research, the potential for positive and negative sociocultural interactions would decrease due to the decrease in research staff directly interacting with local community members in any capacity. By reducing some of the negative sociocultural effects, Alternative 1 may actually benefit local community members. As noted in Chapter 3, however, effects derived from culturally inappropriate behaviors have been decreasing in recent years under existing conditions, so the magnitude of this gain is likely small. Thus, direct sociocultural effects associated with the implementation of Alternative 1 are considered negligible.

An indirect effect of Alternative 1, which may not decrease the number of researchers in local communities, might manifest as a redirection of research funds into more aerial or vessel-based surveying, longer stays in local communities in order to collect a wide range of tissue samples from animals found dead of natural causes, an increased cooperation between research staff and Alaska Natives in order to secure tissue samples from subsistence takes for science, or even a shift by researchers into studying marine mammals not affected by the SSL or NFS permit process. These scenarios could result in increased economic and educational interaction between research staff and local community members, and this increase in interaction would most likely be minor in magnitude.

Additionally, the overall number of researchers in the local communities would likely stay the same as those experienced before the court order, resulting in indirect sociocultural effects similar to those previously experienced by local community members. Thus, indirect sociocultural effects associated with the implementation of Alternative 1 are considered negligible.

Conclusion for Direct and Indirect Effects

There would be a decrease in economic interaction between research staff and local community members under Alternative 1, and it is likely that this decrease would result in a direct effect of minor magnitude. Additionally, as interaction would decrease generally under Alternative 1, sociocultural effects are not likely to be substantially positive or negative. Educational opportunities would likely decline under Alternative 1, however, potentially creating a moderate effect in at least some small, rural communities. Indirect effects associated with the implementation of Alternative 1 are considered to range from minor to negligible.

Direct and Indirect Effects of Alternative 2 – Research Program without Capture or Handling

It is unknown what precise effect Alternative 2 would have directly on the volume of researchers visiting local communities, the frequency local communities may experience visiting researchers, or the duration visiting researchers may stay in each community during field research. The limitations in methods under Alternative 2 are similar to those put in place by the court order, however, so it is likely that the nature of interactions between research staff and local community members would be similar to what is being experienced at present. Therefore, it is generally assumed that volume, frequency, and duration of SSL and NFS research would be less than was experienced under the research permitting process in place prior to the court order, but greater than what would be experienced under Alternative 1. If this is the case, interaction between research team members and local community residents would experience a minor reduction. As close-proximity aerial and vessel-based observations would be allowed, the economic interaction surrounding these industries in the larger, more economically diverse communities regularly associated with SSL research would not be substantially affected by Alternative 2. Similarly, the land-based observational methods prevalent in both SSL and NFS research would be allowed under Alternative 2, resulting in researchers largely able to continue their research in the smaller communities. As is interpreted under Alternative 1, whatever economic effects may happen as a result of decreased research in local communities, the effect is not likely to be substantial due to the relatively negligible importance money from research has in the local community compared to other locally represented economic sectors, such as the fishing industry and, in come cases, the tourism industry. Thus, direct economic effects associated with the implementation of Alternative 2 are considered negligible.

Similar to economic interactions, it is generally assumed that the frequency and quality of educational interactions would decrease under Alternative 2 to a level between what would exist under Alternative 1 and what was experienced before the court order. Because a measurable amount of SSL and NFS research would still take place in local communities (even if capture or handling were not permitted), formal presentations, media appearances, and informal meetings would likely continue to take place between research staff and local community members. For the larger communities associated largely with SSL research, a continuation of educational outreach, even at a slightly depressed level, is not likely to result in any substantial effects. In the smaller communities of St. George and St. Paul, and elsewhere where local volunteers were regularly hired to assist in research before the court order, this practice would likely continue. While not as immediately tactile as animal handling, activities permitted under Alternative 2 (e.g., brand resight, behavioral observation, scat collection, operation of remote sensing equipment) would continue to provide volunteers, including children, an opportunity to learn about biology and ecology from professional scientists. Thus, while not as engaging as the opportunities available under the Status Quo, educational opportunities would continue under Alternative 2. The direct educational effects associated with the implementation of Alternative 2 are considered negligible.

Like economic and educational interactions, it is generally assumed that sociocultural interactions would decrease under Alternative 2 to a place between Alternative 1 and the level experienced before the court order. Because a measurable amount of SSL and NFS research would still take place in local communities, there would be a substantial amount of interaction between research staff and local community members. However, as there would be ostensibly fewer researchers, there would be fewer chances for both positive interactions and sociocultural missteps. By reducing sociocultural effects, Alternative 2 may actually benefit local community members in this regard. As noted under Alternative 1, however, culturally inappropriate behaviors associated with research under existing conditions appears to be on the decline. Therefore, any gains in incrementally reducing these behaviors would likely be negligible. Thus, direct sociocultural effects associated with implementation of Alternative 2 are considered negligible.

It is unknown, however, how the implementation of Alternative 2 would indirectly affect researchers. Indirect effects of Alternative 2 may not decrease the number of researchers in local communities. Indirect effects could manifest themselves as a redirection of research funds into increased observational and/or remote sensing methods, longer stays in local communities in order to facilitate greater observational detail, an increased cooperation between research staff and Alaska Natives in order to secure tissue samples from subsistence takes for science, or even a shift by researchers into studying marine mammals not affected by the SSL or NFS permit process. These scenarios could result in increased economic and educational interaction between research staff and local community members. These would be potentially minor effects. However, the overall number of researchers in the local communities would likely stay the same as those experienced before the court order, resulting in negligible sociocultural effects similar to those previously experienced by local community members. Thus, indirect sociocultural effects associated with the implementation of Alternative 2 are considered to range from minor to negligible.

Conclusion for Direct and Indirect Effects

Although there would be a decrease in economic interaction between research staff and local community members under Alternative 2, it is unlikely that this decrease would result in any direct effect beyond a negligible magnitude. Additionally, as interaction would decrease generally under Alternative 2, sociocultural effects are not likely to be anything more than negligible. Educational opportunities would likely continue under Alternative 2, albeit in a limited fashion, in a manner unlikely to directly affect the community. All direct effects are considered to be negligible. It is unknown, however, exactly how the implementation of Alternative 2 would affect the research methods of individual research teams. It is entirely possible that an indirect effect of Alternative 2 would be longer stays by research staff in local communities. If this happens, economic and educational interaction may increase. Thus, indirect effects associated with the implementation of Alternative 2 are considered to range from minor to negligible.

Direct and Indirect Effects of Alternative 3 – Status Quo Research Program

Because Alternative 3 would reinstate the research program in place before the court order, the volume of researchers visiting local communities, the frequency with which local communities may experience visiting researchers, and the duration visiting researchers may stay in each community during field research would be generally similar to that experienced before the court order. If this is the case, then interaction between research team members and local community residents would experience neither a substantial reduction nor growth. As all research methodologies would be available to researchers that were previously available before the court order, aerial and vessel-based research work would continue, resulting in continued economic interactions surrounding these services. Similarly, land-based work, including observation, capturing, and handling, would be done under Alternative 3 at levels similar to those prior to the court order. This research would result in a frequency and scale of economic interactions similar to those described in Chapter 3. Because Alternative 3 would reinstate the Status Quo, direct economic effects associated with the implementation of Alternative 3 are considered negligible.

As with economic interactions, Alternative 3 would generally result in educational interactions similar to those present before the court order. The educational interactions described in Chapter 3 (i.e., formal presentations, media appearances, informal conversations) would continue to take place between research staff and local community members. For the larger communities associated largely with SSL research, this continuation of educational outreach is likely to result in negligible effects. In the smaller communities of St. George and St. Paul, and elsewhere where local volunteers regularly assisted with research activities, Alternative 3 would maintain the types of opportunities for volunteers present before the court order, including the direct interaction with the animal for purposes of tissue collection, weighing, and marking. Thus, direct educational effects associated with the implementation of Alternative 3 are considered negligible.

Like economic and educational interactions, it is generally assumed that sociocultural interactions under Alternative 3 would be similar to those experienced before the court order. Because a substantial amount of interaction associated with SSL and NFS research would continue to take place in local communities, there would continue to be opportunities for sociocultural misunderstandings. As mentioned in Chapter 3, however, sociocultural missteps were becoming relatively rare under existing conditions and it is likely that this same level of sociocultural understanding would continue under Alternative 3. Thus, direct sociocultural effects associated with the implementation of Alternative 3 are considered negligible.

The implementation of Alternative 3 would be likely to result in the same kinds of indirect effects as those experienced by communities under the Status Quo. Economic, educational, and sociocultural effects are unlikely to increase or decrease based on the assumption that research agendas and methodologies would not drastically change under this alternative. Thus, indirect effects associated with the implementation of Alternative 3 are considered negligible.

Conclusion for Direct and Indirect Effects

As Alternative 3 would reinstate the Status Quo, community interactions would continue in the manner present before the court order. Therefore, economic, educational, and sociocultural interactions are not likely to be directly or indirectly affected by the implementation of Alternative 3. Effects, direct and indirect, are considered negligible under this alternative.

Direct and Indirect Effects of Alternative 4 – Research Program with Full Implementation of Conservation Goals

It is unknown what precise effect Alternative 4 would have directly on the volume of researchers visiting local communities, the frequency with which local communities may experience visiting researchers, or the duration visiting researchers may stay in each community during field research. The methods available under Alternative 4 are similar to those available under Alternative 3, so it is likely that the nature of interactions between research staff and local community members would be similar to what is being experienced at present. It is generally assumed, however, that volume, frequency, and duration of SSL and NFS research would be slightly more than was experienced under the research permitting process in place prior to the court order. NMML suggests (Appendix H) that aerial and vessel-based surveying would be likely to increase, as would the frequency of research trips throughout the year. Additionally, observations, captures, and morphometric collections would expand to new areas in an attempt to gather a larger geographic sample. The number of captures would also increase, ostensibly necessitating lengthier stays aboard vessels or in local communities. These actions would most likely result in an increase in economic interaction between research team members and local community residents. Because Alternative 4 is primarily focused on SSL recovery, this increase would be particularly experienced in larger communities largely related to SSL research activities. Smaller communities, such as St. George and St. Paul, would experience a moderate increase in economic interaction as well, but probably not to the same degree. This potential increase in economic interaction would be considered positive, but it is unknown if it would rise to a major level of magnitude at either the individual business level or the community level, given the uncertainty in forecasting the magnitude of increased activity. Positive effects would be potentially most obvious in communities that have never experienced research-related interactions but, under the increased scope of Alternative 4, would host research throughout the year. Therefore, direct economic effects associated with the implementation of Alternative 4 are considered to be positive, and may range from minor to major at the individual community level.

As with economic interactions, it is generally assumed that the frequency and quality of educational interactions would increase under Alternative 4. Because an increased amount of SSL and NFS research would take place in and around local communities, formal presentations, media appearances, and informal meetings would be likely to take place more frequently between research staff and local community members. For the larger communities generally associated with SSL research, this increase in educational outreach is not likely to result in any effects due to the large population of these communities and the relatively low level of interest demonstrated by community members (compared to the level of interest in smaller, more rural communities). In the smaller communities of St. George and St. Paul, and elsewhere where local volunteers regularly assist in research, a more vigorous research agenda may provide locals with more opportunities to assist directly with biological and ecological research. These opportunities may even include assisting with experimental and cutting-edge methodologies, which would be more prevalent under Alternative 4. Educational outreach would also be likely to be welcome in communities that have never experienced research-related interactions but which, under Alternative 4, would fall within the sphere of inquiry. Therefore, direct educational effects associated with the implementation of Alternative 4 are seen as positive and may range from negligible to major in their magnitude but are only likely to be major for people living in smaller, rural communities.

Like economic and educational interactions, it is generally assumed that sociocultural interactions would increase under Alternative 4. Because an increased amount of SSL and NFS research would take place in and around local communities, there would be a parallel increase in the level of interaction between research staff and local community members. It is likely that Alternative 4 would increase the number of researchers in the community, even drawing new researchers into studying SSL and NFS issues. Coupled with the possibility that research-related interactions would be taking place more frequently and in more places, the opportunity for sociocultural misunderstandings is greatest under Alternative 4. If left unchecked, sociocultural effects could be moderate in magnitude. However, as sociocultural missteps were becoming relatively rare under existing conditions, it is altogether unlikely that a substantial number of research programs would be started without the inclusion of a community collaboration component under Alternative 4. These programs help avoid or minimize cross-cultural interaction based effects. Thus, direct sociocultural effects associated with the implementation of Alternative 4 are considered negligible.

As stated previously, it is generally assumed that Alternative 4 would result in more researchers visiting local communities throughout the year. This may not be the case, however, as the implementation of Alternative 4 could instead result in a number of different scenarios. These include a possible redirection of research funds into experimental remote sensing methods, or the same number of researchers in more geographic areas (resulting in a net loss in research-related interactions for a single community). It is also unclear whether or not implementation of Alternative 4 would be met with a governmental funding increase above that of the Status Quo, which would be necessary to support the research agenda put forth by the SSL Draft Recovery Plan. These scenarios would most likely result in economic, educational, and sociocultural effects similar to those under Alternative 3 and the Status Quo. Thus, indirect effects associated with the implementation of Alternative 4 are considered negligible.

Conclusion for Direct and Indirect Effects

Due to the proposed intensity and wide geographic range of research under Alternative 4, direct effects related to the increased economic interaction are considered to range between minor and major, at least on a localized basis in some communities. Educational opportunities would be likely to increase under Alternative 4, creating a range of effects from negligible, in large communities, to major for some small, rural communities. It is likely, however, that sociocultural effects would be negligible. This is especially true if community collaboration is continued under this alternative. The indirect effects would be most like those experienced under Alternative 3. Therefore, indirect effects associated with the implementation of Alternative 4 are also considered negligible.

Direct Interactions with Communities during Research-Related Activities Cumulative Effects

Summary of Direct and Indirect Effects

Depending on the alternative implemented, there are a number of potentially substantial direct and indirect effects to interactions between SSL and NFS research staff and local community members. Under Alternative 1, while educational and sociocultural interactions are considered to be negligibly affected, economic interactions would be likely to experience a minor decline. Indirect effects under Alternative 1 are considered to be minor for educational and economic interactions, but negligible for sociocultural effects. Alternative 2 also exhibits a decline in educational interaction, but this effect is smaller in scale and all interaction-related effects, direct or indirect, are considered to be negligible.

Because Alternative 3 would reinstate the Status Quo, there are no foreseeable direct or indirect effects related to its implementation. All effects, direct and indirect, are considered to be negligible. Alternative 4, however, would be likely to create a positive economic effect due to an increased number of interactions between staff and local residents, potentially ranging from minor to major depending on community specifics. The number of educational opportunities also has the potential to increase in degrees from negligible (in large communities) to major (in small communities). All indirect effects associated with Alternative 4 are considered negligible.

Summary of Lingering Past Effects

Lingering past effects that influence direct interactions with communities during research-related activities may be tied to multiple causes; however, level of research funding is thought to be the primary factor. Section 4.10.5.2 provides a more detailed summary of the history of research funding. In general, despite impetus for further research funding based on pressure to mitigate potential negative consequences to commercial fisheries from unduly restrictive SSL protection measures, federal appropriation for SSL research and management has shown an overall declining trend. In the case of NFSs, research funding was substantially reduced with the lapse of the Fur Seal Convention in the mid-1980s, but there has recently been an increase in funding due, at least in part, to the fact that NFS populations in the Pribilof Islands show no signs of recovery from recent declines.

Analysis of Reasonably Foreseeable Future Actions

The following is an analysis of direct effects to the subsistence harvest of SSLs and NFSs based on the RFFA groups described in Section 4.5.2. Although the RFFAs were originally drawn to analyze how each would affect SSLs and NFSs, some of them can be interpreted as having effects on interactions between research staff and local community members. For example, increased commercial fishing, shipping, and other economic development may change local communities that have been historically linked to NFS research. These activities could produce a more diversified economy in these small, rural communities, decreasing the relative importance of research-related economic, educational, and sociocultural interactions.

Cumulative Effects

For the purposes of this analysis, the cumulative effects related to the alternatives include possible effects related to small-scale economic activity (e.g., shopping at stores, hiring crew, purchasing repairs), educational outreach and training, sociocultural interactions, and, where appropriate, subsistence activities. Given their identification in individual issue area analyses, the rural, largely Alaska Native communities of St. George and St. Paul are considered likely to experience the greatest cumulative effects related to direct interactions. The following section analyzes how the direct and indirect effects outlined previously would accumulate under each of the proposed alternatives.

Alternative 1 – No Action: No New Permits or Authorizations

For the largely Alaska Native communities of St. George and St. Paul, the implementation of Alternative 1 has the potential to create minor cumulative effects related to direct interactions. The direct effects potentially experienced by these communities include a moderate decrease in educational outreach by visiting research staff. There is also a possibility that local business owners would lose a minor amount of business from an absence of regularly visiting research staff. Of course, the foreseeable economic growth mentioned in Section 4.5.2 may outweigh this minor effect.

These educational and economic concerns interact with the indirect effects of Alternative 1 related to the subsistence harvest of SSLs in the Pribilofs, which were outlined previously. These indirect effects would potentially result in research becoming outdated as environmental conditions and the status of SSL populations change. While members of a community negotiate economic growth (or lack thereof) uniquely, if a downturn in the local economy places more importance on a successful subsistence harvest, these minor effects related to subsistence may have a synergistic effect on community interaction effects, intensifying them. Together, the interaction of these effects would be likely to create a minor cumulative effect related to direct interactions.

Alternative 2 – Research Program without Capture or Handling

For St. George and St. Paul, the implementation of Alternative 2 has the potential to create minor cumulative effects related to direct interactions. In contrast to the effects under Alternative 1, direct moderate educational effects are not likely under Alternative 2. Additionally, the direct effects of economic interactions are expected to be negligible. Coupled with the economic development related to tourism and other industries (mentioned in Section 4.5.2), there may be minor cumulative economic effects. Indirect effects related to economic and educational interactions are considered minor, as well. As discussed above, the types of economic interactions that would result from the implementation of Alternative 2 are unknown; a direct effect could be a decrease, while an indirect effect could be an increase. Thus, economic activity in the form of tourism or other industrial growth could have a countervailing or synergistic effect, depending on how individual communities are affected by the proposed alternative.

Regardless, Alternative 2 is somewhat likely to affect the subsistence harvest, as its implementation would potentially result in research becoming outdated as factors change over time, or being incongruent with more direct types of research on SSLs. Again, depending on how members of a community negotiate economic growth (or lack thereof), if a downturn in the economy places more importance on a successful subsistence harvest, these minor effects related to subsistence may have a synergistic effect on community interaction effects, intensifying them. Together, the interaction of these effects would be likely to create a minor cumulative effect related to direct interactions.

Alternative 3 – Status Quo Research Program

For all communities within the study area, the implementation of Alternative 3 is considered to result in negligible cumulative effects. As Alternative 3 would reinstate the activities permitted before the court order, it is generally assumed that subsistence activities and community interactions would return to levels present before the permits were vacated. As such, there would not likely be a change from the existing conditions outlined in Chapter 3. Thus, the implementation of Alternative 3 is considered to result in negligible cumulative effects related to direct interactions.

Alternative 4 – Research Program with Full Implementation of Conservation Goals

The implementation of Alternative 4 has the potential to create cumulative community effects ranging from minor to major in scope, depending on the nature of the local community. The direct effects potentially experienced by individual communities would be likely to include between a minor and major increase in the amount of money spent by visiting researchers on minor supplies and repairs to equipment, depending on the size of the community.

This is compounded by the foreseeable economic growth mentioned in Section 4.5.2. With more researchers also comes the possibility of an increase in the amount of educational outreach and volunteer opportunities for young people in these communities. These direct effects related to education would be negligible in large communities, but have the potential to be major in small communities. Increased economic activity (in an area historically constrained) and increased educational opportunities, taken together, could accumulate into major effects related to direct interaction for local community members in small, rural communities like St. George and St. Paul.

The increased geographic range and higher intensity of research on SSLs are somewhat likely to create a moderate effect on subsistence harvesters in the Pribilof Islands, depending on the amount of overlap between SSLs used for research and subsistence. This is despite the indirect, minor, positive gains to subsistence garnered through meeting contributing to research goals. As NFS subsistence harvesting is paramount in these communities, a decline in SSL subsistence harvesting would not be as substantial as would be a decline in NFS harvesting, but SSL subsistence is still important. Although it is most likely that research would be conducted through strong coordination with local co-management groups, if left unchecked, this moderate direct effect on the subsistence harvest has the potential to temper any sort of positive cumulative effects gained through increased direct economic and educational interaction by creating a moderate sociocultural effect. A threat to the subsistence harvest perceived to be at the hands of researchers could produce a moderate sociocultural effect for subsistence hunters living in small, rural communities, regardless of whatever community collaboration is in place. The accumulation of these effects has the potential to result in major cumulative effects related to direct interactions in smaller, rural communities like St. Paul and St. George. Larger communities would experience minor to moderate cumulative effects related to direct interactions.

4.9.3 Environmental Justice

As noted in previous sections, under the alternatives likely to have effects, a greater number and higher level of social and economic effects are likely to accrue to the communities of St. George and St. Paul than to other communities. As described in Section 3.5.4, there is a substantial minority population present in the communities of St. George and St. Paul. The proportions of minority populations in St. George and St. Paul are 92.1 percent and 87.0 percent, respectively. These proportions are substantially higher than in the state of Alaska as a whole, which has a minority population of 32.4 percent. St. George and St. Paul exhibit a meaningfully greater percentage of minority residents when compared to the general population of Alaska. Therefore, disproportionately high effects to the populations of these two communities, if any, would be of concern for Environmental Justice analysis purposes.

Table 3.5-2 illustrates the proportion of people with income considered below poverty in the potentially affected communities of St. George and St. Paul, as well as in Alaska as a whole. The proportions of people with income below poverty in St. George and St. Paul are 7.9 and 11.9 percent, respectively. Within the larger general population of Alaska, the proportion of the population with income below poverty level for the same base year was 9.4 percent. In other words, the low-income portion of the population in St. George was smaller than that of the state as a whole, but the opposite is true in St. Paul. Therefore, depending on the specific community, Environmental Justice based on low-income population thresholds may apply to the Pribilof Islands communities, but in any event, the islands have already been shown to have minority population levels that would trigger Environmental Justice concerns, if any.

Direct and Indirect Effects of Alternative 1 – No Action: No New Permits or Authorization

As described previously, Alternative 1 would not directly affect the subsistence harvest of SSLs or NFSs. Educational outreach (specifically outreach aimed toward children), however, would be likely to decrease substantially in St. George and St. Paul under Alternative 1. This would result in Environmental Justice concerns in those communities.

Indirect effects related to a less robust scientific agenda for the formulation of a recovery strategy are possible but would be considered minor under Alternative 1. Outside of any specific community, this effect would disproportionately accrue to Alaska Native populations in general, as the only population allowed to harvest SSLs for subsistence purposes. On a localized basis, SSL harvests in the Pribilof Islands have declined in recent years, with estimated combined total harvests for St. George and St. Paul ranging between 34 and 43 animals annually for the period 2000-2004. While SSLs remain an important subsistence resource for local residents, they are not the most important marine mammal subsistence resource in terms of overall dependency. Islanders are more heavily dependent on NFSs than on SSLs, with annual NFS subsistence takes ranging between 522 and 754 animals on St. Paul and between 121 and 203 animals on St. George over the period 2000-2003. Local residents could potentially offset some level of SSL subsistence harvest decline with increased NFS take, but overall loss of SSL harvest would be a substantial Environmental Justice concern for Alaska Native hunters themselves, as well as for those who benefit from the harvest (from extended families to virtually entire Alaska Native communities that participate in the regular, informal sharing of subsistence resources). This is true of quite a few coastal Alaska communities in general and of the Pribilof Islands in particular. The minor indirect effects associated with the implementation of Alternative 1 would result in Environmental Justice concerns in these communities, as would the minor cumulative effects related to direct interaction and the subsistence harvest.

Conclusion for Direct, Indirect, and Cumulative Effects

Environmental Justice concerns are present in the Pribilof Islands and potentially in other small, coastal Alaska communities due to both moderate and minor direct effects, minor indirect effects, and minor cumulative effects.

Direct and Indirect Effects of Alternative 2– Research Program without Capture or Handling

Environmental Justice concerns under Alternative 2 would be similar to those that would be seen under Alternative 1. Alternative 2 would not directly affect the subsistence harvest of SSLs or NFSs. Educational outreach is not expected to substantially decline under Alternative 2. Researchers would be likely to remain in the communities of St. George and St. Paul, engaging in remote research and collecting tissue samples through passive means. Volunteer opportunities and educational outreach would continue, negating potential loss of these opportunities as an Environmental Justice concern.

Indirect effects related to a less robust scientific agenda for the formulation of a recovery strategy are possible but would be considered minor under Alternative 2. As noted under Alternative 1, outside of any specific community, this effect would disproportionately accrue to Alaska Native populations because they are the only population allowed to harvest SSLs for subsistence purposes, and thereby result in Environmental Justice concerns. Localized Environmental Justice concerns related to potential SSL harvest decline in the Pribilof Islands would be similar to those described under Alternative 1. Cumulative effects related to direct interactions and the subsistence harvest may also have a minor effect.

Conclusion for Direct, Indirect, and Cumulative Effects

Environmental Justice concerns are present in the Pribilof Islands and other small, coastal Alaska communities due to minor indirect effects and minor cumulative effects.

Direct and Indirect Effects of Alternative 3– Status Quo Research Program

There is a theoretical possibility that the continued practice of chemical and drug injections, the application of permanent markings, and the application of various scientific instruments into SSLs and NFSs could result in effects to Alaska Native subsistence use of these animals, which, in turn, would raise Environmental Justice concerns. In reality, however, this is unlikely to rise to a level of significance due to the wide distribution of SSL harvest and research efforts, to the conscientious practices of NFS co-management, and especially to the traditional harvesting methodologies employed for NFSs whereby research animals could likely be efficiently avoided. Other direct aspects of researcher-related interaction, such as economic gain, educational opportunities, and sociocultural interactions, are also considered to be negligible under this alternative. The minor, indirect effect associated with Alternative 3 is not considered to be adverse. As a result, Environmental Justice concerns are not anticipated under Alternative 3.

Conclusion for Direct, Indirect, and Cumulative Effects

Environmental Justice concerns are not present in the Pribilof Islands and other small, coastal Alaska communities due to negligible adverse effects.

Direct and Indirect Effects of Alternative 4– Research Program with Full Implementation of Conservation Goals

In ways similar to Alternative 3, there is a theoretical possibility that the continued practice of chemical and drug injections, the application of permanent markings, and the application of various instruments into SSLs and NFSs could result in a substantial effect to Alaska Native subsistence use of these animals. With potentially more researchers engaging in these methods, there is a danger that these actions could produce a moderate effect if not counterbalanced by co-management agreements (for a detailed discussion of co-management, see Section 4.6.2.3 and Appendix F). A part of this moderate effect is the increased use of aerial and vessel-based observation, which may affect SSL and NFS behavior in ways that could reduce the number of animals available for the subsistence harvest, depending on the actual level of disturbance. This could raise Environmental Justice concerns regarding the Alaska Native population engaged in the subsistence harvest and use of these animals in general and on a localized basis in a number of communities, including the Pribilof Islands. There are minor indirect effects under Alternative 4 and there are moderate cumulative effects under Alternative 4. However, the indirect and cumulative effects are not interpreted to be especially adverse, and are not used to determine Environmental Justice concerns. Regardless, the moderate direct effects anticipated under Alternative 3 would result in Environmental Justice concerns for small, rural communities like St. Paul and St. George.

Conclusion for Direct, Indirect, and Cumulative Effects

Environmental Justice concerns are present in the Pribilof Islands and potentially in other small, coastal Alaska communities due to moderate direct effects.

4.10 Economic Effects of Federal Funding for SSL and NFS Research

As described in Chapter 3, federally funded research on SSLs and NFSs results in a variety of economic effects. Research-related spending not only generates jobs and income in the entities that are recipients of the research funds, it can have a "ripple" economic effect throughout a region. In addition, scientific and technological advances from basic and applied research can produce economic benefits for society that may not be readily translated into dollar values. This section examines criteria for evaluating the potential economic effects of each alternative considered in terms of changes in both research expenditures and the output of SSL and NFS research activities.

The varying level of research effort represented by each of the alternatives could potentially result in a difference in the amount and distribution of funds for SSL and NFS research and management. These funding differences, in turn, have employment and income implications for the entities that are recipients of the funds and, because of the multiplier effect described in Chapter 3, for the broader regional economy. However, it is difficult to quantify the predicted amount and distribution of funds for SSL and NFS research and management under each alternative because of the fiscal, political, institutional and other factors that affect research funding; to at least some extent these complex and unpredictable factors exist apart from the specific types of SSL and NFS research techniques and level of research effort permitted. Nevertheless, it is possible to present a qualitative discussion of the effects of the selected alternatives on the amount and distribution of funds for SSL and NFS research and management based on the informed judgment of individuals engaged in this research. This qualitative analysis will include a determination of which institutions would be affected, the nature of the economic effects (e.g., changes in research positions or purchases), how likely any economic effects would be and whether the economic effects would be temporary or long-term.

As discussed in Section 3.6, the economic effects of changes in research output are related to public preferences for providing protection to SSL and NFS populations. This expressed willingness to pay exists because the protection of SSL contributes to human welfare, where "welfare" is broadly defined to reflect the overall happiness or satisfaction of an individual or group of individuals (National Research Council, 2004). Due to data limitations, it is not possible to quantify the extent to which alternative research policies affect the welfare of individuals; however, the likely direction and magnitude of change in human welfare can be estimated for each alternative if expected changes in SSL and NFS recovery and conservation are used as a proxy for this non-market value. The anticipated changes in SSL and NFS recovery and conservation are described for each alternative in Sections 4.8.1 and 4.8.2. In general, it is assumed that an alternative that has a beneficial effect on SSL and NFS protection enhances the welfare of those individuals who value this protection.

Section 3.6 noted that it may not be necessary that a given research policy have negative or positive implications for the survival of a SSL or NFS population in order for a segment of the American public to be affected. For example, if a given research policy causes the death of some individual animals within a SSL or NFS population, it is likely that some members of the general public would experience a loss of welfare or feel moral unease even if the SSL or NFS population as a whole is unharmed. Consequently, if a research policy both results in the death of some animals and potentially contributes to the protection of the overall population, there would be a trade-off between the social welfare losses from research-related mortality and the social welfare gains from the possibility of increased protection. Additional in-depth surveys are needed before we can better understand the nature and magnitude of these trade-offs among members of the American public.

4.10.1 Direct and Indirect Effects of Alternative 1 – No Action: No New Permits or Authorization

4.10.1.1 Economic Effects of Changes in Research Expenditures

Under this alternative, the level of SSL and NFS research funding is expected to be less than that under the Status Quo. This is because the research that can be conducted under the grant and permitting restrictions of Alternative 1 is of limited value in terms of creating new knowledge that will lead to the identification of key factors for the recovery of SSLs and conservation of NFSs (DeMaster, 2006; Bengtson, 2006; Wilson, 2006). In the words of one scientist, the research would be "spending a lot of money to find out very little" (Lee, 2006).

If the SSL research conducted has little potential to increase our understanding of the cause of the decline of the SSL and to develop conservation and protective measures to ensure recovery of the species, Congress is likely to question the point of continuing its appropriation for this research (DeMaster, 2006; Bengtson, 2006). Moreover, the ability of researchers to offset possible reductions in Congressional appropriations with funds from other sources may be limited under Alternative 1. Through their systems of merit review, the National Science Foundation and other non-appropriation funding sources direct funds to research that has the greatest potential to lead to significant scientific advances. In the case of SSL research, achieving this standard generally requires the use of aerial and vessel-based surveys, tagging and marking procedures, attachment of scientific instruments, collection of tissue samples and other techniques that are prohibited under the ESA and MMPA except where allowed by permit (DeMaster, 2006; Bengtson, 2006). For example, the use of satellite transmitters attached to SSLs provide information on location, dive characteristics, time on land and at sea and other data critical to revealing the relationship between the foraging ecology of SSL and recent population declines (Wilson, 2006).

The grant and permitting restrictions under Alternative 1 would also constrain the ability of some entities to use existing research resources to attract additional research funding. For example, prior to permits being vacated by the 26 May 2006 court order, free-ranging juvenile sea lions were captured and transported to the $2 million specialized Steller South Beach holding facility at the ASLC to conduct health assessments. Since the court order the facility has been idle—all captive animals were released following the court order (Atkinson, 2006). Under Alternative 1, the ASLC facility would continue to be disallowed from holding SSL at the facility, effectively preventing the ASLC from fully capitalizing on a major research investment already made. Further, the absence of SSLs may reduce the popularity of the ASLC as a tourist attraction; a reduction in income from visitor admission fees and gift shop purchases would have an additional negative economic effect on the ASLC.

A substantial reduction in the funding for SSL and NFS research would be likely to have long-term negative economic consequences for those entities that have been the recipients of those funds. These entities and their SSL research funding levels are described in Chapter 3. Job losses would occur in these entities, including the universities and federal agencies with "soft money" positions supported by SSL and NFS research funds. In addition, a decrease in research funds will lead to a reduction in purchases of capital items and expendable items by these entities and may affect their ability to meet overhead costs.

Another likely effect of the policy direction under Alternative 1 is that SSL research fund recipients would direct a larger portion of their research monies to projects outside of the United States; for example, to projects studying SSL populations in Russia and Canada (Atkinson, 2006). Both NMFS and the ASLC have programs to monitor population trends (non-pup and pup counts), estimate vital rates (branding and re-sighting), collect food habits data and conduct other research on SSLs in Russia (NMFS, 2006).

An overall decrease in research expenditures in combination with a diversion of funds to research activities outside of the United States would have a broader negative effect on the local economy because of the spending/income multiplier effect discussed in Chapter 3. However, the effect is unlikely to be substantial due to the relatively minor role SSL and NFS research funding plays in generating economic activity in regions within the project area.

Not all recipients of SSL research and management funds would experience a reduction in funding under Alternative 1. For example, the amount of SSL research and management funds received by the NPFMC may not decrease relative to the Status Quo because NPFMC primarily uses those funds for management rather than research (Wilson, 2006). Most management activities, such as meetings to implement regulations, independent reviews of actions and analyses of the effects of actions, would be unaffected under Alternative 1.

Conclusion

Under Alternative 1, research institutions and independent researchers would likely experience a major reduction in funding for SSL and NFS research relative to the Status Quo because the research that can be conducted under the grant and permitting restrictions of this alternative would be of limited value in the recovery of SSL and conservation of NFS populations. The lower level of funding would likely continue as long as the grant and permitting restrictions are in place. However, entities that receive funds for SSL and NFS management activities are unlikely to experience a lower amount of funding under Alternative 1 in comparison to the Status Quo.

4.10.1.2 Economic Effects of Changes in Research Output

According to the analysis of direct/indirect effects of Alternative 1 on SSLs in Section 4.8.1, the usefulness of existing data in terms of addressing the conservation objectives from the SSL Recovery Plan would be likely to decrease over time as environmental conditions and the status of the population change. Further, Section 4.8.1 states that under Alternative 1, the level of scientific uncertainty regarding the efficacy of these critical habitat and fishery regulations would be likely to increase over time as the original data becomes outdated. With respect to the contribution of Alternative 1 to NFS conservation objectives, Section 4.8.2 states that, because of the limited magnitude and intensity of the research program under Alternative 1, the beneficial contribution towards the objectives in the NFS Conservation Plan is considered negligible. To the extent that the implementation of Alternative 1 plays a role in a possible failure to stop or reverse a decline of SSL or NFS populations, the loss of welfare among that segment of the American public who value SSL and NFS protection would be potentially substantial, depending on the ultimate biological consequences of the lack of research.

According to Sections 4.8.1 and 4.8.2, the estimated direct and indirect mortality of SSLs and NFSs from research is less under Alternative 1 than under any other alternative. Consequently, the likelihood of a loss of human welfare resulting from the deaths of individual animals due to research would be lowest under Alternative 1.

Conclusion

To the extent that the implementation of Alternative 1 plays a role in a possible failure to stop or reverse a decline of SSL or NFS populations, the loss of welfare among that segment of the American public who value the protection of SSL and NFS populations as a whole would be potentially major, depending on the ultimate biological consequences of the lack of research. The members of the American public that would potentially be affected are widely distributed geographically; it is likely that they are dispersed throughout the United States.

A comparison of the estimated number of animals that would die from the specified scope of research defined for each alternative suggests that the likelihood of a loss of human welfare resulting from the deaths of individual animals due to research would be lowest under Alternative 1.

4.10.2 Direct and Indirect Effects of Alternative 2 – Research Program without Capture or Handling

4.10.2.1 Economic Effects of Changes in Research Expenditures

Alternative 2 is similar to Alternative 1 in that no grants, permits or authorizations would be issued for research activities that require capture, handling, and/or invasive procedures on wild animals. As noted in the assessment of the effects of Alternative 1, the inability of researchers to engage in these research activities could have negative implications for research funding. However, researchers may choose to seek funding to expand their efforts with non-intrusive techniques. In that event, the effect of Alternative 2 on the level of funding for SSL and NFS research would be less negative than under Alternative 1.

Conclusion

To the extent that funding for non-intrusive research activities could be secured, the impact of Alternative 2 on research institutions and independent researchers would likely be moderate or minor.

4.10.2.2 Economic Effects of Changes in Research Output

As discussed in Section 4.8.1, the non-intrusive research activities that could be authorized under Alternative 2 would address many but not all of the conservation objectives listed in the SSL Recovery Plan. As under Alternative 1, the level of scientific uncertainty regarding the efficacy of these critical habitat and fishery regulations would be likely to increase over time as the original data becomes outdated. With respect to contributing to NFS conservation objectives, Section 4.8.2 states that, because the magnitude/intensity of the research program under Alternative 2 does allow for some low-level field research activities and non-field related research, the beneficial contribution towards the conservation objectives in the Draft NFS Conservation Plan is considered minor. These assessments of the contributions of Alternative 2 to SSL and NFS conservation objectives suggest that the probability of Alternative 2 leading to a gain in welfare among that segment of the American public who value the protection of SSL and NFS would be higher than under Alternative 1, but lower than that probability under Alternatives 3 or 4.

According to Sections 4.8.1 and 4.8.2, the estimated direct and indirect mortality of SSL and NFS from research under Alternative 2 is less than that under the Status Quo, due to the decreased scope of the research program under Alternative 2. Consequently, the likelihood of a loss of human welfare resulting from the deaths of individual animals due to research would be lower under Alternative 2 relative to the Status Quo.

Conclusion

Assessments of the contributions of Alternative 2 to SSL and NFS conservation objectives suggest that the likelihood that Alternative 2 would lead to a gain in welfare among that segment of the American public who value the protection of SSL and NFS populations as a whole would likely be higher than the likelihood under Alternative 1, but may be lower than the likelihood under Alternatives 3 or 4, as Alternative 2 would address many but not all conservation objectives.

4.10.3 Direct and Indirect Effects of Alternative 3 – Status Quo Research Program

4.10.3.1 Economic Effects of Changes in Research Expenditures

The policy direction of this alternative would have no effect on research funding because grants and permits would be issued for the same type and scope of research as occurred under SSL grants and permits prior to the May 26, 2006 court order.

Conclusion

The impact of Alternative 3 on SSL and NFS funding for research institutions and independent researchers would likely be negligible, as all Status Quo grants and permits would be issued.

4.10.3.2 Economic Effects of Changes in Research Output

Section 4.8.1 states that the range of research activities that are authorized under Alternative 3 provide the means to address essentially all basic information needs about SSLs that are identified in the Recovery Plan. The section further states that, because of the magnitude/intensity, long-term nature, and frequency of sampling under the

Alternative 3 research program, the beneficial contribution towards the conservation objectives in the NFS Conservation Plan is considered moderate. Given the contribution of research results developed under Alternative 3 to the recovery and conservation of SSLs and NFSs, the likelihood that individuals who value the protection of these species would incur a welfare loss is less than would be the case under Alternatives 1 and 2.

According to Sections 4.8.1 and 4.8.2, the estimated direct and indirect mortality of SSL and NFS from research would be higher under Alternative 3 than under Alternative 1 or Alternative 2 due to the increased scope of the research program under Alternative 3. Consequently, the likelihood of a loss of human welfare resulting from the deaths of individual animals due to research would be higher under Alternative 3 than under Alternative 1 or Alternative 2.

Conclusion

Given the contribution of research results developed under Alternative 3 to the recovery and conservation of SSL and NFS, the likelihood that individuals who value the protection of SSL and NFS populations as a whole would incur a welfare loss is less than would be the case under Alternatives 1 and 2. The likelihood of a loss of human welfare resulting from the deaths of individual animals due to research would be higher under Alternative 3 than under Alternative 1 or Alternative 2.

4.10.4 Direct and Indirect Effects of Alternative 4 – Research Program with Full Implementation of Conservation Goals

4.10.4.1 Economic Effects of Changes in Research Expenditures

This alternative would include not only those specific activities currently or previously permitted but any additional research activities or methods that are needed to implement the Draft SSL Recovery Plan and Draft NFS Conservation Plan. Alternative 4 represents an extensive research program for SSLs and NFSs that is able to simultaneously address multiple issues over a large geographical space. To be fully implemented, such a program would require a much larger research budget than is currently allocated to these species.

It is uncertain whether a proposal for an extensive research program would, in fact, lead to higher funding levels. Both the Draft SSL Recovery Plan (NMFS 2006a:ii) and Draft NFS Conservation Plan (NMFS 2006b:iv) include this disclaimer:

> *Objectives will be attained and any necessary funds made available subject to budgetary and other constraints affecting the parties involved, as well as the need to address other priorities. Nothing in this plan should be construed as a commitment or requirement that any federal agency obligate or pay funds in contravention of the Anti-Deficiency Act, 31, U.S.C. 1341, or any other law or regulation.*

On the other hand, Alternative 4 may help remove some of the "budgetary and other constraints affecting the parties involved" by making SSL and NFS research more attractive to both researchers and sources of research funding. For example, an expanded research program would create more opportunities to conduct "cutting-edge" marine mammal science.

Conclusion

It is uncertain whether a proposal for an extensive research program would lead to higher funding levels. However, Alternative 4 may make SSL and NFS research more attractive to both researchers and sources of research funding by creating opportunities for more advanced marine mammal studies.

4.10.4.2 Economic Effects of Changes in Research Output

Sections 4.8.1 states that Alternative 4 is designed to allow researchers to address all objectives and sub-objectives of the Draft SSL Recovery Plan, while Section 4.8.2 states that the alternative is focused toward full implementation of the Draft NFS Conservation Plan. Given the beneficial contribution towards the recovery and conservation of SSLs and NFSs, the likelihood that individuals who value the protection of these species would experience a welfare gain is similar to that of Alternative 3 and higher than would be the case under Alternatives 1 and 2.

According to Sections 4.8.1 and 4.8.2, the estimated direct and indirect mortality of SSL and NFS from research would be higher under Alternative 4 than under any other alternative due to the increased scope of the research program under Alternative 4. Consequently, the likelihood of a loss of human welfare resulting from the deaths of individual animals due to research would be highest under Alternative 4.

Conclusion

Given that Alternative 4 could provide information to support all of the conservation objectives listed in the SSL Recovery Plan and NFS Conservation Plan, the effect of Alternative 4 on that segment of the American public that values the protection of SSL and NFS populations as a whole would be similar to the effect of Alternative 3. A comparison of the estimated number of animals that would die from the specified scope of research defined for each alternative suggests that the likelihood of a loss of human welfare resulting from the deaths of individual animals due to research would be highest under Alternative 4.

4.10.5 Cumulative Effects Analysis

4.10.5.1 Summary of Direct and Indirect Effects

The restrictions on research under Alternative 1 would be likely to result in less funding for SSL and NFS research relative to the other alternatives. The lower funding level would have an immediate and major negative economic effect on entities that have been recipients of those funds. There would also be a broader negative effect on the local economy because of the spending/income multiplier effect, but this effect would be minimal due to the relatively minor role SSL and NFS research funding plays in generating economic activity in regions within the project area.

According to Section 4.8.1 and Section 4.8.2, the alternatives differ with respect to improving understanding of the reasons for the unfavorable condition of SSL and NFS populations and determining the most effective management and policy actions—Alternative 1 contributes the least to SSL and NFS conservation objectives and Alternative 4 contributes the most. Alternatives 2 and 3 lie in between Alternatives 1 and 4. Accordingly, the alternatives can be ranked in terms of their likelihood that they would lead to a gain in welfare among that segment of the American public who value the protection of SSLs and NFSs, with the likelihood being lowest under Alternative 1 and highest under Alternative 4.

4.10.5.2 Summary of Lingering Past Effects

The complexity, indirectness and cumulative effects of the factors negatively affecting the western population segment of SSLs have made it difficult to determine which factors were responsible for the population decline and which are primary threats to recovery (Holmes *et al.*, 2006). The negative consequences of this scientific uncertainty for the recovery of the western population segment of SSLs, together with the possibility that Alaskan groundfish fisheries might face costly restrictions as a result of this uncertainty, continue to provide an impetus to fund SSL research. However, as discussed in Chapter 3, the Congressional appropriation for SSL research and management has shown an overall declining trend, and a sharp decrease occurred in FY 2006 due to federal budget constraints. These federal budget constraints are likely to continue. In addition, a large amount of federal research funds has already been devoted to reducing uncertainty about the factors negatively affecting the SSL population. The budget for SSL research since 2001 has been the largest for a U.S. endangered species (Holmes *et al.*, 2006). It has been argued that this investment in SSL research and management is prudent given the economic importance of the commercial fisheries potentially at stake (e.g., Hogarth, 2005); however, some researchers have expressed concern about the high level of federal funding for research on a single species at a time when the availability of research funds for many other endangered species is low or absent (Dalton, 2005).

As noted in Chapter 3, the lapse of the Fur Seal Convention in 1985 substantially reduced research funding into the causes of the fur seal decline and limited the subsequent scope of that broad fur seal research program. However, funding levels for NFS research have recently increased due, at least in part, to the fact that NFS populations in the Pribilof Islands show no signs of recovery from recent declines.

With respect to impacts on individuals who express a positive preference for the continued survival of SSLs and NFSs, that segment of the American public has experienced a welfare loss due the decline of the western DPS of SSLs and the population of the eastern Pacific stock of NFSs. Human-caused mortality associated with fishing, subsistence hunting and other actions have contributed to the decline. The increasing population trend for the eastern DPS of SSLs and San Miguel Island stock of NFSs has resulted in a welfare gain among those who value the protection of SSL and NFS populations. However, human actions result in the deaths of individual animals in those populations, causing a decrease in the welfare of those who wish to protect individual animals, as well as the populations as a whole.

4.10.5.3 Analysis of RFFAs

Given on-going federal budget constraints due to the record-high federal deficit, possible proposals to end the widespread use of Congressional appropriation earmarks and other factors, it is doubtful that there will be an increase in the Congressional appropriation for SSL research and management in the foreseeable future, and it is possible that there could be a substantial reduction. Moreover, non-defense federal agencies are projected to see dramatic reductions in their research and development (R&D) portfolios over the next five years; NOAA is expected to experience a 19 percent real reduction in R&D by 2011 (Koizumi, 2006). On the other hand, there is a possibility that other funding sources would step in to cover any shortfalls in research funding should the Congressional appropriation for SSL research and management decrease (DeMaster, 2006; Bengtson, 2006). There are opportunities for funding SSL research from other federal sources (e.g., National Science Foundation and North Pacific Research Board) and private research centers and foundations (e.g., Pollock Conservation Cooperative Research Center, Alfred P. Sloan Foundation and Doris Duke Charitable Foundation) (Atkinson, 2006).

With specific regard to NFS research, research funding for this species may increase, depending on factors such as its future population trend and speculation about the contribution of commercial fisheries and other factors to its population status and prospects. NFS populations in the Pribilof Islands show no signs of recovery from recent declines. Commercial fisheries operate in NFS habitat and target some of the same fish species that it preys upon. However, it is unclear whether this is an important cause of the population decline, or whether it is caused primarily by non-anthropogenic factors such as changing ocean conditions. In any case, there is increasing concern that an ESA listing petition for NFSs could be on the horizon. This situation invites comparison to that of the SSL (Hershman, 2005). Since the SSLs gained ESA protection in the 1990s, fishery management decisions affecting the SSL have been extremely controversial and litigious largely due to ongoing scientific uncertainty regarding whether commercial fisheries are responsible for the population decline. To avoid a similar situation for NFSs it is likely that funding to investigate factors affecting survival of NFS will increase.

4.10.5.4 Cumulative Effects

The on-going federal budget constraints in combination with the reduction in research funding likely to occur under Alternative 1 would have an additive cumulative effect on SSL and NFS research funding. The highly restrictive research environment under Alternative 1 offers little justification or incentive for federal investments in SSL and NFS research, especially in the face of a tight federal budget and declining federal R&D funding.

Further, the research restrictions would hamper the ability of entities to secure research funding from non-federal sources. The rapid and substantial decline in research funding expected to occur under Alternative 1 would have negative employment and income generation effects both on the entities that have been the recipients of these funds and on the broader local economy due the multiplier effect.

In comparison to Alternative 1, the ability of researchers to offset possible reductions in federal funding for SSL and NFS research with funds from other sources would be greater under Alternatives 2, 3 and Alternative 4 because of the higher potential to acquire new knowledge that will lead to the identification of key factors for the recovery of SSLs and conservation of NFSs. Consequently, the potential to generate positive effects on the economy in terms of jobs created and purchases of goods and services is higher under Alternatives 2, 3 and Alternative 4 than under Alternative 1.

In the cumulative effects analysis, Section 4.8.1 and Section 4.8.2 state that the contribution of Alternative 1 to the cumulative SSL and NFS conservation efforts would be minimal. To the extent that the implementation of Alternative 1 plays a role in failing to stop or reverse a decline of SSL or NFS populations, the loss of welfare among that segment of the American public who value the protection of SSL and NFS populations as a whole would be potentially major, depending on the ultimate biological consequences of the lack of research. Sections 4.8.1 and 4.8.2 indicate that the other alternatives can be ranked in increasing scope and intensity of contributed research from Alternative 2 to Alternative 3 to Alternative 4. Accordingly, these three alternatives can be ranked in terms of likelihood that they would lead to a gain in welfare among that segment of the American public who value the protection of SSL and NFS populations, with the likelihood being lowest under Alternative 2 and highest under Alternatives 3 or 4. A comparison of the estimated number of animals that would die from the specified scope of research defined for each alternative suggests that the likelihood of a loss of human welfare resulting from the deaths of individual animals would be lowest under Alternative 1 and highest under Alternative 4. As discussed above, there may be trade-offs in welfare if a research policy results in the deaths of individual animals but possibly contributes to the protection of the population as a whole. Additional in-depth surveys are needed before we can better understand the nature and magnitude of these trade-offs among members of the American public.

4.11 Summary of Effects

As presented in Chapter 2 of this document, there are four alternatives analyzed in this PEIS. Under Alternative 1, the No Action Alternative, no new permits would be issued to replace existing permits as they expire, nor could existing permits be amended to allow modifications in research activities, sample sizes, or objectives. Further, no grants would be awarded for research that requires a permit, except for those activities authorized under existing permits. When the existing permits expire, all research activities that require a permit would have to cease, or researchers would risk violation of the MMPA, ESA, and NMFS regulations. Under Alternative 1, no incidental or intentional mortality due to research activities would be acceptable or authorized.

The policy direction of Alternative 2 would be to issue permits and to provide grant support to qualified individuals and institutions to conduct research on SSLs and NFSs using methods that would not involve capture, restraint, tissue sampling, or that would not risk causing animals to leave rookeries during the breeding season. This restriction on intrusive activities would essentially limit research to censusing surveys and behavioral observations that have a very small potential to cause injury to animals. Under Alternative 2, the total amount of incidental mortality allowed under all permits and authorizations would not exceed 5 percent of PBR for each stock (western SSL is 12 animals, eastern SSL is 100, eastern Pacific NFS is 763, San Miguel Island NFS is 11). No intentional lethal take would be authorized under Alternative 2.

Alternative 3, Status Quo, represents the existing grant and permit process and is somewhat flexible in that it can accommodate changes in funding level, management priorities, scientific interests, research techniques, population status, and threats to the populations' recovery. Under the Status Quo process, permits are issued to qualified individuals and institutions to conduct research according to the scope and methods requested in their applications, with permit restrictions and mitigation measures required by the MMPA, ESA, and NMFS implementing regulations. In addition to these statutory and regulatory permit restrictions, the proposed research programs for SSLs must have impacts at a level below that which would jeopardize the continued existence of the species or result in adverse modification of critical habitat, as required by Section 7 of the ESA. For NFSs, funding levels have recently increased; therefore, the number, types, and distribution of takes allowed by all permits approved by January 2006 are used for the analysis of effects under this alternative. This may not represent a peak research effort for NFSs, depending on future funding opportunities and interest among the research community, both of which are linked to factors such as population trends and speculation about the contribution of commercial fisheries and other factors to population status and prospects. Under Alternative 3, the total amount of incidental mortality allowed under all permits and authorizations would not exceed 10 percent of PBR for each stock (western SSL is 23 animals, eastern SSL is 200, eastern Pacific NFS is 1,526, San Miguel Island NFS is 22).

Alternative 4 represents an extensive research program that would be able to simultaneously address multiple issues over a huge geographical space. This alternative would include not only those specific activities currently or previously permitted but any additional research activities or methods that are needed to implement the new Draft SSL Recovery Plan (NMFS 2006a) and the new Draft NFS Conservation Plan (NMFS 2006b), assuming they are consistent with the MMPA, ESA, and NMFS implementing regulations. To be fully implemented, such a program would require a much larger research budget than is currently allocated to these species. It would also require greater administrative support for the Grants, Permits, and Regional Offices of NMFS in order to efficiently process the large number of projects. For the purposes of this EIS, it is assumed that the grants and permits processes will be essentially the same as under the Status Quo. Under Alternative 4, the total amount of incidental mortality allowed under all permits and authorizations would not exceed 15 percent of PBR for each stock (western SSL is 35 animals, eastern SSL is 300, eastern Pacific NFS is 2,289, San Miguel Island NFS is 33).

The following tables (Tables 4.11-1 through 4.11-8) summarize the direct, indirect, and cumulative effects under each alternative for all resources where environmental consequences were evaluated and found to be possible. More detailed discussions of direct, indirect, and cumulative effects can be found in Sections 4.8 through 4.10.

Table 4.11-1
Summary Of Direct/Indirect And Cumulative Effects –Steller Sea Lions– Section 4.8.1

	Alternative 1: No Action; No New Permits or Authorizations	**Alternative 2: Research Program Without Capture or Handling**	**Alternative 3: Status Quo Research Program**	**Alternative 4: (Preferred Alternative) Research Program with Full Implementation of Conservation Goals**
WESTERN DPS STELLER SEA LIONS				
DIRECT / INDIRECT EFFECTS				
Mortality	• No mechanism for mortality.	• Mortality 3.4 SSLs/yr (1.5% of PBR[1]); negligible on population level. • Disturbance effects minor.	• Mortality 14.8 SSLs/yr (6.3% of PBR[1]); negligible on population level. • Individuals could be disturbed >4x/yr; moderate effect.	• Mortality 29.8 SSLs/yr (12.7% of PBR[1]); minor on population level. • Individuals could be disturbed >5-6x/yr; moderate effect.
Sub-Lethal Effects	• No mechanism for sub-lethal effects.	• Magnitude of sub-lethal effects to productivity unknown. • Disturbance effects minor.	• Magnitude of sub-lethal effects to productivity unknown. • Individuals disturbed >4x/yr; moderate effect.	• Magnitude of sub-lethal effects to productivity unknown. • Individuals disturbed >5-6x/yr; moderate effect.
Contribution to Conservation Objectives	• Increased level of scientific uncertainty over time.	• Increased level of scientific uncertainty over time.	• Major contribution to conservation efforts. • Contributes to both immediate and long-term needs.	• Major contribution to conservation efforts. • Contributes to both immediate and long-term needs; highly dependant on funding.
CUMULATIVE EFFECTS				
	• No additional anthropogenic mortalities. • No additional sub-lethal effects. • Contribution to conservation efforts minimal.	• Contributes 3.4 SSL mortalities/yr. • Total mortality[2] 219/yr (93.6% of PBR[1]); major cumulative effect. • Cumulative effects of disturbance and sub-lethal effects unknown. • Contributes more data to conservation objectives than Alt. 1.	• Contributes 14.8 SSL mortalities/yr. • Total mortality[2] 230/yr (98.5% of PBR[1]); major cumulative effect. • Cumulative effects of disturbance and handling, and sub-lethal effects unknown. • Contributes more data to conservation objectives than Alts. 1 and 2.	• Contributes 29.8 SSL mortalities/yr. • Total mortality[2] 245/yr (104.9% of PBR[1]); major cumulative effect. • Cumulative effects of disturbance and handling, and sub-lethal effects unknown. • Contributes more data to conservation objectives than Alts. 1, 2 and 3.

Table 4.11-1 (continued)
Summary Of Direct/Indirect And Cumulative Effects –Steller Sea Lions– Section 4.8.1

	Alternative 1: No Action; No New Permits or Authorizations	Alternative 2: Research Program Without Capture or Handling	Alternative 3: Status Quo Research Program	Alternative 4: (Preferred Alternative) Research Program with Full Implementation of Conservation Goals
EASTERN DPS STELLER SEA LIONS				
DIRECT / INDIRECT EFFECTS				
Mortality	• No mechanism for mortality.	• Mortality 3.2 SSLs/yr (0.2% of PBR[1]); minor on population level. • Disturbance effects minor.	• Mortality 25.5 SSLs/yr (1.3% of PBR[1]); negligible on population level. • Individuals could be disturbed >4x/yr; moderate effect.	• Same as Alt. 3.
Sub-Lethal Effects	• No mechanism for sub-lethal effects.	• Magnitude of sub-lethal effects to productivity unknown. • Disturbance effects minor.	• Magnitude of sub-lethal effects to productivity unknown. • Individuals disturbed >4x/yr; moderate effect.	• Same as Alt. 3.
Contribution to Conservation Objectives	• New analyses and syntheses from existing data but increased scientific uncertainty over time.	• Contributes to most conservation objectives except perhaps genetics.	• Major contribution to conservation efforts. • Contributes to conservation objectives.	• Same as Alt. 3.
CUMULATIVE EFFECTS				
	• No additional anthropogenic mortalities. • No additional sub-lethal effects. • Contribution to conservation efforts minimal.	• Contributes 3.2 SSL mortalities/yr. • Total mortality[2] 13/yr (0.7% of PBR[1]); negligible cumulative effect. • Cumulative effects of disturbance and sub-lethal effects unknown. • Contributes to all conservation objectives except perhaps monitoring disease and genetic refinement.	• Contributes 25.5 SSL mortalities/yr. • Total mortality[2] 36/yr or 1.8% of PBR[1]); negligible cumulative effect. • Cumulative effects of disturbance and handling, and sub-lethal effects unknown. • Contributes to all conservation objectives.	• Same as Alt. 3.

[1] - PBR = potential biological removal
[2] - Total mortality = total human-caused mortality (i.e., research, subsistence, commercial fishing, etc.)
Note: For more detail on effects please see Chapter 4 of the EIS.

Table 4.11-2
Summary Of Direct/Indirect And Cumulative Effects –Northern Fur Seals– Section 4.8.2

	Alternative 1: No Action; No New Permits or Authorizations	Alternative 2: Research Program Without Capture or Handling	Alternative 3: Status Quo Research Program	Alternative 4: (Preferred Alternative) Research Program with Full Implementation of Conservation Goals
EASTERN PACIFIC STOCK NORTHERN FUR SEALS				
DIRECT / INDIRECT EFFECTS				
Mortality	• No mechanism for mortality.	• Mortality 1.2 NFSs/yr (<0.1% of PBR[1]); negligible on population level.	• Mortality 47.8 NFSs/yr (0.3% of PBR[1]); negligible on population level.	• Mortality 67 NFSs/yr (0.4% of PBR[1]); negligible on population level.
Sub-Lethal Effects	• No mechanism for sub-lethal effects.	• Duration of activities short-term. • Effects of disturbance and sub-lethal effects negligible.	• Magnitude of sub-lethal effects to productivity unknown; large number of animals disturbed. • Geographic extent and frequency/duration of disturbance moderate.	• Magnitude of sub-lethal effects to productivity unknown; large number of animals disturbed. • Geographic extent and frequency/duration of disturbance moderate.
Contribution to Conservation Objectives	• Contribution to conservation objectives minor.	• Contribution to conservation objectives minor.	• Addresses many immediate and long-term needs. • Moderate contribution to conservation efforts.	• Addresses most immediate and long-term needs. • Major contribution to conservation efforts; highly dependant on funding.
CUMULATIVE EFFECTS				
	• Mortality negligible; (< PBR of 14,546). • No cumulative sub-lethal effects. • Contribution to conservation efforts minimal.	• Contributes 1.2 NFS mortalities/. • Total mortality[2] 757/yr (5.0% of PBR[1]); negligible cumulative effect. • Cumulative effects of disturbance and sub-lethal effects unknown; contribution of research considered negligible. • Contributes more data to conservation objectives than Alt. 1.	• Contributes 47.8 NFS mortalities/yr • Total mortality[2] 804/yr (5.3% of PBR[1]); negligible cumulative effect. • Cumulative effects of disturbance and handling, and sub-lethal effects unknown. • Moderate contribution to conservation objectives; contributes more than Alts. 1 and 2.	• Contributes 67 NFS mortalities/yr • Total mortality[2] 823/yr (5.4% of PBR[1]); minor cumulative effect. • Cumulative effects of disturbance and handling, and sub-lethal effects unknown. • Major contribution to conservation objectives; contributes more than Alts. 1, 2 and 3.

Table 4.11-2 (continued)
Summary Of Direct/Indirect And Cumulative Effects –Northern Fur Seals– Section 4.8.2

	Alternative 1: No Action; No New Permits or Authorizations	**Alternative 2: Research Program Without Capture or Handling**	**Alternative 3: Status Quo Research Program**	**Alternative 4: (Preferred Alternative) Research Program with Full Implementation of Conservation Goals**
SAN MIGUEL ISLAND STOCK NORTHERN FUR SEALS				
DIRECT / INDIRECT EFFECTS				
Mortality	• No mechanism for mortality.	• Mortality 0; negligible on population level.	• Mortality 5.0 NFSs/yr (2.3% of PBR[1]); negligible on population level.	• Same as Alt. 3.
Sub-Lethal Effects	• No mechanism for sub-lethal effects.	• Duration of activities short-term. • Effects of disturbance and sub-lethal effects negligible.	• Magnitude of sub-lethal effects to productivity unknown. • Geographic extent of disturbance is major (concentrated on San Miguel Island). Duration and frequency is minor	• Same as Alt. 3. Additional methods/ procedures could be authorized but are unknown at this time.
Contribution to Conservation Objectives	• Not listed as threatened or endangered; no conservation objectives.	• Not listed as threatened or endangered; no conservation objectives.	• Not listed as threatened or endangered; no conservation objectives.	• Not listed as threatened or endangered; no conservation objectives.
CUMULATIVE EFFECTS				
	• No additional anthropogenic mortalities. • No additional sub-lethal effects. • Not listed as threatened or endangered; no conservation objectives.	• Population is increasing; no population-level effects expected therefore, cumulative effect negligible. • Cumulative effects of disturbance and sub-lethal effects unknown; contribution of research considered negligible. • Not listed as threatened or endangered; no conservation objectives.	• Contributes 5.0 NFS mortalities/yr • Total mortality[2] 5.7/yr (2.7% of PBR[1]); negligible cumulative effect. • Effects of disturbance and handling, and sub-lethal effects unknown. • Not listed as threatened or endangered; no conservation objectives.	• Same as Alt. 3. • Additional methods/ procedures could be authorized but are unknown at this time.

[1] - PBR = potential biological removal
[2] – Total mortality = total human-caused mortality (i.e., research, subsistence, commercial fishing, etc.)
Note: For more detail on effects please see Chapter 4 of the EIS.

Table 4.11-3
Summary Of Direct/Indirect And Cumulative Effects – Killer Whales, Other ESA-Listed Species, And Other Marine Mammals (Cetaceans, Pinnipeds)– Sections 4.8.3 through 4.8.6

Effect		Alternative 1 No Action: No New Permits or Authorizations	Alternative 2 Research Program without Capture or Handling	Alternative 3 Status Quo Research Program	Alternative 4 (Preferred Alternative) Research Program with Full Implementation of Conservation Goals
KILLER WHALES, OTHER ESA-LISTED SPECIES, AND OTHER MARINE MAMMALS (CETACEANS, PINNIPEDS)					
Direct/Indirect	Effects on survival or reproductive success due to SSL and NFS research	• Research vessels investigating the role of killer whale in SSL and NFS population dynamics not requiring authorization for incidental take or disturbance could result in rare injury or death from strikes, as well as short-term discharges and increased turbidity. • Effects of research on California sea lions as a surrogate species for SSLs would be short-term and negligible. • Overall effects considered negligible.	• Likely increase in marine vessel research due to permitted incidental take or disturbance of SSL and NFS; potential effects resulting mortality, injury, and disturbance considered negligible. • Potential local increase in available killer whale prey around rookeries and haulouts. • Overall effects considered negligible.	• The frequency and geographic extent of marine vessel use for the purposes of research could increase; potential effects resulting mortality, injury, and disturbance considered negligible. • Overall effects considered negligible.	• Similar to Alternative 3, effects considered negligible.
	Disturbance due to SSL and NFS research	• Marine research vessel disturbance from visual cues and noise pollution could result in stress and avoidance behavior, displacement, interference with whale communication and echolocation, modifications to whale surfacing, respiration, and diving cycles. • Short-term disturbance of other animals during California sea lion research activities is considered negligible. • Overall effects considered short-term and negligible.	• Marine research vessel disturbance would result in the same effects as Alternative 1. • Opportunistic sightings during SSL and NFS low-altitude aerial surveys could cause negligible behavioral changes in a few individuals. • Sea otters concentrated in the vicinity of SSL and NFS haulouts could potentially be disturbed, effects considered negligible. • Overall effects considered negligible.	• Few or no marine vessels or aircraft would seek out or occur in the vicinity of whales under this alternative, there would be no measurable effects of disturbance. • Few sea otters are likely to occupy areas where research activities occur. • Overall effects considered negligible.	• Similar to Alternative 3, effects considered negligible.

Table 4.11-3 (continued)
Summary Of Direct/Indirect And Cumulative Effects – Killer Whales, Other ESA-Listed Species, And Other Marine Mammals (Cetaceans, Pinnipeds)– Sections 4.8.3 through 4.8.6

Effect		Alternative 1 No Action: No New Permits or Authorizations	Alternative 2 Research Program without Capture or Handling	Alternative 3 Status Quo Research Program	Alternative 4 (Preferred Alternative) Research Program with Full Implementation of Conservation Goals
KILLER WHALES, OTHER ESA-LISTED SPECIES, AND OTHER MARINE MAMMALS (CETACEANS, PINNIPEDS)					
Cumulative		• Potential killer whale cumulative effects difficult to predict (commercial fisheries, intentional shooting, vessel traffic, and marine pollution, global climate change, long-term regime shifts). • Internal (few) and external (numerous) factors could affect survival and reproductive success of other ESA species. De-listing likely prevented as a result of past actions. • There has been no apparent affect on California sea lions from past or present actions, including incidental research. • California sea lions removed from the wild for research as a surrogate to SSLs would not approach the species' PBR. • Negligible contribution to overall cumulative effects from SSLs and NFSs research activities.	• Same as Alternative 1. • Negligible contribution to overall cumulative effects from SSLs and NFSs research activities.	• Same as Alternative 1. • Negligible contribution to overall cumulative effects from SSLs and NFSs research activities.	• Same as Alternative 1. • Negligible contribution to overall cumulative effects from SSLs and NFSs research activities.

Table 4.11-4
Summary of Direct/Indirect and Cumulative Effects – Seabirds - Section 4.8.6

Effect		Alternative 1 No Action: No New Permits or Authorizations	Alternative 2 Research Program without Capture or Handling	Alternative 3 Status Quo Research Program	Alternative 4 (Preferred Alternative) Research Program with Full Implementation of Conservation Goals
SEABIRDS					
Direct/Indirect	Effects on survival or reproductive success due to SSL and NFS research	• Potential effects when accessing high ground above the SSL and NFS rookeries for behavioral observation or installation/maintenance of remote sensing equipment. • Negligible affect on survival and reproductive success.	• Aerial surveys not anticipated to affect nesting seabird ESA-listed bird species. Mortality of adults or chicks unlikely based on aircraft elevation. • Effect of research activity considered negligible.	• Potential disturbance increase to adjacent nesting seabirds from land-based census activities and intensive sampling. • Effects to reproductive success from land-based activities would be very low. • Effects of disturbance from research activity on seabird survival or productivity would be negligible. • Effects on ESA-listed species are unlikely and are considered negligible.	• Same as Alternative 3, effects considered negligible.
	Disturbance due to SSL and NFS research	• Potential nesting disturbance associated with remote observations of SSL or NFS, installation and maintenance of remote camera equipment, especially if helicopters use is required. • Effects are considered negligible.	• Potential effects from short-term aerial survey overflights and land-based observations. Potential for small loss of eggs or chicks from panic flights. • Effects considered negligible.	• Potential effects from short-term aerial survey overflights and land-based observations would be the same as Alternative 2. Effects from scat collection or other survey activity would be negligible. • Effects considered negligible.	• Potential effects from short-term aerial survey overflights and land-based observations would be the same as Alternative 2. • Effects considered negligible.
Cumulative		• All seabird groups have experienced infrequent mortality events in the recent past, and all are susceptible to future human-caused mortality factors. • Negligible contribution from SSLs and NFSs research activities.	• Same as Alternative 1. • Negligible contribution from SSLs and NFSs research activities.	• Same as Alternative 1. • Negligible contribution from SSLs and NFSs research activities.	• Same as Alternative 1. • Negligible contribution from SSLs and NFSs research activities.

Table 4.11-5
Summary Of Direct/Indirect And Cumulative Effects – Subsistence Harvest – Section 4.9

Effect	Alternative 1: No Action; No New Permits or Authorizations	Alternative 2: Research Program Without Capture or Handling	Alternative 3: Status Quo Research Program	Alternative 4: (Preferred Alternative) Research Program with Full Implementation of Conservation Goals
SUBSISTENCE HARVEST				
Direct/Indirect	• None of the research methods would directly affect the subsistence harvest of SSLs or NFSs, therefore direct effects are considered to be negligible. • Depending on the ultimate biological consequences of the reduced scope of research, the indirect effects could be minor.	• It is unlikely that any of the research methods would directly affect the subsistence harvest of SSLs or NFSs, therefore direct effects are considered to be negligible. • Depending on the ultimate biological consequences of the reduced scope of research, the indirect effects could be minor.	• It is likely that only a few, if any, of the same individual SSLs or NFSs used for research would be included in the subsistence harvest, therefore direct effects are considered to be negligible. • Because basic informational needs outlined in the Plans would be addressed, indirect effects are considered positive and minor.	• The possible intensity and wide geographic area of permitted research has the potential to affect SSL subsistence harvest, therefore direct impacts are considered to be moderate. • Because research would directly address the needs outlined under the Plans, indirect effects to SSL are considered positive and minor. • It is likely that only a few, if any, of the same individual NFSs used for research would be included in the subsistence harvest, therefore direct and indirect effects are considered to be negligible.
Cumulative	• Depending on how economic change is negotiated, small communities that rely heavily on SSL and NFS subsistence harvest may result in a minor cumulative effect.	• Depending on how economic change is negotiated, small communities that rely heavily on SSL and NFS subsistence harvest may result in a minor cumulative effect.	• Subsistence activities of SSLs and NFSs would return to level prior to vacation of permits, resulting in negligible cumulative effects.	• The extent of the effect on harvesters is unknown and is ultimately dependent on the level of overlap between SSL and NFS subsistence populations and those studied by researchers. • Cumulative effects are considered moderate to major, with major effects being more possible in small communities.

Table 4.11-6
Summary Of Direct/Indirect And Cumulative Effects – Interactions with Communities – Section 4.9

Effect		Alternative 1: No Action; No New Permits or Authorizations	Alternative 2: Research Program Without Capture or Handling	Alternative 3: Status Quo Research Program	Alternative 4: (Preferred Alternative) Research Program with Full Implementation of Conservation Goals
INTERACTIONS WITH COMMUNITIES					
Direct/ Indirect	Economic	• For larger and more economically diversified communities, the decrease in revenue associated with less research is likely to result in negligible direct impacts. • Smaller communities, such as St. George and St. Paul, could experience minor direct impacts. • A redirection of research funds could result in minor indirect effects.	• For both small and large communities, the potential decrease (but possible maintenance) in revenue associated with different research methods is likely to result in negligible direct impacts. • A redirection of research funds could result in minor indirect effects.	• As research practices would be the same as those prior to the court order, direct and indirect effects are considered negligible.	• The proposed intensity and wide geographic range of research, direct effects are considered to range between minor and major, on a localized basis in some communities. • The possible intensity and wide geographic area of permitted research would result in moderate direct impacts. • Indirect effects considered negligible.
	Educational	• For more populous communities, the decrease in education opportunities is likely to result in negligible direct impacts. • Communities such as St. George and St. Paul, where research related education opportunities are important to a higher proportion of the population, could experience minor indirect impacts. • A redirection of research funds could result in minor indirect effects.	• The educational opportunities that remain would be less engaging than the Status Quo, but still available, therefore the direct educational effects are considered negligible. • A redirection of research funds could result in negligible indirect effects.	• As research practices would be the same as those prior to the court order, direct and indirect effects are considered negligible.	• Educational opportunities would likely increase, therefore direct effects would range from negligible in large communities to major in small communities. • Indirect effects are considered negligible.

Table 4.11-6 (continued)
Summary Of Direct/Indirect And Cumulative Effects – Interactions with Communities – Section 4.9

Effect		Alternative 1: No Action; No New Permits or Authorizations	Alternative 2: Research Program Without Capture or Handling	Alternative 3: Status Quo Research Program	Alternative 4: (Preferred Alternative) Research Program with Full Implementation of Conservation Goals
Direct/ Indirect	Sociocultural	• The potential for positive and/or negative sociocultural interactions would decrease, therefore direct effects are considered negligible. • A redirection of research funds could result in negligible indirect effects.	• The potential for positive and/or negative sociocultural interactions would decrease, therefore direct effects are considered negligible. • A redirection of research funds could result in longer stays in local communities to collect data, therefore indirect effects range from minor to negligible.	• As research practices would be the same as those prior to the court order, direct and indirect effects are considered negligible.	• The proposed intensity and wide geographic range of research would result in some direct sociocultural interactions. Therefore effects are considered to be negligible (especially if community collaboration continues). • Indirect effects are considered negligible.
Cumulative		• Cumulative effects would be considered minor, depending of how members of the community negotiate economic growth or recession.	• Cumulative effects would be considered minor, depending of how members of the community negotiate economic growth or recession.	• Cumulative effects would be considered negligible, depending of how members of the community negotiate economic growth or recession.	• The proposed intensity and wide geographic range of research has the potential to result in major cumulative effects in smaller communities and minor to moderate cumulative effects in larger communities

Table 4.11-7
Summary Of Direct/Indirect And Cumulative Effects – Environmental Justice – Section 4.9

Effect	Alternative 1: No Action; No New Permits or Authorizations	Alternative 2: Research Program Without Capture or Handling	Alternative 3: Status Quo Research Program	Alternative 4: (Preferred Alternative) Research Program with Full Implementation of Conservation Goals
ENVIRONMENTAL JUSTICE				
Direct/Indirect	• No direct effects on subsistence harvest. Educational outreach would likely decrease. Therefore, direct effects are considered minor. • Permitting restrictions and lack of research may potentially contribute to a failure to stop or reverse population declines which may influence subsistence harvesting in some small communities. Therefore, indirect effects are considered minor.	• No direct effects on subsistence harvest. Educational outreach and volunteer opportunities would likely continue. Therefore, direct effects are considered negligible. • Permitting restrictions and lack of research may potentially contribute to a failure to stop or reverse population declines which may influence subsistence harvesting in some small communities. Therefore, indirect effects are considered minor.	• As research practices would be the same as those prior to the court order, direct and indirect effects are considered negligible.	• Due to increased research scope and intensity, some of the research practices (i.e., chemical and drug injections and aerial surveys) could influence Alaska Native subsistence use of SSL and/or NFS in small coastal communities. Therefore, direct effects are considered moderate. • Indirect effects are considered negligible.
Cumulative	• Lower research levels could lead to a decrease in educational interaction opportunities and lower numbers of animals available for subsistence. Therefore, cumulative effects are considered minor.	• Lower research levels could lead to a decrease in educational interaction opportunities and lower numbers of animals available for subsistence. Therefore, cumulative effects are considered minor.	• As research practices would be the same as those prior to the court order, direct and indirect effects are considered negligible.	• Due to increased research scope and intensity, some of the research practices (i.e., chemical and drug injections and aerial surveys) could influence some subsistence animals used by small communities. Therefore, cumulative effects are considered minor.

Table 4.11-8
Summary Of Direct/Indirect And Cumulative Effects –Economic Effects of Funding for Research– Section 4.10

Effect	Alternative 1: No Action; No New Permits or Authorizations	Alternative 2: Research Program Without Capture or Handling	Alternative 3: Status Quo Research Program	Alternative 4: (Preferred Alternative) Research Program with Full Implementation of Conservation Goals
ECONOMIC EFFECTS OF FEDERAL FUNDING FOR SSL AND NFS RESEARCH				
DIRECT/INDIRECT EFFECTS				
Economic Effects of Changes in Research Expenditures	• Due to permitting restrictions, research would be of limited value, which would likely lead to less available research funding. Reduced funding would likely have major negative direct and indirect effects to both institutional and independent researchers.	• Depending on the amount of funding for non-intrusive research that could be procured, direct and indirect negative effects would be considered minor to both institutional and independent researchers.	• Because funding would maintain at about Status Quo levels, direct and indirect effects would be considered negligible to both institutional and independent researchers.	• Because it is unclear whether a more extensive research program would actually lead to greater funding levels, direct and indirect positive effects would be range from minor to moderate to both institutional and independent researchers.
Economic Effects of Changes in Research Output	• Permitting restrictions and a lack of research might contribute to a failure to stop or reverse population declines. Therefore, negative direct and indirect effects would be considered major to the concerned public. • The direct and indirect effects among the public concerned about research-associated mortality would be negligible.	• To the extent that conservation objectives would be addressed, direct and indirect positive effects to the concerned public could be minor to major, depending on the ultimate biological outcome of the research. • The direct and indirect effects among the public concerned about research-associated deaths would be minor.	• To the extent that conservation objectives would be addressed, direct and indirect positive effects to the concerned public could be minor to major, depending on the ultimate biological outcome of the research. • The direct and indirect effects among the public concerned about research-associated deaths would be moderate.	• To the extent that conservation objectives would be addressed, direct and indirect positive effects to the concerned public could be minor to major, depending on the ultimate biological outcome of the research. • The direct and indirect effects among the public concerned about research-associated deaths would be moderate to major.
CUMULATIVE				
Economic Effects of Changes in Research Expenditures	• The highly restrictive research environment (and lack of new scientific contributions) would offer the least incentive for federal research investments. Therefore, cumulative effects would be considered major.	• The moderately restrictive research environment would offer moderate incentive for federal research investments. Therefore, cumulative effects would be considered minor.	• The permissive research environment (and possibility of new scientific contributions) would offer researchers a greater ability to offset federal funding losses with other sources. Therefore, cumulative effects would be considered minor.	• The highly permissive research environment (and possibility of new scientific contributions) would offer researchers the greatest ability to offset federal funding losses with other sources. Therefore, cumulative effects would be considered moderate.

Table 4.11-8 (continued)
Summary Of Direct/Indirect And Cumulative Effects –Economic Effects of Funding for Research– Section 4.10

Effect	Alternative 1: No Action; No New Permits or Authorizations	Alternative 2: Research Program Without Capture or Handling	Alternative 3: Status Quo Research Program	Alternative 4: (Preferred Alternative) Research Program with Full Implementation of Conservation Goals
CUMULATIVE				
Economic Effects of Changes in Research Output	• The highly restrictive research environment might contribute to a failure to stop or reverse population declines. Therefore, cumulative effects on public welfare loss associated with extinction of populations are considered major. • Cumulative effects on public welfare loss due to research-associated mortality are considered negligible.	• The moderately restrictive research environment might help to stop or reverse population declines. Therefore, cumulative effects on public welfare gain associated with survival of populations are considered minor. • Cumulative effects on public welfare loss due to research-associated mortality are considered minor.	• The permissive research environment might help to stop or reverse population declines. Therefore, cumulative effects on public welfare gain associated with survival of populations are considered moderate to major. • Cumulative effects on public welfare loss due to research-associated mortality are considered moderate. •	• The highly permissive research environment might help to stop or reverse population declines. Therefore, cumulative effects on public welfare gain associated with survival of populations are considered moderate to major. • Cumulative effects on public welfare loss due to research-associated mortality are considered moderate to major.

5.0 NATIONAL ENVIRONMENTAL POLICY ACT COMPLIANCE IMPLEMENTATION AND RECOMMENDATIONS

5.1 Introduction

The purpose of Chapter 5 is 1) to explain the procedures that will be used to implement future National Environmental Policy Act (NEPA) compliance on permitting and grant activities addressed in the Steller Sea Lion (SSL) and Northern Fur Seal (NFS) Research Programmatic Environmental Impact Statement (PEIS); 2) document actions underway to address concerns raised during preparation of this PEIS regarding compliance with the Animal Welfare Act (AWA); and 3) to make recommendations for further actions associated with SSL and NFS research that have been suggested during the course of the EIS process. A number of recommendations were made that fall within general categories: reporting requirements for research and grant activities; coordination of research activities and monitoring the effects of research activities; developing a research implementation plan; and additional coordination with Alaska Native organizations. NMFS determined that it was most appropriate to address these issues outside the scope of any one alternative as these issues and recommendations are considered significant enough that they should be considered and implemented independent of any selected alternative. Unless otherwise stated, the following recommendations are to NMFS for action (for further detail on Alternatives Considered, refer to Chapter 2).

5.1.1 Need for National Environmental Policy Act Compliance Guidance

The SSL and NFS Research EIS addresses research permit and grant activities that are expected to occur over the foreseeable future. NMFS staff, research permit and grant applicants, and the general public should understand the process for preparing grant and research permit applications and how they will be reviewed for NEPA compliance using this PEIS. In addition to providing a NEPA compliance "road map", Sections 5.1 and 5.2 will provide guidance to research permit and grant applicants in preparing their applications, and provide other stakeholders with an understanding of the level of subsequent NEPA review that will take place.

5.1.2 National Environmental Policy Act Compliance Review of Annual Research Permit and Grant Applications Using the Steller Sea Lion and Northern Fur Seal Research Programmatic Environmental Impact Statement

The Final SSL and NFS Research PEIS will cover the research programs for these species in general, but is not specific to issuance of any particular permits or grants. Thus, each project-specific action (i.e., permit or grant application) will require its own NEPA compliance review. The form of this additional NEPA review will depend on the nature and scope of the proposed research and may take the form of a Memorandum to the File, a supplemental EIS, an Environmental Assessment (EA), a new EIS, or a Categorical Exclusion memorandum.

NMFS anticipates that applications for grants, new permits, and amendments to permits will be submitted in the future. There is no formal schedule for submission of permit applications or limitation on the date by which applications must be received, meaning they can be submitted at any time throughout a calendar year. The permit process schedule is thus initiated and driven by the applicants. In contrast, the schedule for submission of grant applications is initiated by NMFS with a call for proposals, the timing of which will depend on availability of funds. Each time a permit application is received or a grant cycle is initiated, the requests will be reviewed by NMFS to determine whether the activity proposed by the applicant is covered by the assessment of impacts in the Final SSL and NFS Research PEIS.

The Final SSL and NFS Research PEIS has identified Alternative 4 as the Preferred Alternative. The Record of Decision (ROD) associated with the PEIS will identify any conditions of approval that are relevant to permit and grant applications, and will provide a listing of research permit and grant activities addressed by the Preferred Alternative. Both constitute a decision document that will be used for the purpose of documenting NEPA compliance of ongoing and future activities addressed within the PEIS. Proposed research permit and grant activities that are identified and analyzed within the Preferred Alternative will be subject to routine NEPA compliance implementation, as described below. Proposed research permit and grant activities that are not identified and analyzed within the Preferred Alternative will be subject to a separate NEPA compliance action, to be determined at the time the application is submitted.

Permit Review Procedures

Applications for new permits and for modifications to permits for research on SSL and NFS will be reviewed by NMFS Office of Protected Resources, Permits, Conservation and Education Division (F/PR1). Applications for grants for research on SSLs and NFSs will be reviewed by the Alaska Region Operations/Management/Information Division, Grants Program Office (Grants Program). During processing of these permit and grant applications:

- NMFS staff will review the proposed permit or grant application against the Final SSL and NFS Research PEIS and ROD to determine if the research proposed is within the scope of the Preferred Alternative. NMFS Grants Program staff will use an Environmental Compliance Questionnaire to assure consistency across applications in this review. In addition to internal review by F/PR1 staff, permit applications are sent out for public review and comments.
- The methodology for estimating unobserved mortality used in Chapter 4 of this PEIS will be applied to the requested take contained in each permit application. NMFS F/PR1 staff will calculate the requested and potential incidental mortality, and adjust the permitted take as appropriate, taking into account the total take already authorized in existing permits, to ensure that levels estimated in the PEIS are not exceeded.
- If the research proposed in the permit or grant application has been identified and analyzed within the Preferred Alternative of the Final SSL and NFS Research PEIS, a Memorandum to the File will be prepared, documenting that NEPA compliance for issuance of the grant or permit is provided by the Final PEIS and any conditions of approval that apply as documented in the ROD. A copy of the ROD will be attached to the Memorandum.
- Applications for permit amendments will be evaluated following the same procedures as applications for new permits.

If NMFS determines through the above process that the research proposed in the permit or grant application was not analyzed within the Preferred Alternative, an additional NEPA compliance review will be conducted. The NOAA NEPA Compliance Handbook and NOAA Administrative Order 216-6 provide guidance for agency officials on this step of NEPA review, including the process for tiering analyses from a general or broad-scope EIS to a project-specific review, and incorporating by reference.

5.1.3 Coordination of the Grant and Permitting Review Process

At present, grant and research permit applications are submitted separately, and often at different times, therefore individual NEPA compliance reviews are conducted separately by F/PR1 and Grants Program staff for permits and grants, respectively. Staff from these two program offices coordinate to the extent practicable, and share NEPA compliance documentation where applicable. This process will be reviewed by NMFS to determine whether more formalized coordination is appropriate. Potential options include formalized joint participation in permit and grant application reviews, and a mechanism to identify: if a research grant proposal is associated with an existing permit; will require a new permit or permit modification; or is not eligible for a permit. Similarly, the F/PR1 and Grants Program will consider "condition of approval" language which indicates that funding cannot be unconditionally committed to research projects that cannot be permitted, and that receipt of grant money does not guarantee issuance of a research permit.

5.1.4 Reporting Requirements

NMFS F/PR1 requires annual and final reports from permit holders, and the Grants Program requires semi-annual reports from grant recipients (see Section 4.7.3). However, there are differences in reporting requirements and content, and in enforcement of reporting requirements.

- NMFS will develop a process for linking permit and grant reporting compliance, including for enforcement purposes. The types of information required in permit versus grant reports are necessarily different, but failure to comply with one should have consequences for the other and enforcement of compliance should be consistent.

NMFS F/PR1 is developing a web-based permit application and permit tracking system which will include submission of electronic reports. Information about permits, including annual reports, will be available to the public through this system. In the interim, NMFS will investigate establishing a page on their website where annual permit reports, technical memoranda, journal publications, and conference presentations related to SSL and NFS research could be made available for access by interested parties.

5.1.5 Other Considerations

The fact that grant cycles and permit processing are not synchronized often results in permit applications with vaguely stated objectives or methods, or overly broad objectives or sample sizes, when applicants are uncertain which projects may be funded or to what extent. Further, when additional funds become available after permit issuance (e.g., new Congressional appropriations), some permit holders will submit numerous applications to amend their permits to take advantage of the new money. It is expected that some researchers will continue to voluntarily coordinate with each other prior to entering the field, to optimize resources and reduce potential problems with overlapping research areas. However, given the broad nature of some permits, NMFS may not know where and what research is actually occurring until after it is conducted. Permits for research on SSLs and NFSs require permittees to notify NMFS Alaska Region of their planned field work at least two weeks in advance. However, since not all researchers initiate research at the same time each year, and some researchers have multiple field seasons within a year, NMFS does not have the information to understand the overall research "plan" (e.g., what research is being done where, when, or by whom) until receiving annual permit reports after research has been conducted. To assist with permit monitoring and compliance, the pre-field work reporting date by which all permittees notify NMFS of field plans for the coming year will be coordinated by the Research Coordinator and become an established annual event.

5.2 Coordination of Research and Monitoring of Effects

Issues were raised during scoping with regard to whether research activities were being coordinated by researchers, or whether NMFS was required to coordinate research that it permits or funds. Uncoordinated research was perceived as increasing the amount of unnecessary harm to individual animals, affecting more animals than necessary, and reducing the efficiency of research. Comments indicated that research was overly repetitive and that it could not be determined whether there would be duplicative effects on one group of animals or rookeries that were unnecessary and could be avoided with a plan. Comments received pointed to the 2006 Draft SSL Recovery Plan, Objective 1.5, focused on the development of an implementation plan for research. Further, section 3.5 of the Draft Recovery Plan Implementation Schedule focused on the evaluation and reduction of direct and indirect impacts of research activities, coordination of research efforts to reduce duplicative takes, and monitoring of unintentional takes associated with research activities.

The Draft PEIS indicated that such a plan would serve to refine research priorities and determine a strategy for when and how research should be conducted for purposes of management decisions. NMFS has coordinated activities on an annual basis and many of the comments failed to recognize that pre- and post season workshops or meetings have occurred which have facilitated a transfer of information between the researchers such that everyone knew where everyone else would be at any given time. Research efforts were often piggy-backed in order to reduce unnecessary field trips to any one location and leverage one research activity with another. This level of duplication is often necessary, is intentional, and provides valuable trend information from specific areas. NMFS recognizes that the coordination of research has not been formalized but it has occurred at the day-to-day/within season level to a greater extent than that recognized in the comments and this is described in more detail in Section 4.7.2.2. Large-scale efforts such as monitoring or survey work have also been coordinated in great detail. Given that it takes several years to complete a survey, this coordination is absolutely critical.

However this is not the level of needed coordination suggested by the comments. What has been lacking has been an implementation plan that would focus beyond the immediate needs. For example, if research shifted from the eastern DPS of SSLs to the western DPS, or to NFSs, in 3 years (during the five-year life of the permits being authorized under this PEIS) how would that influx of research be coordinated and how would the activities be staggered such that there would not be a tremendous increase of effects in areas and on rookeries that had not experienced previous research activity? This is of considerable concern under Alternative 4, which would allow for increased effort in any given area. This is the scenario that precipitated the focus on SSL research effects in 2001-2002 and since, and is still the major issue of concern being addressed in this PEIS. In 2001-2002 an influx of funds provided the mechanism necessary to allow needed research to move forward. However, the increased research efforts and the analysis of the effects of that influx of activity on SSLs and their habitat have not been comprehensively assessed. NMFS hired a research coordinator and initiated such an effort in 2002 but the effort was never completed such that it could be implemented. As a result there have been no formalized coordination plans or protocols implemented by NMFS regarding a comprehensive research plan and this was highlighted in many of the comments received. The 2006 Draft Recovery Plan states that the Regional Coordinator should maximize coordination, minimize duplication of research, and enhance collaboration. Therefore many of the specific steps that are identified in the 2006 Draft Recovery Plan, and that NMFS is now recommending should be implemented prior to the 2008 field season, were actually supposed to occur prior to the 2005 EA (and field season) but never actually proceeded past the planning stages.

Another issue raised in the scoping process, and one which is linked with the long-term coordination of research, is the uncertainty about the effects of research, given the recognized lack of post-research monitoring. Of particular concern to some commenters are the potential long-term effects of research activities and associated disturbance on rookeries and on pups or juvenile SSLs at rookeries. NMFS recognizes that some post-activity monitoring has occurred. Most researchers observe and monitor animals that have been captured or restrained for a short period of time after their release. However, much field work moves from location to location with minimal follow-up after the research activity has concluded. This often cannot be avoided. Some locations preclude such extended monitoring due to logistical restraints. However, monitoring sites could be established that would serve to provide necessary, representative information. For example, locations in the western Aleutian Islands cannot be occupied for extended periods for many reasons. However if effects were monitored elsewhere, and best practices based on that monitoring were implemented on the Aleutian sites, much of the concern expressed in the comments would be addressed.

There is a need to analyze the results of monitoring that has occurred, establish new monitoring requirements, and incorporate them in a long-term monitoring plan. Therefore, in response to this concern, NMFS intends to phase-in the implementation of the Preferred Alternative during 2007, and 2008 if necessary, to limit approval of intrusive activities associated with rookery research during pupping season to a specific set of rookeries and haulouts, some of which will be subject to a permit condition to conduct a post- research activity monitoring program to observe the potential effects of research activities. Results of the monitoring program will be assessed to determine the uncertainty that currently exists regarding research effect, and determine what conditions subsequent intrusive actions at rookeries and haulouts should be permitted and implemented into a long-term research coordination and monitoring plan (see section 5.2.1).

5.2.1 Development of a Formalized Research Implementation Plan

In the past, implementation plans and teams have been proposed for endangered marine mammals to guide recovery efforts (i.e., overall direction of recovery efforts, establishing priorities), practical matters (e.g., logistics, funding, coordination). The 2006 Draft SSL Recovery Plan describes the need for an implementation plan and team as follows: "An implementation plan should be developed that includes a comprehensive ecological and conceptual framework that integrates and further prioritizes the numerous recovery actions provided in this plan. The implementation plan should provide a synthesis of the individual actions and coordinate their implementation in a cohesive strategy (Section V.B)". The 2006 Draft NFS Conservation Plan also references the need for an implementation schedule.

The 2006 Draft SSL Recovery Plan also places the responsibility for monitoring of combined impacts of research at the NMFS Alaska Region. While the implementation of that plan may rest at a NMFS regional office, NMFS believes the development of that plan should be the responsibility of an independent review group. Section 202 of the MMPA recommends that the Marine Mammal Commission (MMC) and its Committee of Scientific Advisors, or a similar body, undertake, or cause to be undertaken, reviews and studies as it deems necessary in connection with its assigned duties as to the protection and conservation of marine mammals, and conduct reviews of, amongst other activities, research programs conducted under the authority of the MMPA, and of all applications for permits for scientific research, and further to recommend to the Secretary such steps as it deems necessary or desirable to protect and conserve marine mammals with regards to these activities. NMFS believes the development of this plan is of such importance that the MMC and its Committee of Scientific Advisors, should oversee the development of the research implementation plan and provide that plan to the Secretary as a recommendation for its implementation. At this time demonstration of an effective effort to implement a long-term research plan for Steller sea lions and northern fur seals may be the single most important thing that NMFS can do to instill a sense of confidence and trust in the research and management efforts on behalf of the species of concern.

In that regard, NMFS intends to convene an independent research "implementation team" with MMC oversight to assess the effectiveness of the research program. Among other things, the team would:

1. conduct an analysis of [recommended] research and management priorities consistent with the recovery plan goals and objectives, and based on that analysis, recommend a cohesive strategy for the conduct of specific research studies consistent with the recovery plan and sufficient to assess the effectiveness of management actions,
2. establish timelines for initiation and completion dates for research efforts as appropriate,
3. evaluate and help coordinate logistics within and among research organizations,
4. help identify funding sources and recommend distribution of discretionary funding in accordance with research and management priorities,
5. coordinate activities to minimize disturbance at research sites,
6. identify [recommend] studies to monitor and determine the effects of research on the subject species,
7. review research results on an ongoing basis and update research directions and priorities accordingly consistent with implementation of the recovery plan, and
8. standardize procedures used to coordinate grant and permit application requirements, reviews, and conditions of approval to ensure that comparable procedures are being used.

In response to comments submitted on the Draft PEIS, recommendations by staff, and the need for an implementation plan, NMFS has determined that while the Preferred Alternative optimizes the opportunity for collection of information that could be used to protect the species, approval of research activities associated with rookery disturbance will be limited to a specific set of rookeries and haulouts during 2007, and possibly 2008, and post-activity monitoring at several of these sites will be required. These approvals will be subject to a permit condition to conduct a post-research activity monitoring program to observe the potential effects of research activities. Results of the monitoring program will be assessed to determine what additional conditions might need to be implemented, and what subsequent research actions at rookeries and haulouts should be permitted. Any proposed new conditions associated with research actions at rookeries and haulouts will be circulated for public comment before approval as part of the research permitting process. The intent of this phased implementation is to provide additional observations on potential effects of research activities (in addition to the literature cited and analysis conducted in the PEIS).

5.3 Animal Welfare Act (AWA) Compliance and Establishment of Best Management Practices

During the public meetings, NMFS received comments on, and recognized the importance of establishing Institutional Animal Care and Use Committees (IACUCs), to review the handling of SSLs and NFSs during research activities. The Animal Welfare Act (AWA) charges the Secretary of Agriculture (delegated to the U.S. Department of Agriculture Animal and Plant Health Inspection Service (APHIS)) with promulgating regulations and standards for the humane handling, care, treatment, and transportation of "animals" by dealers, research facilities, and exhibitors. Requirements include annual reporting and establishing an IACUC to review protocols and assure compliance with AWA. The AWA states that "Each Committee shall be appointed by ... such research facility and shall be composed of not fewer than three members. Such members shall possess sufficient ability to assess animal care, treatment, and practices in experimental research as determined by the needs of the research facility and shall represent society's concerns regarding the welfare of animal subjects used at such facility."

It is the responsibility of individual researchers to comply with the IACUC requirements of the AWA, and it is within the jurisdiction of the USDA APHIS to enforce such compliance with the AWA. To ensure research NMFS permits, funds, or undertakes on SSL and NFS is consistent with the IACUC requirements of the AWA, NMFS will require, as part of the permit application, a copy of the protocols approved by the permit applicant's IACUC, and a copy of the IACUC's recommendations. NMFS is aware that not all researchers are affiliated with an IACUC and that some may not be required under the AWA to have their protocols reviewed by an IACUC because they do not meet the AWA definition of a "research facility." Consistent with current practice, all permit applicants will be required to provide enough detail about their research protocols to allow NMFS F/PR1 staff to determine whether the proposed research methods satisfy the MMPA's humane and bona fide science standards. Applications without sufficient information and justification for research methods to allow NMFS to make determinations about these permit issuance criteria will be returned to the applicants.

The NMFS Science Review Board recently addressed the issue of NMFS compliance with AWA as a "research facility." The Board reviewed the following questions: 1) Are NMFS research facilities (i.e., science centers) subject to the AWA; and 2) Are marine mammal field studies exempt from the IACUC requirement? It was determined that NMFS is subject to the AWA and therefore there is a need to establish IACUC committees. The AWA requires all Federal research facilities to comply with the requirements for all other research facilities, including annual reports and having an IACUC. NMFS falls under the definition of a Federal research facility. Research Facility is defined as "…any school, institution, organization, or person that uses or intends to use live animals in research, tests, or experiments, and that (1) purchases or transports live animals in commerce, or (2) receives funds under a grant, award, loan, or contract from a department, agency, or instrumentality of the United States for the purpose of carrying out research, tests, or experiments."

With regards to the second question, the law does exempt "field studies" from IACUC review and monitoring. The definition of field study is "…a study conducted on free-living wild animals in their natural habitat." However, this term excludes any study that involves an invasive procedure, harms, or materially alters the behavior of an animal under study. It is not clear what NMFS marine mammal research, in addition to those that solely involve observations of animals and noninvasive measurements, would be exempt from the AWA requirements. These determinations would be made by the established IACUC. Other issues to be evaluated would be to determine what field study activities should be approved and used by researchers conducting their work under a scientific research permit issued by NMFS, such as marking procedures, use of anesthesia, techniques for taking tissue samples form live animals, techniques for restraint of animals, and marking/data transmission protocols.

Therefore, and important to the questions asked during the public meetings and comment period on the Draft PEIS, it was recognized that the need for an IACUC committee and process should not be imbedded in any one alternative. The need for an IACUC review process works across all alternatives and will be implemented by NMFS independent of this NEPA process. Steller sea lion and northern fur seal research, as well as all other marine mammal research, will be subject to the IACUC review once the process is established. At present NMFS has appointed a committee to develop a policy on how to implement this process. The committee will determine whether IACUCs should be established for each science center, regionally, or nationally. The committee will also look into how the IACUC members will be selected, how science is reviewed under this process, and any other AWA requirements. A report by this committee to the NMFS Science Review Board is due early May 2007.

Currently, most if not all academic researchers applying for marine mammal research permits use IACUCs. This greatly facilitates the permitting process in making the humaneness determination. For those permit requests in which an IACUC is not established, mainly NMFS research, NMFS F/PR1 staff will continue to make the required MMPA determinations for humaneness, least possible degree of pain and suffering, and feasibility of non-lethal methods. Once the NMFS IACUC committees are established they will facilitate this process by having humaneness and "least practicable degree of pain and suffering," reviewed pursuant to the AWA which will aid in reviewing permits under the MMPA process.

5.4 Coordination with Alaska Native Organizations

NMFS has formally established co-management agreements with Alaska Native communities for specific marine mammals, including SSLs and NFSs (see Appendix F). In addition, the agency recognizes both the special relationship provided under Government-to-Government Consultation requirements (Executive Order [E.O.] 13175), and potential contribution of traditional knowledge to the management of SSLs and NFSs.

Several Alaska Native organizations participated in the scoping and consultation processes associated with the SSL and NFS Research PEIS (see Appendix C and Appendix E). The following recommendations are based on comments submitted.

- Improve mechanisms that allow Native Tribes or Alaska Native Organizations (ANOs) to participate in identifying priorities for SSL and NFS research in Recovery and Conservation Plans.
- Improve collection and meaningful inclusion of local Tribes or ANO's traditional Native knowledge in Recovery and Conservations Plans, research plans, and management findings. This is something that could be achieved during implementation of Recovery and Conservation Plans, or during plan development.
- Seek and encourage participation of Alaska Natives in developing research and grant projects and applications, including monitoring of the long-term effects of research activities.
- Identify appropriate ANOs to be included on a standing mailing list, where NMFS will notify them, and ask for comments on permit applications.
- Provide notification of proposed research field activities to ANOs and communities in the vicinity of the proposed research, including when, where, and who is conducting the research. This could be done by NMFS or required of permit holders.
- Encourage researchers to involve Tribal or ANO biologists in field research.
- Provide annual feedback on research activities and results which affect the closest Native communities(s) affected by the research.

- Share final documents of research with the nearest Native Tribe or affected ANO. Establishing a website where research results (as in permit reports, technical memoranda, conference proceedings, publications, etc.) could be posted would facilitate this.

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9.0 INDEX

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Appendix A
Description of Active Permits

The following tables lists the number of takes in each research activity that were authorized in the Status Quo permits (some of which were vacated by court order after this Programmatic Environmental Impact Statement [PEIS] was initiated). The totals for each research activity were used to calculate the risk of injury and mortality under Alternative 3 for the different stocks of Steller sea lions (SSLs) and northern fur seals (NFSs) in Sections 4.8.1 and 4.8.2, respectively. The numbers of takes in each research activity under Alternative 2 and Alternative 4 were derived from these Status Quo numbers as described in Sections 4.8.1 and 4.8.2. Note that the numbers of takes used to calculate the risk assessments in the Draft PEIS are different from those used in the Final PEIS. The original tabulation of takes for the Draft PEIS included some inconsistencies and errors that were corrected for the Final DEIS according to the following method.

The research activity categories used in the PEIS are not necessarily the same categories used by researchers requesting takes. The takes listed in the permits have been assigned to the most appropriate category in the risk assessment tables. If the permit contained a combined take category (i.e., incidental take from all activities), the takes may have been divided among different research activity categories based on the description of the proposed research. If there was ambiguity in where takes should be tallied, they were allocated to the category with the highest overall risk values in order to provide a more precautionary estimate of risk. Some permits contained several separate research programs and listed take numbers for these programs separately. So some permits have more than one entry for disturbance categories (i.e., aerial surveys).

For capture and handling procedures, the number of animals authorized for capture and a given set of procedures (a sampling protocol) were multiplied by the appropriate number of procedures in different risk categories. For example, if a sampling protocol specified that 10 animals would be captured, weighed, measured, and processed for a blood sample, enema, flipper tag, and blubber biopsy, the table for that permit would include 30 “relatively low risk” procedures (blood, enema, tag) and 10 “relatively medium risk” procedures (biopsy). The morphometric measurements are considered to be “no risk” and are not tallied. Most permits that included capture and handling had several subsets of animals that were subject to different sampling protocols.

In some cases, permits specified that some animals would be recaptured one or more times throughout the year and would undergo a given set of procedures. Because of animal dispersal, logistical difficulties in recapturing animals, and limited funding for capture efforts, it is unlikely that every animal in a subset would be recaptured as often as specified in the permit each year. However, the risk assessments in Sections 4.8.1 and 4.8.2 are based on the authorized levels of takes so the appropriate number of handling procedures was multiplied by the number of captures and recaptures listed in the permits (some procedures such as branding and tooth pulls are only performed once over the life of that animal). This accounting method therefore overestimates the number of animals actually affected and the number of procedures they are subject to, yielding a conservative estimate of the risk involved in the authorized levels of takes in the permits.

Table A-1 Take By Permit Number and Research Activity
(Page 1 of 13)

Steller sea lion: western stock								Total takes for all permits, each activity type
Activity	**Age class**	**Kate Wynne #1010-1641-03**	**Wynne #1049-1718-00**	**Matkin # 545-1761-00**	**Gelatt #782-1768-00**	**Davis #800-1664-00**	**Calkins #881-1668-05**	**Total for Rows**
Incidental disturbance during survey activities (including work on other species)								
Aerial survey	pups				10,000			10,000
	non-pups				29,000			98,250
	All (non-breeding season)				25,000			
					25,000			
	All (non-breeding season) High years	19,250						
Vessel surveys	pups							
	non-pups							
	All	1,600	100	500				2,200
On land	pups							
	non-pups							
Incidental disturbance during researcher presence among animals								
On rookeries during breeding season (June and July) '(ground counts, scats, captures)	pups				6,000			6,000
					400			400
Roundups for branding								
Roundups for measure/sampling	non-pups				18,000			18,000
Roundups for branding[2]								
Roundups for measure/sampling Haulouts, rookeries non-breeding	pups							
(scats, resights, captures)								
	non-pups							
	All	1,600			20,000	400	15,000	37,000

Table A-1 Take By Permit Number and Research Activity
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Steller sea lion: western stock								Total takes for all permits, each activity type
Activity	Age class	Kate Wynne #1010-1641-03	Wynne #1049-1718-00	Matkin # 545-1761-00	Gelatt #782-1768-00	Davis #800-1664-00	Calkins #881-1668-05	Total for Rows
Capture and restraint procedures								
Capture/Physical restraint	pups				700			700
	non-pups				0			0
Capture/chemical anesthesia '(inhalable agent-isoflurane)	pups				400		160	560
	non-pups				120	90	340	1,060
							330	
							180	
Capture/chemical anesthesia	non-pups							
(injectable)								
Capture/chemical sedation	non-pups				60	45		105
(injectable-eg valium)								
Lethal take or permanent removal	pups							
	non-pups							
Handling in the wild								
Permanent mark/hot branding	pups				400			400
	non-pups				180			180
"Low risk" procedures	pups				450		280	3,860
					450		280	
					1,100		100	
					700		100	
							200	
							200	
	non-pups				240	135	340	6,433
					120	45	254	
					240	135	140	
					120		340	
					110		254	
					110		140	
					110		260	
					110		174	
					110		100	
					110		260	

Table A-1 Take By Permit Number and Research Activity
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Steller sea lion: western stock								Total takes for all permits, each activity type
Activity	Age class	Kate Wynne #1010-1641-03	Wynne #1049-1718-00	Matkin # 545-1761-00	Gelatt #782-1768-00	Davis #800-1664-00	Calkins #881-1668-05	Total for Rows
"Low risk" procedures (continued)							174	
							100	
							120	
							120	
							120	
							40	
							40	
							40	
							340	
							254	
							140	
							340	
							254	
							140	
							40	
							40	
							40	
							134	
"Med risk" procedures	pups					135	280	695
							280	
	non-pups				90		340	1,918
					240		254	
					120		140	
							340	
							254	
							140	
"High risk" procedures	pups							
	non-pups							

Table A-1 Take By Permit Number and Research Activity
(Page 4 of 13)

Steller sea lion: western stock									Total takes for all permits, each activity type
Activity	Age class	Kate Wynne #1010-1641-03	Wynne #1049-1718-00	Matkin # 545-1761-00	Gelatt #782-1768-00	Davis #800-1664-00	Calkins #881-1668-05		Total for Rows
Temporary Captivity									
Capture/Transport/holding/release	pups								
	non-pups						16		16
chemical sedation (injectable-eg valium)	non-pups						208		208
Perm mark/hot branding	non-pups						16		16
"Low risk" procedures	pups								
	non-pups						208		1,104
							384		
							416		
							64		
							32		
"Med risk" procedures	pups								
	non-pups						32		84
							20		
							4		
							24		
							4		
"High risk" procedures	pups								
	non-pups						16		16

[1]Mortality rates associated with alert, enter water, and injured reactions account for unobserved or subsequent mortalities attributable to the activity.

Observed mortality rates are derived from permit and trip reports, others are professional judgement.

[2]Number exposed are based on numbers of pups handled or branded, and are a subset of the number exposed for the activity.

Low risk: blood/flipper tag/whisker pull/isotopes/eb/bia/injections/ultrasound/external instruments/enemas/stomach intubate/fecal

Medium risk: teeth pull/biopsies/remote biopsies/(includes local anesthesia)

Elevated risk: implant transmitters, surgeries

Table A-2 Take By Permit Number and Research Activity
(Page 5 of 13)

Steller sea lion: eastern stock		Number of animals listed as takes under permit for each activity and age/class									
Name of permit holder and permit #											
Activity	Age class	Rea #358-1769-00	Brown #434-1669-03	Straley #473-1700-00	Calam-bokidis #540-1502-00	Calam-bokidis #540-1811	Trites #715-1784-00	Reilly #774-1714-00	Bengtson #782-1702-03	Gelatt #782-1768-00	Total for rows
Incidental disturbance during survey activities (including work on other species)											
Aerial survey	pups						15,000			6,000	21,000
	non-pups	15,000					45,000			18,000	225,000
										4,500	
	All (non-breeding season)				500	500	45,000	30,000	0	10,000	
								1,500		55,000	
Vessel surveys	pups										
	non-pups										4,600
	All (non-breeding season)			100					0	4,500	
On land	pups										
	non-pups										1,500
	All (non-breeding season)							1,500	0		
Incidental disturbance during researcher presence among animals											
On rookeries during breeding season (June and July)	pups	10,000	2,000								12,000
(ground counts, scats, captures)											
		600	200								800
Roundups for branding Roundups for measure/sampling											
	non-pups	15,000	5,000								20,000
ps for branding[2]		864	30								894
Roundu Roundups for measure/sampling											
Haulouts, rookeries non-breeding	pups										36,750
(scats, resights, captures)											
	non-pups										
	All	15,000	10,000				7,250		0	4,500	

Steller sea lion: eastern stock	Number of animals listed as takes under permit for each activity and age/class										
Name of permit holder and permit #											
Activity	Age class	Rea #358-1769-00	Brown #434-1669-03	Straley #473-1700-00	Calam-bokidis #540-1502-00	Calam-bokidis #540-1811	Trites #715-1784-00	Reilly #774-1714-00	Bengtson #782-1702-03	Gelatt #782-1768-00	Total for rows
Capture and restraint procedures											
Capture/Physical restraint	pups										0
	non-pups								0		
Capture/chemical anesthesia '(inhalable agent-isoflurane)	pups	700	200								900
	non-pups	1,200	30								1,230
Capture/chemical anesthesia	non-pups	60							0		60
(injectable)											
Capture/chemical sedation	non-pups									12	12
(injectable-eg valium)											
Lethal take or permanent removal	pups										
	non-pups										
Handling in the wild	**All values are the number of procedures done regardless of whether one animals has 1 procedure or multiple procedures**										
Permanent mark/hot branding	pups	600	200								800
	non-pups	330	30						0	12	906
		260									
		174									
		100									
"Low risk" procedures	pups	1,400	50								4,180
		700	200								
		20	200								
		700	80								
		130									
		700									
	non-pups	1,260	30							24	9,490
		1,230	30							24	
		720	30							12	
		300	30								
		290									
		330									
		1,200									

Steller sea lion: eastern stock	**Number of animals listed as takes under permit for each activity and age/class**										
Name of permit holder and permit #											
Activity	**Age class**	**Rea #358-1769-00**	**Brown #434-1669-03**	**Straley #473-1700-00**	**Calam-bokidis #540-1502-00**	**Calam-bokidis #540-1811**	**Trites #715-1784-00**	**Reilly #774-1714-00**	**Bengtson #782-1702-03**	**Gelatt #782-1768-00**	**Total for rows**
"Low risk" procedures		1,200									
		1,260									
		860									
		660									
"Med risk" procedures	pups	20									20
	non-pups	480								12	2,052
		1,230									
		330									
"High risk" procedures	pups										
	non-pups										
Temporary Captivity											
Transport/holding/release	pups										
	non-pups										
Perm mark/hot branding	non-pups										
"Low risk" procedures	pups										
	non-pups										
"Med risk" procedures	pups										
	non-pups										
"High risk" procedures	pups										
	non-pups										

[1]Mortality rates associated with alert, enter water, and injured reactions account for unobserved or subsequent mortalities attributable to

Observed mortality rates are derived from permit and trip reports, others are professional judgement.

[2]Number exposed are based on numbers of pups handled or branded, and are a subset of the number exposed for the activity

Low risk: blood/flipper tag/whisker pull/isotopes/eb/bia/injections/ultrasound/external instruments/enemas/stomach intubate/fecal loop/stomach pill telemeters

Medium risk: teeth pull/biopsies/remote biopsies/(includes local anesthesia)

Elevated risk: implant transmitters, surgeries

Northern fur seal-Eastern Pacific Stock

Table 1 - Estimated mortality due to researcher presence in view of animals

Activity	Age class	Williams #1066-1750-00	Lindsay #1050-1727-00	Holser #1068-1755-01	Insley #1045-1713-00	Calam-bokidis #540-1502-00	Calam-bokidis #540-1811	Reilly #774-1714-00	Bengtson #782-1708-02	Gelatt #782-1768-00	Total for rows
Aerial survey	pups										
	non-pups										30,500
	All non-breeding season					2,000	2,000	5,500		10,000	
On land catwalks, tripods, cliffs	pups								6,500		6,500
	non-pups	2,200							17,750		38,450
	All		2,000	Unlimited				5,500			
Subtotal mortality for incidental effects of researcher presence in view of animals											

[1]Mortality rates associated with alert, enter water, and injured reactions account for unobserved or subsequent mortalities attributable to the activity.

Table 2 - Estimated mortality due to researcher presence among animals

Activity	Age class	Williams #1066-1750-00	Lindsay #1050-1727-00	Holser #1068-1755-01	Insley #1045-1713-00	Calam-bokidis #540-1502-00	Calam-bokidis #540-1811	Reilly #774-1714-00	Bengtson #782-1708-02	Gelatt #782-1768-00	Total for rows
Activities involving pup roundups	pups	410							6,600		7,010
	non-pups								3,465		3,465
Activities involving clearing rookery/haulout	pups								215,775		217,275
									1,500		
	non-pups								97,475		103,975
									1,500		
	all									5,000	

Table 2 - Estimated mortality due to researcher presence among animals (cont.)

Activity	Age class										
Incidental disturbance during captures in breeding season	pups	400			50				7,200		8,420
									770		
	non-pups	13,400			125				6,000		20,165
									640		
	All										
Incidental disturbance during captures outside of breeding season	pups								3,150		11,890
									8,400		
									340		
	non-pups								2,625		9,905
									7,000		
	All								280		
Subtotal mortality for incidental effects of researcher presence among animals:											
notes for text: SM prior to 1 August; EP prior to 08 August											

Table 3 - Estimated mortality due to capture and restraint activities

Activity	Age class										
Capture/physical restraint	pups	10			5				22,120		25,535
									3,000		
									300		
									100		
	non-pups	165			25						190
Capture/chemical anesthesia '(inhalable agent-isoflurane)	non-pups										0
Capture/chemical anesthesia	non-pups										
(injectable)											
Capture/chemical sedation	non-pups								140		660
									400		
									120		
(injectable-eg valium)											
Lethal take or permanent removal	pups										
	non-pups										
Subtotal mortality for capture/restraint effects:											

Table 4 - Estimated mortality due to handling and sampling procedures

Activity	**Age class**										
Permanent mark/hot-cold branding	pups										
	non-pups										
"Low risk" procedures	pups	20							300		3,620
									2,100		
									1,200		
	non-pups	330			20				210		2,620
									1,400		
									660		
"Med risk" procedures	pups										
	non-pups								70		70
"Elevated risk" procedures	pups										
	non-pups										
Subtotal mortality estimated increased risk of handling effects:											

Table 5 - Estimated mortality due to temporary captivity for experimentation

Activity	**Age class**										
Transport/holding/release	pups										
	non-pups										
Permanent mark/hot branding	non-pups										
Relatively low risk procedures	pups										
	non-pups										
Relatively medium risk procedures	pups										
	non-pups										
Relatively high risk procedures	pups										
	non-pups										
Total mortality											

Low risk: blood/flipper tag/whisker pull/isotopes/eb/bia/injections/ultrasound/external instruments/enemas/stomach intubate/fecal loop/stomach pill telen
Medium risk: teeth pull/biopsies/remote biopsies/(includes local anesthesia)
Elevated risk: implant transmitters, surgeries
For text: No risk: swabs/hair or nail clipping, temp marks, morph measurements, milk sample, external physical exan

Northern fur seal-San Miguel Stock

Table 1 - Estimated mortality due to researcher presence in view of animals

Activity	Age class	Stewart #486-1790-00	Bengtson #782-1708-02	Moore #782-1613-03	Total in rows
Aerial survey	pups				
	non-pups				350
	all	350			
On land catwalks, tripods, cliffs	pups		700		1,300
			600		
	non-pups		300		2,450
			1,800		
	all	350			
Subtotal mortality for incidental effects of researcher presence in view of animals:					
[1]Mortality rates associated with alert, enter water, and injured reactions account for unobserved or subsequent mortalities attributable to the activity.					

Table 2 - Estimated mortality due to researcher presence among animals

Activity	Age class				
Activities involving pup roundups	pups		3,000		3,000
	non-pups		1,575		1,575
Activities involving clearing rookery/haulout	pups				
	non-pups				500
	all			500	
Incidental disturbance during captures in breeding season	pups	0	1,630		1,630
	non-pups		1,360		2,260
	all			900	
Incidental disturbance during captures outside of breeding season	pups		710		710
	non-pups		595		595
Subtotal mortality for incidental effects of researcher presence among animals:					
notes for text: SM prior to 1 August; EP prior to 08 August					

Table 3 - Estimated mortality due to capture and restraint activities					
Activity	**Age class**				
Capture/physical restraint	pups	100	300		1,900
			1,500		
	non-pups	100			100
Capture/chemical anesthesia	non-pups				
(inhalable agent-isoflurane)					
Capture/chemical anesthesia	non-pups	125			125
(injectable)					
Capture/chemical sedation	non-pups		40		40
(injectable-eg valium)					
Lethal take or permanent removal	pups				
	non-pups				
Subtotal mortality for capture/restraint effects:					

Table 4 - Estimated mortality due to handling and sampling procedures					
Activity	**Age class**				
Permanent mark/hot-cold branding	pups				
	non-pups				
"Low risk" procedures	pups	300	1,200		4,525
			3,000		
			25		
	non-pups	400	220		1,795
		100			
		400			
		300			
		75			
		300			
"Med risk" procedures	pups	100			100
	non-pups	100			450
		25			
		100			
		100			
		25			
		100			
"Elevated risk" procedures	pups				
	non-pups				
Subtotal mortality estimated increased risk of handling effects:					

Table A-4 Take By Permit Number and Research Activity
(Page 13 of 13)

Table 5 - Estimated mortality due to temporary captivity for experimentation

Activity	**Age class**				
Transport/holding/release	pups				
	non-pups				
Permanent mark/hot branding	non-pups				
Relatively low risk procedures	pups				
	non-pups				
Relatively medium risk procedures	pups				
	non-pups				
Relatively high risk procedures	pups				
	non-pups				
Total mortality					

Low risk: blood/flipper tag/whisker pull/isotopes/eb/bia/injections/ultrasound/external instruments/enemas/stomach intubate/fecal loop/stomach pill telemeters

Medium risk: teeth pull/biopsies/remote biopsies/(includes local anesthesia)

Elevated risk: implant transmitters, surgeries

For text: No risk: swabs/hair or nail clipping, temp marks, morph measurements, milk sample, external physical exam

The summaries provided herein are abstracts from current National Marine Fisheries Service (NMFS) permits that are valid from January 1, 2006 through December 31, 2011. For more detailed information, please refer to the complete permit document or application on file with NMFS.

Permit Number	Valid* Dates	Entity/Institution	Principal Investigator	Co-Investigator	Marine Mammal Affected
1008-1637-02	**expires 10/31/2011**	**University of Southern Maine**	**John Wise, Ph.D.**	**David St. Aubin, Ph.D. Shannon Atkinson, Ph.D. Frances Gulland, Ph.D. Jerry Shay, Ph.D. William Baldwin, Ph.D. Dennis McDaniel, Ph.D. Chun Hu, Ph.D. David Kitts, Ph.D. Andrew Trites, Ph.D. Sylvain DeGuise Tracey Romano Carlos Romero, Ph.D. Margie Peden-Adams, Ph.D. Patricia Fair, Ph.D. Hendrik Nollens, Ph.D.**	**Steller sea lion (SSL)**

Permit Type: SCIENTIFIC RESEARCH PERMIT

Summary: This permit authorizes the acquisition and world-wide importation and exportation of marine mammal and endangered species specimens (i.e., hard and soft parts, including cell lines derived from such parts) under the jurisdiction of the NMFS and the United States (U.S.) Fish and Wildlife Service. The objectives of the research are to: 1) determine tissue levels of metals in Steller sea lions (*Eumetopias jubatus*) and other marine mammal species; and 2) to establish a national resource of marine mammal cell lines for use as model systems in the investigation of various factors related to marine mammal health (e.g., toxicity of metals, virology, etc.). Once the cell lines are established, they may be transferred to other researchers for study, including export world-wide. The cell lines will not be sold for profit or used for commercial purposes.

Permit Number	Valid* Dates	Entity/Institution	Principal Investigator	Co-Investigator	Marine Mammal Affected
1010-1641-03	**expires 12/31/2007**	**Aleutians East Borough/University of Alaska Fairbanks**	**Kate Wynne**	**Cathy Foy**	**SSL**
Permit Type: SCIENTIFIC RESEARCH PERMIT **Summary:** The purpose of the authorized research is to provide additional information on seasonal prey consumption by SSLs through scat collection at rookeries and haulouts along the Alaska Peninsula and eastern Aleutian Islands and to improve the accuracy and precision of population indices through expanded aerial and vessel surveys in the western Gulf of Alaska.					
1045-1713-00	**expires 07/31/2008**	**Hubbs-SeaWorld Research Institute**	**Stephen Insley, Ph.D.**	**N/A**	**Northern fur seal (NFS)**
Permit Type: SCIENTIFIC RESEARCH PERMIT **Summary:** The purpose of the authorized research is to remotely investigate at-sea interactions between northern fur seals (*Callorhinus ursinus*) and ships, particularly the impact of commercial fishing vessels on NFSs. Annually, lactating female NFSs from the Pribilof Islands in Alaska will be captured, measured, outfitted with data logging instrumentation, and released. The individuals will be tracked and recaptured, the data logger removed and the animals subsequently released. Additionally, Level B harassment of NFSs is authorized annually for pups, breeding females, mature males, and immature males. The results of this research will provide important information for management decisions regarding NFSs.					
1049-1718-00	**expires 06/30/2009**	**University of Alaska Fairbanks School of Fisheries and Ocean Sciences**	**Kate Wynne**	**Briana H. Witteveen Lisa Baraff Jordan Thomson**	**NFS/SSL**
Permit Type: SCIENTIFIC RESEARCH PERMIT **Summary:** The primary goal of the proposed research project is to improve understanding of the diving and foraging behaviors of fin whales and humpback whales on their feeding grounds in the Gulf of Alaska. Specific objectives include: 1) collecting data on the depth, duration, and location of dives; and 2) relating dive profiles to presence of prey fields and bathymetric features. All research will involve the non-lethal take by unintentional or incidental harassment of whales using vessels to collect photographs and attach archival time-depth-recorder tags. Incidental harassment and collection of dead parts from SSLs, NFSs, humpback whales, killer whales, minke whales, gray whales, fin whales, sperm whales, sei whales, harbor porpoises, Dall's porpoises, harbor seals, and Pacific white-sided dolphins during killer whale predation studies are permitted.					

Permit Number	Valid* Dates	Entity/Institution	Principal Investigator	Co-Investigator	Marine Mammal Affected
1050-1727-00	**expires 02/28/2006**	**Pribilof Project Office, National Oceanic and Atmospheric Administration, National Ocean Service**	**John A. Lindsay**	**N/A**	**NFS**
Permit Type: COMMERCIAL/EDUCATIONAL PHOTOGRAPHY PERMIT **Summary:** The purpose of the activities is to collect high-definition digital media of contemporary NFSs on the Pribilof Islands, particularly breeding and territorial behaviors in a natural setting on rookeries and haulout areas for a public television documentary series. The documentary series will combine footage of NFSs with original research, photographs, and other documents about the history of commercial fur sealing on the Pribilofs with emphasis on key historical figures.					
1066-1750-00	**expires 06/30/2009**	**NMFS**	**Michael Williams**	**Phillip A. Zavidil Steve A. MacLean**	**NFS**
Permit Type: SCIENTIFIC RESEARCH PERMIT **Summary:** The purposes of the authorized research are to: 1) estimate the annual proportion of sub-adult male NFSs entangled in derelict fishing gear and marine debris, compare these estimates to those from St. Paul and St. George Islands in previous years, and capture and disentangle NFSs observed on both islands; and 2) count the number of NFSs entangled, and capture and disentangle them individually on St. Paul Island.					
1068-1755-01	**issued 07/14/2005 expires 05/10/2009**	**Pribilof Islands Stewardship Program - St. Paul**	**Karin Holser**	**Justine Kibbe Moon Rachel Holser Bruce Robson Andrew Malavansky**	**NFS**
Permit Type: LETTER OF CONFIRMATION UNDER THE GENERAL AUTHORIZATION **Summary:** This permit authorizes scientific research activities that involve only Level B harassment of NFSs on St. Paul and St. George Islands, Alaska. NFSs will be observed using spotting scopes and binoculars from vantage points overlooking rookeries and haulout areas to: 1) check for entangled NFSs; 2) identify tagged NFSs; 3) examine the timing of NFS arrival and parturition; and 4) estimate percent age composition of female NFSs.					

Permit Number	Valid* Dates	Entity/Institution	Principal Investigator	Co-Investigator	Marine Mammal Affected
358-1769-00	**expires 05/31/2010**	**Alaska Department of Fish and Game**	**Lorrie Rea, Ph.D.**	**Thomas Gelatt, Ph.D. Brian Fadely, Ph.D. Vicki Stegall Bob Small Don Calkins Kim Raum-Suryan Mike Rehberg Kelly Hastings Grey Pendleton Dennis McAllister Kathy Burek, D.V.M. William Taylor, D.V.M. Chris Curgus Ken Pitcher Jennifer Burns Mille Gray Kimberlee Beckman, D.V.M. Frances Gulland, D.V.M. Bruce Heath, D.V.M. Martin Haulena, D.V.M. Vicki Vanek, D.V.M. Robert Braun, D.V.M. Pam Tuomi, D.V.M. Chris Dold, D.V.M. Shawn Johnson, D.V.M. Debbie Fauquier, D.V.M. Heather Harmon Jamie King Kelly Hastings Lauri Jemison Vicki Stegall Andrew Trites, Ph.D. Julie Richmond Carrie Beck Matt Moran**	**SSL**

Permit Number	Valid* Dates	Entity/Institution	Principal Investigator	Co-Investigator	Marine Mammal Affected
				Jo-Ann Mellish, Ph.D. **Lisa Hoopes**	
Permit Type: SCIENTIFIC RESEARCH PERMIT **Summary:** The objectives of the authorized research are to investigate the various hypotheses for the decline of SSLs in western Alaska, including conducting studies of life history traits, physiological investigations of animal condition and time of weaning, and studies of animal movement and dive activity. To accomplish this, the Alaska Department of Fish and Game will conduct aerial surveys and ground counts, as well as capture, sample, and mark SSLs.					
369-1757-00	**issued 05/26/2005 expires 05/31/2010**	**Oregon State University**	**Bruce Mate, Ph.D.**	**Barbara Lagerquist**	**NFS**
Permit Type: SCIENTIFIC RESEARCH PERMIT **Summary:** This permit authorizes research on humpback whales (*Megaptera novaeangliae*), blue whales (*Balaenoptera musculus*), fin whales (*Balaenoptera physalus*), southern right whales (*Eubalaena australis*), bowhead whales (*Balaena mysticetus*), sperm whales (*Physeter macrocephalus*), grey whales (*Eschrichtius robustus*), and killer whales (*Orcinus orca*). The purposes of the authorized scientific research are to: 1) identify migration routes; 2) identify specific feeding and breeding grounds for each species, if unknown; 3) characterize local movements and dive habitats in both feeding and breeding grounds, and during migration; 4) examine the relationships between movements/dive habits of and prey distribution, time of day, geographic location, or physical and biological oceanographic conditions; 5) provide surface-rate information that can be useful in the development of more accurate abundance estimations; 6) characterize whale vocalizations; and 7) characterize sound pressure levels to which whales are exposed. Level B harassment of NFSs is authorized for in-water and aerial approach only.					
42-1642-03	**expires 10/15/2007**	**Mystic Aquarium**	**Lisa Mazzaro, Ph.D.**	**David J. St. Aubin, Ph.D.**	**SSL**
Permit Type: SCIENTIFIC RESEARCH PERMIT **Summary:** The purposes of the authorized research are to: 1) study metabolic clearance rates of vitamins A and E using isotope tracers and vitamin analogs in captive SSLs, in relation to various life history stages; 2) establish the vitamin A and E status of free-ranging SSLs from samples received from other permit holders; 3) determine the metabolic requirements for these vitamins by relating intake to blood levels in captive specimens; and 4) receive, import, and export blood, milk, and other soft parts from all non-listed marine mammals and certain listed marine mammals under NMFS jurisdiction, including samples taken during routine husbandry sampling of captive marine mammals held in facilities within the U.S. and abroad; stranded animals abroad; legally subsistence hunted animals in the U.S. and abroad; and samples from this and other permitted research projects in the U.S. and abroad. The purposes of objective number 4 are to study the disease hemochromatosis (an excessive accumulation of iron in tissues often associated with hepatic lesions) and other factors associated with general marine mammal health.					

Permit Number	Valid* Dates	Entity/Institution	Principal Investigator	Co-Investigator	Marine Mammal Affected
Additional marine mammal health investigations include studies on: Brucella, environmental stressors and their effects on the immune system and health, and characterization of and investigations on the marine mammal nervous and immune systems. In addition, blood samples collected during routine physical exams or authorized research, tissue samples collected from animals that die of natural causes or were humanely euthanized as advised by staff veterinarians, and samples taken from dead stranded animals in the U.S. (in consultation with the NMFS Stranding Network) may be exported abroad for valid research projects. The permit also authorizes the importation of one adult male SSL known as "Kodiak" from the Vancouver Aquarium, Vancouver, Canada, for enhancement and research purposes. Specifically, Kodiak will be bred with female SSLs currently maintained by Mystic Aquarium, in support of the study on changes in vitamin A and E status in relation to various life history stages, as part of an on-going investigation of the decline of the SSL population. Any progeny resulting from breeding will serve to expand the pool of captive sea lions available for enhancement and scientific research activities, including the studies just described.					
434-1669-03	**expires 12/31/2007**	**Oregon Department of Fish and Wildlife**	**Robin Brown**	**Robert DeLong, Ph.D.** **Jeff Laake** **Bryan Wright** **Susan Reimer** **Sharon R. Melin, Ph.D.** **Pat Gearin** **Brad Hanson** **Steven Jeffries** **John Sease** **Thomas Loughlin, Ph.D.**	**SSL**
Permit Type: SCIENTIFIC RESEARCH PERMIT **Summary:** The purpose of the authorized research is to continue monitoring the status of the Alaskan SSL population and to identify causes of the population decline to provide for the population's recovery. This permit authorizes takes of threatened SSLs in Washington, Oregon, and California by: 1) capture; 2) hot-branding; 3) flipper tagging; 4) collection of blood and tissue samples; 5) attachment of external scientific instruments; 6) harassment incidental to these activities and remote monitoring; and 7) accidental mortality.					

Permit Number	Valid* Dates	Entity/Institution	Principal Investigator	Co-Investigator	Marine Mammal Affected
473-1700-00	**expires 06/30/2009**	**University of Alaska Southeast**	**Janice Straley**	**Elizabeth Wilson Elizabeth Mathews Steve Lewis Briana Lawson Kate Wynne Janet Doherty Christine Gabriele**	**NFS/SSL**
Permit Type: SCIENTIFIC RESEARCH PERMIT **Summary:** The objectives of the proposed research are to collect data to: 1) continue a study in developing long term sighting histories of individual humpback whales to assess stock structure, life history parameters, feeding behaviors, social behaviors of feeding populations, and population estimates; 2) assess the feasibility of using a CRITTERCAM to aid researchers in determining how sperm whales are depredating longline fishing gear in the Gulf of Alaska; 3) opportunistically photo-identify and sample biopsy killer whales, sperm whales, minke whales (*Balaenoptera acutorostrata*), gray whales and fin whales to enhance the body of knowledge, stock structure, and current status of these species in the North Pacific; and 4) follow killer whale predation events, photograph, observe, sample biopsy, incidentally harass and collect and export dead parts from prey including: humpback whales, gray whales, minke whales, fin whales, harbor porpoise (*Phocoena phocoena*), Dall's porpoise (*Phocoenoides dalli*), Pacific white-sided dolphin (*Lagenorhynchus obliquidens*), NFS, SSL and harbor seal (*Phoca vitulina*). All research would take place over a 5-year period ending June 30, 2009.					
486-1790-00	**expires 10/01/2010**	**Hubbs-SeaWorld Research Institute**	**Brent S. Stewart Ph.D., JD**	**Pamela K. Yochem MS, D.V.M.**	**NFS**
Permit Type: SCIENTIFIC RESEARCH PERMIT **Summary:** The objectives of the authorized research are to continue studies begun in 1978 on the demography, physiological ecology, foraging ecology, and behavior of California sea lions (*Zalophus californianus*), northern elephant seals (*Mirounga angustirostris*), harbor seals, and NFSs in California. To accomplish this, the permit holder will conduct: 1) aerial surveys; capture individuals of any age of the aforementioned mentioned pinniped species by various techniques; 2) physically or chemically immobilize animals; 3) collect blood, skin, hair, blubber, muscle, urine, feces, gastric contents, and various skin and mucosal swabs; 4) flipper tag animals; 5) attach VHF and satellite-linked radio transmitters or time-data recorders to some animals; 7) and perform exams of musculoskeletal and cardiovascular systems, ears, nares, oral cavity, and eyes.					

Permit Number	Valid* Dates	Entity/Institution	Principal Investigator	Co-Investigator	Marine Mammal Affected
545-1761-00	**issued 09/16/2005 expires 09/15/2010**	**North Gulf Oceanic Society**	**Craig Matkin**	**Russel Andrews, Ph.D. Lance Barrett-Lennard Mike Brittain David Ellifrit John Ford Dena Matkin Lori Mazzuca Peter Nilsson Damian Sean Power Eva Saulitis Cy St. Amand Janice Straley Kate Wynne**	**NFS/SSL**
Permit Type: SCIENTIFIC RESEARCH PERMIT **Summary:** The objectives of the research are to conduct population studies on numerous cetacean species. The research specifically focuses on gathering data to study: 1) mating and social systems and feeding behavior of killer whales; and 2) diving behavior, feeding, movement and contaminant loads of several cetacean species. Takes will occur by close approach for vessel surveys, photo-identification, behavioral observation, passive acoustic recording, tagging, biopsy sampling, collection and export of dead parts, and incidental harassment. Research will take place in waters off Alaska over a 5-year period. Collection of dead parts from SSLs, NFSs, humpback whales, minke whales, gray whales, harbor porpoises, Dall's porpoises, harbor seals, and Pacific white-sided dolphins during killer whale predation studies is permitted. Incidental takes are also allowed of Baird's beaked whale (*Berardius bairdii*), Cuvier's beaked whale (*Ziphius cavirostris*), Stejneger's beaked whale (*Mesoplodon stejnergeri*), in addition to the aforementioned species during predation studies.					
715-1784-00	**expires 05/31/2010**	**North Pacific Universities Marine Mammal Research Consortium**	**Andrew Trites, Ph.D.**	**Laura Kucey**	**SSL**
Permit Type: SCIENTIFIC RESEARCH PERMIT **Summary:** The objectives of the authorized research are to understand how diets vary temporally and spatially, and how this variation is related to population trends and abundance, nutritional stress, and commercial fishing activities. To accomplish this objective, researchers intend to: 1) collect data on SSL distribution and diet compositions through aerial surveys of SSL rookeries and haulouts in southeast Alaska; 2) collect scat from rookeries and haulouts in southeast Alaska; and 3) conduct behavioral observations of SSLs on rookeries, haulouts and tagged SSLs at sea.					

Permit Number	Valid* Dates	Entity/Institution	Principal Investigator	Co-Investigator	Marine Mammal Affected
774-1714-00	**expires 06/30/2009**	**Southwest Fisheries Science Center NMFS**	**Stephen B. Reilly, Ph.D.**	**Lisa Ballance Jay Barlow Jim Carretta Susan Chivers Tim Gerrodette Peter Dutton Rick LeDuc Wayne Perryman Bob Pitman Barbara Taylor Mark Lowry**	**NFS/SSL**

Permit Type: SCIENTIFIC RESEARCH PERMIT

Summary: The permit contains four projects and the objectives of each project are: *Project I (Pinniped Studies)* to conduct population assessments for pinnipeds to determine abundance, distribution patterns, length frequencies, breeding densities, to determine the diet from collection of scat and spew (collection of scat and spew will occur on California sea lion haulouts only), and to assess the status of pinniped species and identify fishery-marine mammal conflicts; *Project II (Cetacean Studies)* to determine the abundance, distribution, movement patterns, and stock structure of cetaceans, in U.S. territorial and international waters; *Project III (Sea Turtle Studies)* to determine the abundance, distribution, movement patterns, stock structure and diet of marine turtles in U.S. territorial and international waters; *Project IV (Salvage and Import/Export of Parts Studies)* salvage, collection of biological samples and import/export of parts will be used to determine stock structure.

Level B harassment is permitted in *Project I* on northern elephant seals, California sea lions, SSLs, NFSs and harbor seals. *Project IV* permits specimens to be collected, salvaged, acquired, analyzed, archived, imported/exported, re-imported, re-exported worldwide in unlimited numbers from whales, dolphins, porpoises, seals, sea lions, and sea turtles. *Projects II and III* do not involve scientific research or takes of SSLs and NFSs.

Permit Number	Valid* Dates	Entity/Institution	Principal Investigator	Co-Investigator	Marine Mammal Affected
782-1613-03	**issued 11/02/2001 expires 04/30/2006**	**NMFS/Alaska Fisheries Science Center/National Marine Mammal Laboratory (NMML)**	**Sue Moore, Ph.D. (original Principal Investigator was Robert DeLong, Ph.D.)**	**Sharon R. Melin, Ph.D. Frances M. D. Gulland Linda J. Lowenstein**	**NFS**
Permit Type: SCIENTIFIC RESEARCH PERMIT **Summary:** The purpose of the authorized research is to: 1) monitor trends in population parameters and health (population assessment) and study the ecology of infectious diseases and cancers of California sea lions; and 2) to describe the environmental factors influencing the foraging ecology of harbor seals and northern elephant seals. Level B harassment is permitted on NFSs resulting from branding activities, and live and dead pup surveys of California sea lions.					
782-1702-03	**expires 09/30/2008**	**NMML**	**John Bengtson, Ph.D. (original Principal Investigator was Sue Moore, Ph.D.)**	**Robin Brown Robert DeLong, Ph.D. Steven Jeffries Pat Gearin Merrill Gosho Harriet Huber**	**SSL**
Permit Type: SCIENTIFIC RESEARCH PERMIT **Summary:** The purposes of the authorized research are to conduct aerial, ground, and vessel surveys annually for stock assessment of harbor seals, California sea lions, SSLs, and northern elephant seals. Harbor seals, California sea lions, SSLs and northern elephant seals will be: 1) captured, tagged, and branded for long-term identification of individuals and to collect information on reproductive success, survival and longevity; 2) blood sampled for disease screening; 3) blubber biopsied for contaminant analysis; 4) tissue sampled for genetics and for fatty acid analysis; and 5) some seals will be instrumented with VHF radio transmitters and/or time-depth recorders, satellite tags or sonic tags to document movements, activity, and foraging patterns. In addition, harbor seals will be blood sampled and biopsied for contaminant analysis and tissue sampled for genetic analysis. Harbor seals and California sea lions will be instrumented with VHF radio transmitters and/or time-depth recorders or satellite tags to document movement activity and foraging patterns.					

Permit Number	Valid* Dates	Entity/Institution	Principal Investigator	Co-Investigator	Marine Mammal Affected
782-1708-02	**issued 06/23/2005 expires 12/31/2008**	**NMML**	**John Bengtson, Ph.D. (original Principal Investigator was Thomas Loughlin, Ph.D.)**	**Sue Moore, Ph.D. Robert DeLong, Ph.D. Brian Fadely, Ph.D. Rolf Ream, Ph.D. Ward Testa**	**NFS**
Permit Type: SCIENTIFIC RESEARCH PERMIT **Summary**: The purposes of the authorized research are to: 1) monitor the status and trends of the NFS population; 2) evaluate the condition of animals from each cohort (health and strength of year class); 3) monitor the diet; 4) document the movement patterns, foraging behavior, and essential foraging habitat of various age and sex classes of NFSs; and 5) test the hypotheses that a) prey availability is a function of physical oceanographic features, productivity, and/or commercial fishery pressure and prey quality is likely a condition of habitat type and associated with community structure. Therefore, prey availability and quality are lower on the continental shelf than the Bering Sea; and b) alternatively, if differences in female condition during the breeding season (when they are utilizing more local foraging areas) are not reflected in body condition, food web productivity in the North Pacific is insufficient to support NFSs on their winter-spring migration and is causing the decline on rookeries.					
782-1768-01	**issued 05/31/2005 expires 05/31/2010**	**NMML**	**Thomas Gelatt, Ph.D.**	**Vladimir Burkanov, Ph.D. Don Calkins Brian Fadely, Ph.D. Lowell Fritz Thomas Loughlin, Ph.D. Wayne Perryman Lorrie Rea, Ph.D. Rolf Ream, Ph.D. Ward Testa James Thomason Kate Wynne**	**SSL**
Permit Type: SCIENTIFIC RESEARCH PERMIT **Summary:** The permit contains two projects and the objectives of each project are: *Project 1* to collect information on the life history, foraging behavior, habitat use, physiology, population status and trends, survival and reproductive rates, and condition of SSLs in the North Pacific. To accomplish this, NMML will conduct aerial surveys and ground counts, as well as capture, sample, and mark SSLs. *Project 2* will identify individual animals to determine predation rates on endangered salmonids; to perform disease screening and genetic analyses; and to document movements and migration rates of individuals. To accomplish this, NMML will capture, sample, tag, and hot-brand SSLs in Washington and Oregon.					

Permit Number	Valid* Dates	Entity/Institution	Principal Investigator	Co-Investigator	Marine Mammal Affected
881-1668-05	**expires 12/31/2008**	**Alaska SeaLife Center**	**Donald Calkins**	**Jo-Ann Mellish, Ph.D.** **Shannon Atkinson, Ph.D.** **Pam Tuomi, D.V.M.** **Natalie Noll, Ph.D.** **Alexander Burdin, Ph.D.** **John Maniscalco** **Jason Waite** **Kendall Mashburn** **Markus Horning, Ph.D.** **Russel Andrews, Ph.D.** **Daniela Maldini** **Lorrie Rea, Ph.D.** **Bob Hicks** **Lisa Mazzaro, Ph.D.**	**SSL**
Permit Type: SCIENTIFIC RESEARCH PERMIT **Summary:** The purpose of the authorized research is to collect information on the health status, physiology, life history, foraging behavior and habitat use of SSLs. The permit includes 1) transport, temporary captive maintenance at the Alaska SeaLife Center and associated experiments on juvenile SSLs authorized for capture; and 2) substitution of hair bleach, paint marks, or fur clippings for hot-brands as a means of marking individual SSL pups.					
881-1745-00	**issued 03/16/2006 expires 03/31/2011**	**Alaska SeaLife Center**	**Shannon Atkinson, Ph.D.**	**Donald Calkins** **Dennis Christen** **Russel Andrews, Ph.D.** **Jo-Ann Mellish, Ph.D.** **Lisa Hartman**	**SSL**
Permit Type: SCIENTIFIC RESEARCH PERMIT **Summary:** The purpose of the authorized research is to investigate stress responses, endocrine and immune system function, and seasonal variations to normal biological parameters in captive SSLs at the Alaska SeaLife Center. Additionally, the Alaska SeaLife Center will conduct research and development of external tags and attachments and test less-intrusive research methods on the captive SSLs for future deployment in the field on wild SSLs. Projects include: 1) “Condition Assessment;” 2) “Endocrinology and Immunology Study;” 3) “Assessing Metabolism in Steller Sea Lion Survival;” 4) “Metabolic Demands of Steller Sea Lion Survival;” and 5) “Biotelemetric Monitoring of Foraging Behavior.”					

Notes: NFS northern fur seals; NMFS National Marine Fisheries Service; NMML National Marine Mammal Laboratory; SSL Steller sea lions; U.S. United States

* Permit issuance and expiration dates are provided where available.

Appendix B
Description of Research Methodologies

APPENDIX B

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ACRONYMS AND B-ABBREVIATIONS

ACTH	Adrenocorticotropic hormone
ADF&G	Alaska Department of Fish and Game
ARGOS	Satellite and Information Data Collection System
ASLC	Alaska Sea Life Center
BIA	bioelectric impedance analysis
C	Centigrade
cm	centimeters
CO_2	carbon dioxide
DNA	Deoxyribonucleic Acid
DPS	Distinct Population Segment
ESA	Endangered Species Act
FA	fatty acid
FDA	Federal Drug Administration
ft	feet/foot
g	gram
kg	kilograms
LHX	Life History Transmittors
M	Midazolam
m	meter
mg/kg	milligrams per kilogram
ml	milliliter
mm	millimeter
MMPA	Marine Mammal Protection Act
NFS	Northern fur seal
nm	Nautical Mile
NMFS	National Marine Fisheries Service
NMML	National Marine Mammal Laboratory
NOAA	National Oceanic and Atmospheric Administration
P	pethidine
PTT	platform transmitter terminals
Rs	resistance
SLR	single-lens reflex
SLTDR	satellite-linked time depth recorder
SPOT2	smart position and temperature
SSL	Steller sea lion
STT	stomach temperature transmitter
TDR	time depth recorder
VHF	Very High Frequency
Xc	reactance

1.0 INTRODUCTION

1.1 Objective of Paper

Research on Steller sea lions (SSLs) (*Eumetopias jubatus*) and northern fur seals (NFSs) (*Callorhinus ursinus*) dates back to the early 1900s, but has intensified in recent years with the listing of the SSL under the Endangered Species Act (ESA) and the classification of NFS as depleted under the Marine Mammal Protection Act (MMPA). Many of the research methods used on these two species have evolved over time for several reasons including, but not limited to: availability of better instruments; better understanding of the animals and their behavior; efforts to reduce harm to animals; and improvement of techniques by trial and error. The objective of this paper is to provide an overview of the current research techniques used on SSLs and NFSs, summarize the potential effects of these techniques, and describe the types of information collected using different techniques and how that information may be used.

1.2 Purpose of Research on Steller Sea Lions and Northern Fur Seals

The purpose of the research on SSL and NFS, as stated in the Draft Revised Recovery Plan for the Steller Sea Lion, herein referred to as the SSL Recovery Plan (NMFS 1992a, NMFS 2006a) and Draft Conservation Plan for Eastern Stock of Northern Fur Seal, herein referred to as the NFS Conservation Plan (NMFS 1993, NMFS 2006b), is to promote the recovery of the species' populations to levels appropriate to justify removal from ESA listings and to delineate reasonable actions to protect the depleted species under the MMPA. The need for research is rooted in the fundamental need to understand the species' biology and ecology, especially factors that determine SSL and NFS population growth, such as; rates of reproduction and mortality, emigration and immigration, and incidence and types of predation, parasitism, and disease. These things are in turn functions of factors such as habitat availability and use, behavior, and energetics.

1.3 Information Sources – National Marine Fisheries Service, Websites, Literature

Information gathered for this report was collected from the following sources: applications and annual reports from National Marine Fisheries Service (NMFS) permit holders; websites hosted by the National Marine Mammal Laboratory (NMML), the Alaska Sea Life Center (ASLC), Alaska Department of Fish and Game (ADF&G), and Texas A&M University; and peer-reviewed literature.

2.0 RESEARCH METHODS

2.1 Aerial Surveys

2.1.1 Description of Methods

Aerial surveys are used to conduct counts of SSLs, but are not used to assess abundance of NFSs. The typical protocol used by ADF&G and NMML for aerial surveys involves flying over rookeries and haul-out sites at 100 – 150 knots air speed, a minimum of 150 - 200 meters (m) altitude, and 500 m (1/4 nautical miles [nm]) offshore in order to take 35-millimeter (mm) color photographs and Hi-8 video film for the purpose of counting non-pups present (Calkins and Pitcher 1982, Withrow 1982). Strong winds occasionally require flying at higher altitudes or farther offshore, whereas fog or low clouds sometimes require flying at a lower altitude or closer inshore.

The surveys typically include a single pass over each site, with additional passes made only when the photographers have reason to believe they missed part of the site. Replicate surveys on separate days are occasionally conducted to develop an estimate of the survey variance.

Sea lions are photographed using a 35-mm manual focus single-lens reflex (SLR) camera with motor drives and zoom lenses (70-210 mm or equivalent) and moderately fast (ISO 200 or faster) color transparency slide film. Where appropriate, sequential photographs overlap slightly to guarantee complete coverage of a site. Personnel also photograph each site using a high-resolution 8-mm video camera for back-up imagery. Following the surveys, adult and juvenile sea lions are counted on projected slides in the laboratory. Because altitude and orientation are known, the length of individual animals can be measured and animals are assigned to age and sex classes.

In the late 1990s, researchers began developing a new technique for aerial surveys, medium format color photogrammetry, which allows them to count pups and improve counts of non-pups using aerial surveys (Snyder *et al.* 2001, Fritz and Stinchcomb 2005). The medium format aerial surveys are conducted from directly above each rookery/haul-out site (vertical orientation) rather than from offshore (oblique orientation) as with 35 mm slides. The 2004 aerial survey conducted by NMML of non-pup SSLs was conducted using a 5-inch military reconnaissance camera with motion compensation mounted in the belly of an AeroCommander survey aircraft (Fritz and Stinchcomb 2005). Medium format color photographs were taken from directly above each rookery/haul-out site at an altitude of at least 700 feet (ft). The surveys were conducted between the hours of 0900 and 1700 local time when SSLs are most likely to be on land (Sease and Gudmundson 2002). Counts of SSLs were made from images placed on a high intensity light table with the aid of a dissecting scope (2X to 20X magnification). Comparisons of surveys conducted simultaneously with the 35 mm and medium format techniques (in 2000) indicated that the medium format technique yielded counts approximately 3.6 percent greater than those from 35 mm slides. Population trend analyses have been compensated to account for the difference in resolution from the different techniques (Fritz and Stinchcomb 2005). The ability of the medium format technique to provide counts of pups offers a much less disruptive technique compared to drive counts of pups conducted on land (Snyder *et al.* 2001).

2.1.2 Objectives of Research

The SSL Recovery Plan identified the need for Alaska-wide surveys of adult and juvenile SSLs every year, and a range-wide survey every fifth year. The status of the Alaskan SSL population is evaluated based on aerial surveys of adults and juveniles observed on rookeries and haul-outs during June and July.

2.1.3 Use of Data

Data from these surveys are used to determine the current status of the SSL population for evaluation relative to recovery criteria. These data are also used to evaluate trends by sub-area and site; to study causes of decline, and the efficacy of management actions.

2.1.4 Effects of Research

2.1.4.1 Steller Sea Lions

Disturbance from aircraft traffic has been observed to have highly variable effects on SSLs on land (Calkins and Pitcher 1982). Reactions range from none to complete departure from the haul-out site (i.e., a stampede). Researchers report that the sound change associated with banking of the aircraft increases the likelihood of disturbing the animals. Researchers also report that disturbances caused during aerial surveys are typically minimal; most SSLs appear unaware of the aircraft and less than 10 percent of the animals react at all. The few animals that are occasionally disturbed by the aircraft are usually found in remote regions that experience little aircraft or vessel traffic, or where the physiography of the site acts to amplify the sound of the aircraft.

When SSLs are disturbed off of rookeries, pups may be trampled or abandoned. Juvenile and adult animals can also be injured from running into each other or sliding or crashing into cliff facings or underwater rocks. In addition, excessive metabolic heat from the flight response can put the SSLs in jeopardy.

In two separate instances, captive SSLs jumping from elevations of 4-5 feet landed on the chest area, rupturing the brachiocephalic vein located in the left shoulder area, resulting in a serious or fatal injury (Sweeney 1990). Jaw fractures are also a common result of the flight response, which could affect feeding. Because the physiography of SSL habitat is characterized by rocky outcroppings and steep cliffs, there is a possibility of such injuries occurring.

2.1.4.2 Northern Fur Seals

Although aerial surveys are not used to assess NFS abundance, studies have shown that NFSs could be adversely affected by aircraft noise. Insley (1992, 1993) suggested that aircraft activity could adversely affect NFSs because sound spectra of aircraft noise and airborne vocalizations are similar. He also noted that some NFSs oriented towards aircraft noise during overflights. Johnson *et al.* (1989) reported that aircraft caused a large stampede of bachelor bulls into the water on St. Paul Island and caused little disturbance on St. George Island. Attempts to reduce aircraft disturbance to NFSs include Aircraft Advisory Zones and Requested Aircraft Flight Paths which have reduced overflights of NFS rookeries on St. George and St. Paul Islands (NMFS 2006b).

2.1.4.3 Other Pinnipeds

In general, hauled-out pinnipeds react to airborne sound (and possibly sight) of aircraft by becoming alert and/or rushing into the water. Reactions tend to be most strong if the aircraft is flying low, passes nearly overhead, and causes abrupt changes in sound. Pinnipeds hauled-out for pupping or molting are the most responsive to aircraft. Partial habituation may occur under some conditions (Richardson *et al.* 1995).

Harbor seals (*Phoca vitulina*) often temporarily leave pupping beaches when aircraft fly over and do not always haul-out at the same site when they return to land (Johnson 1977). In Glacier Bay, harbor seals typically reacted strongly to small aircraft at altitudes below 61 m, but overflights above 76 m elicited minor reactions (Hoover 1988). However, harbor seals can also habituate to frequent overflights; for example, aircraft using Vancouver International Airport fly over a haul-out site and the harbor seals show little reaction (Johnson *et al.* 1989).

Ringed seals (*Phoca hispida*) hauled-out on ice often dive when approached by a low-flying aircraft or helicopter (Richardson *et al.* 1995). Born *et al.* (1999) indicate that the disturbance in ringed seals is related to the type of aircraft. Ringed seals entered the water in higher proportions and at greater distances to helicopters than fixed-wing aircraft.

Walrus (*Odobenus rosmarus*) responses to overflights of haul-out sites vary with range, age, sex, and group size, as well as aircraft type and flight pattern. For example, adult females, calves, and immatures are more likely to enter the water than males (Richardson *et al.* 1995). Some walruses raised their heads when a helicopter was over 2.5 kilometers away and some rushed into the water when it came within 1.3 km (Salter 1979). Brueggeman *et al.* (1990) found that 12 percent of walrus groups observed in open waters and 38 percent on pack ice responded to a survey aircraft at 305 m altitude.

2.1.4.4 Cetaceans

Reactions of toothed and baleen whales to aircraft are reported less often than pinnipeds, possibly indicating that airborne sounds from an aircraft are less relevant to marine mammals in the water than to pinnipeds hauled-out on land or ice. When reported, reactions vary from diving, slapping the water, or swimming away. Their overall behavioral state during the overflight influences the disturbance (Richardson *et al.* 1995).

2.1.5 Mitigation

Researchers believe approaching or departing from 1 km or more offshore without banking reduces the incidences of disturbance because the aircraft would only be in hearing range of the animals for one to two minutes. Limiting the frequency of the aerial surveys over individual rookeries and haul-out sites, limiting surveys to times of year when pups are older (less likely to be trampled), or requiring surveys to be flown at higher altitudes may reduce the possibility of adverse effects.

2.2 Vessel Surveys

2.2.1 Description of Methods

Researchers primarily use vessel surveys to re-sight branded or tagged animals. Counts of animals from vessels are typically not conducted for SSLs or NFSs because it is difficult to see the animals from a vessel. Vessels are also used to drop personnel onshore for ground counts and capture/restraint, scat collections, as well as to capture animals using a floating platform trap or underwater lasso (Section 2.5). At each site, a small group of biologists surveys the site from a skiff to determine the best way to approach, herd, and move animals. The skiff approaches the beach and the biologists come ashore as needed for collection of samples or capture of animals.

2.2.2 Objectives of Research

Resights of marked animals are used to estimate vital rates (survivorship, reproduction, and dispersal). Estimation of vital rates is a recovery action within the SSL Recovery Plan, and these estimates, along with population trend, will be considered in evaluating the SSL population's status relative to the Plan's recovery criteria.

2.2.3 Use of Data

Data are used to determine the current status of the SSL population for evaluation relative to recovery criteria. These data are also used to evaluate trends in order to study causes of decline and the efficacy of management actions.

2.2.4 Effects of Research

2.2.4.1 Steller Sea Lions

Researchers primarily use a skiff to survey sea lions from the water to identify marked individuals. To adequately observe whether an individual is marked, researchers require animals to become alert so that their sides (where brands have typically been applied) are visible. This is accomplished by approaching slowly (usually downwind), letting the animals gradually become aware of the researchers presence and by making noise to attract attention. It is not advantageous to the researchers for the animals to enter the water since this makes identifying marked individuals much harder if not impossible. However, occasionally the vessel survey will cause a large number of adult and juveniles to leave the rookery or haul-out and enter the water. If this occurs, every effort is made to minimize the impact through slow approach and withdrawal. This method allows the researchers to gauge the rate at which animals enter the water, to reduce the likelihood of a stampede. The types of impacts associated with stampeding animals are discussed in Section 2.1.4.1.

2.2.4.2 Northern Fur Seals

Few studies have described NFS responses to vessel traffic. Johnson *et al.* (1989) reported observations of NFSs approaching vessels at sea, but also reported that they avoided ships if the ships were engaged in seal hunting. Some evidence suggests that NFSs are curious in the water and may be attracted to vessels, but this behavior may be related to past experiences of individual animals (NMFS 2006b).

2.2.4.3 Other Pinnipeds

Walruses observed by Salter (1979) showed no response when boats with outboard motors approached the haul-out site at distances of 1.8 to 7.7 km. For walruses hauled-out on ice, the probability and type of reaction depends strongly on distance, ship speed, and sound (Richardson *et al.* 1995).

California sea lions (*Zalophus californianus*) in the water tolerate close approach by vessels and sometimes tend to congregate around fishing vessels. They are typically more responsive when hauled-out on land, but rarely react unless a boat approaches within 100-200 m (Richardson *et al.* 1995). Reactions appear to be more common if motor noise varies.

Harbor seals may be displaced from haul-out sites when boats approach within 100 m; less severe disturbance can cause alert reactions without departure (Bowles and Stewart 1980). Some harbor seals returned within an hour and others remained absent for over three hours after leaving a haul-out in response to a boat (Allen *et al.* 1984). In Alaska, most harbor seals pay little attention to fishing vessels at over 200 m away, become alert at 150-200 m, and vacate the haul-out site within 60 m (Johnson *et al.* 1989).

2.2.4.4 Cetaceans

Odontocetes exhibit tolerance of vessel traffic, but may react if confined (e.g., ice, shallow water) or if previously harassed by vessels (Richardson *et al.* 1995). Bottlenose dolphins (*Tursiops truncatus*) commonly approach boats, often swimming in the bow and stern waves (Shane *et al.* 1986). However, boats may alter dolphin behavior. Shane (1990) found that altered behavior was least common when dolphins were actively socializing.

Beluga whales' (*Delphinapterus leucas*) reactions to small vessel approaches range from approach to strong avoidance. The intensity of disturbance varied with the number and speed of boats, the activity and ages, and the location (Blane 1990). Beluga whales react strongly and at long ranges from ships and icebreakers during the spring (Finley *et al.* 1990).

In general, when baleen whales experience low-level sounds from vessels, there is little reaction. When vessels approach whales slowly and non-aggressively, whales tend to exhibit slow avoidance maneuvers. When vessels approach whales with strong or rapidly changing noise, whales often swim rapidly away (Richardson *et al.* 1995).

2.2.4.5 Other Marine Mammals

In Alaska, Udevitz *et al.* (1995) estimated that approximately 15 percent of sea otters (*Enhydra lutis*) along boat survey transects were not detected because they moved away from the approaching boat. Garrott *et al.* (1993) found that some sea otters on shore moved into the water from approach of a small boat traveling parallel to the shore.

2.2.5 Mitigation

By approaching cautiously and monitoring the rate at which adults enter the water, the likelihood of a stampede is decreased, which decreases the possibility of pups getting trampled. Disturbing the adults slowly also allows the pups time to move away from the water, reducing the number of pups entering the water (NMML 2005 Annual Permit Report).

2.3 Ground Surveys

2.3.1 Description of Methods

There are instances where neither aerial nor vessel surveys are desirable or practical for SSL and NFS research. For example, except when using the newer wide-format photography, the resolution of photographs taken during SSL aerial surveys can be inadequate to detect pups reliably on certain sites. Thus, in some instances, personnel come ashore at rookeries to count pups in what are called “drive counts.” Pup counts typically take place during the last week of June through the second week of July at rookeries throughout the range. Pups are counted first by clearing the rookery of most SSLs other than pups. A team of biologists experienced in herding SSLs slowly moves non-pups away from the pups. After the non-pups have retreated, two or more biologists make independent counts of the live (and dead) pups on the beach and in the water.

In some locations, SSLs can also be counted by observers positioned on cliffs above the rookeries at established observation points (Withrow 1982). Animals are then counted and sexed through high-powered binoculars without any disturbance of the animals. Observers typically scan the area and count the number of territorial males or bulls present. The observers next census the number of females, followed by juveniles, and pups. A scan is then made to record the number and sex (if possible) of animals in the water.

NFS adult male counts are conducted by observers overlooking the rookeries (from clifftops, catwalks, and other distant vantage points). NFS pup production estimates have been conducted using the shear-sampling method (York and Kozloff 1987). Pups are marked by shearing a small patch of hair from the top of their heads, which exposes the silver fur underneath and produces an easily identifiable mark. The number of pups marked on each rookery is approximately 10 percent of the most recent pup production estimate for each rookery, and the marking effort is allocated proportionately throughout the rookery according to the distribution of breeding males. After allowing a few days to pass for adequate mixing of the marked and unmarked animals, each rookery is observed from overhead vantage points twice by multiple observers. Recent pup production estimates have been conducted biennially and have included subsampling of rookeries during some years (Towell *et al.* 2006).

2.3.2 Objectives of Research

The SSL Recovery Plan identified the need for surveys of SSL pups at Alaska rookeries every year and range-wide every fifth year. Pup counts obtained during late June and mid-July provide supplemental information on population status, in conjunction with aerial surveys of non-pups and pups. The NFS Conservation Plan identifies the need to continue adult male NFS counts and develop estimates of pup production and survival. Ground surveys are essential to developing census information on NFSs, particularly because aerial photography has not proven to be effective (due to poor resolution of individuals on the terrain, the large abundance and density of animals, adverse weather, and other difficulties. Ground surveys may also include scat collection for use in diet studies.

2.3.3 Use of Data

Data from these surveys are used to determine the current status of the SSL/NFS population for evaluation against recovery criteria. These data are also used to evaluate trends by subarea and site, in order to study causes of the decline, and the efficacy of management actions.

2.3.4 Effects of Research

2.3.4.1 Steller Sea Lions

The possible effects of a stampede are similar to those described for aerial surveys (i.e., serious injuries and mortality). Parturition in SSLs occurs from mid-May until mid-July, with the highest frequency of births occurring in mid-June. Thus, the majority of pups on a rookery at the time that ground counts occur would be a few days to six weeks old. Because the motor skills of pups at this age are not as well developed as in older pups, they would be less likely to avoid getting trampled or knocked into the water if adults stampeded. For those that are knocked into the water, they may not be able to climb the rocky cliffs common to rookeries. For those that are able to reach shore, they may be susceptible to hypothermia and respiratory complications as a result of aspirating water. Pups injured during a stampede may not die from their injuries immediately, as is the case from hemorrhaging or infections.

It is extremely difficult to identify mother-pup pairs repeatedly without external markings. Thus, it is problematic to identify whether a pup has been abandoned unless it is locatable for an extended period of time. Because foraging trips of lactating females may last several days or more (Brandon 2000), it cannot be determined whether a pup has been abandoned as a result of the disturbance or are simply alone due to its mother foraging. Fostering is not known to occur and likely very rare in SSLs; thus the majority of abandoned pups will starve.

The disturbance associated with ground counts can result in aggressive interactions among SSL. When adult animals are displaced from the rookery during breeding season, some males may have to re-establish their territories, increasing the likelihood of aggressive interactions among males and the possibility of injury (Lewis 1987). In addition, other SSLs on the rookery, including pups, may be injured during these aggressive competitions among males. Along with the possibility of physical trauma, heightened aggressive interactions, and resulting psychological effects could result in secondary disease manifestations (Sweeney 1990).

SSL mothers are very attentive, particularly post-partum. Thus, it is important to minimize disturbance at the time of parturition to allow for maternal security.

The magnitude of the disturbance effects may be affected by the number of personnel who come ashore, the amount of time the rookery or haul-out is occupied by researchers, the frequency of these disturbances, and the timing of the disturbance. A recent study by Kucey and Trites (2005) determined that assessing the effects of disturbance on SSLs is extremely difficult, particularly when determining the recovery after disturbance. In addition, no studies have assessed long-term effects of disturbance on SSLs.

2.3.4.2 Northern Fur Seals

The possible effects of ground counts and disturbance on NFSs are similar to those described for SSLs. NFS are not prone to abandoning their breeding areas during the pupping and breeding season. NFS mother-offspring pairs recognize each other's vocalizations during the course of the breeding season and are able to retain those memories for at least four years (Insley 2000). If mother and pup are separated due to disturbance before vocal recognition is established, there is a possibility that they will remain separated and the pup will die. However, vocal recognition is established shortly after birth, and NFS pup production estimates are conducted well after the peak of the pupping season. Adult male NFS counts are conducted during the breeding season, but from vantage points which cause little disturbance and do not cause animals to abandon the rookery.

A detailed analysis of the influence of human disturbance on NFSs has not been undertaken, but experiments conducted by Gentry (1998) indicate that NFSs are resilient to extreme disturbances during the breeding season. They often detect human scent and become more vigilant, but typically do not leave the breeding area. Outside the peak breeding season, mothers will separate from their young once human presence is detected but often return within a few hours (NMFS 2006b). Repeated displacement of females may result in permanent abandonment of sites. Juvenile males are less tolerant of human presence and are displaced from haul-out sites easily (Gentry 1998).

2.3.4.3 Other Pinnipeds

A study by Gazo *et al.* (2000) found that Mediterranean monk seal (*Monachus monachus*) pups washed from their beaches died from multiple skull fractures as a result of impacts against rocks, and those that managed to arrive back onshore still alive probably died shortly thereafter.

A study on the social calls of South American fur seal (*Arctocephalus australis*) mothers and pups revealed that the postpartum fasting period is a critical time for establishing mother-pup bonds (Phillips and Stirling 2001). They use individual calls to reunite and maintain contact in dense breeding colonies. Mothers must learn their pup’s individual call during the days immediately following birth in order to assure recognition and reuniting following foraging trips to sea. Increased disturbance during this critical time period may affect the ability of mothers and pups to reunite after the disturbance or after foraging trips.

2.3.5 Mitigation

To minimize the impacts of pup counts, the following methods are included in the protocol:

- Surveys are not conducted until the end of the pupping season (surveys during late June or later for SSL, August for NFS) after the majority of mother-pup bonds are well established;
- Time occupying the beach is minimized; and
- Only biologists experienced in herding the adults out of the way and experienced counters are used to complete the surveys as quickly as possible.

Additional mitigation measures may include:

- Limiting the frequency of disturbance at individual rookeries (to reduce chronic disturbance) between years and within one year;
- Waiting until pups are at least two months old and more capable of avoiding injury when adults stampede; and
- Conducting pre- and post-activity monitoring.

2.4 Remote Video Monitoring

2.4.1 Description of Methods

Advances in video technology have made it possible to conduct behavioral studies of marine mammals in very remote locations over extended periods of time. The use of remote video recording, including remotely operated cameras at rookeries and haul-outs has increased dramatically in the last decade (Loughlin *et al.* 2005) and has advanced the study of pinnipeds in many ways.

Remotely operated video cameras mounted on land have been used with very good success for collection of behavioral data at SSL rookeries and haulouts in Alaska (Seal Rocks, Chiswell Island, Glacier Island, Benjamin Island), Oregon (Rogue Reef and Orford Reef), and California (St. George Reef) (Loughlin *et al.* 2005) and at NFS rookeries in Alaska (Pribilof Islands). Remotely operated video cameras are typically deployed when most of the animals are absent, or in conjunction with other research, to minimize disturbance. Cameras are mounted at several vantage points to record all or a portion of the rookery or haul-out. Cameras can either record images for periodic retrieval (by removing the recording media) or deliver images in real time to a remote location. For example, the cameras used for the Chiswell Island projects by the ASLC are equipped with 12-18 power optical and digital zoom lenses, mounted in a waterproof housing that includes remotely controlled pan tilt, zoom, and windshield wiper/washer functions. These cameras can be remotely redirected by staff at the ASLC to scan the haul-out area or zoom in on animals of particular interest. Both audio and video signals are sent by cable to a central control tower, which transmits images and sound to a central headquarters at the ASLC in Seward, Alaska for viewing and storage of the data. The cameras and control tower are powered by a 12-volt battery system charged by solar and wind power (Maniscalco *et al.* 2005).

2.4.2 Objectives of Research

The SSL Recovery Plan and NFS Conservation Plan identified the need to monitor the health, condition, and vital parameters of SSLs and NFSs. More specifically, this included conducting intensive studies on rookeries, on vital parameters such as sex and age classes on rookeries, pup production and survival, and observations on maternal care of pups. Objectives of the remote video program are to provide basic information on SSLs/NFSs, the ecological and biological population aspects of SSLs/NFSs, identify marked individuals, develop predictive models on population, and provide data necessary for the conservation and recovery of SSLs/NFSs. The remote video camera technology allows for direct observation of marine mammals in their natural habitat to collect data on these vital parameters, both in real time and by recording for review at a later time. These methods minimize the need for human observers in the field.

2.4.3 Use of Data

Observations on rookeries focus on the breeding biology of these animals, including pup numbers, birth dates, suckling times, maternal care, perinatal period duration, aggressive interactions, foraging cycles, and rookery attendance (Maniscalco *et al.* 2002, 2005; Parker *et al.* 2005; Andrews *et al.* 2005). Changes in the population's vital parameters—such as survivorship, sex ratio, age distribution, and pup production—provide information on the status of the population and source of the decline of the SSLs/NFSs.

2.4.4 Effects of Research

Because biologists are remote from the rookery or haul-out, and observation of SSLs/NFSs occurs from viewpoints overlooking the rookeries, no animals are taken by harassment, disturbance, or capture under remote video protocols.

An indirect effect of the remote video monitoring is primarily associated with installation of the camera and data transmission systems on the rookeries. Installation of cameras is typically done prior to the breeding season to minimize disturbance to the rookery. Maintenance of equipment during the breeding season can lead to some level of disturbance at the rookery, especially if helicopter access is required. Cameras are typically mounted above or on the periphery of the rookery for optimum visibility; therefore, unscheduled maintenance of the camera typically does not require walking through the main breeding areas.

2.4.5 Mitigation

Because there is no measurable disturbance effect of the cameras or transmission equipment on the animals on the rookery or haul-out, mitigation measures are not necessary. However, efforts should be undertaken to ensure that maintenance of the equipment is minimized during critical times of the year. Routes of access to cameras and other equipment for unscheduled maintenance should be determined in advance in order to limit disturbance should maintenance be required.

2.5 Capture and Restraint

2.5.1 Description of Methods

2.5.1.1 On-Land

SSLs are captured by a variety of methods depending on their age, size, and location. Young pups on rookeries can easily be picked up by hand. Subadult SSLs and adult female SSLs can be captured on-land with a large hoop net (3 ft in diameter and 5 ft long handle). Subadult and adult SSLs of either sex can be captured by remotely darting with injectible immobilizing agents. After stalking as close to a target sea lion as possible, drugs are delivered via propelled darts (lightweight, slow-injection darts), which are CO_2 fired and compressed-air actuated (Heath *et al.* 1996, Cattet *et al.* 2006) or blow darts (Telinject USA Inc., Saugas, CA; Haulena *et al.* 2000).to deliver drugs *intra muscularly* preferentially over the hips and tibia lumbar muscle, or into muscle over the shoulders (Haulena and Heath 2001). Telazol (an injectable 1:1 mixture of Tiletamine and Zolazepam) is delivered at dosages of 1.8-2.5 mg/kg (Loughlin and Spraker 1984), though Medetomidine (an alpha-2-agonist sedative) with ketamine or Telazol may also be used for initial sea lion capture (Haulena and Heath 2001; see section 2.6). Captured adults may also then be restrained with inhalable isoflurane (Section 2.6), which is administered via a cone or endotracheal tube for anesthesia if an animal is already otherwise restrained (physically or through injected agents) and is useful for restraint during lengthy handling procedures.

To capture SSLs using a hoop net, one or two biologists approach as close as possible to the target animal before entrapping it in the net. Once captured, the animal is transferred to a fabric restraining wrap used for weighing the animal. The animal may be restrained in this wrap during measurements and while collecting samples, or it may be sedated and/or anesthetized for collection of tissue samples or attachment/insertion of scientific instruments. See Section 2.6 for description of use of remotely delivered immobilizing agents used to capture SSLs.

Another proposed SSL capture method involves the use of lassos. The lasso is placed at the end of a long pole and placed around the sea lion, just anterior to the fore flippers. The lasso tightens as the sea lion moves away from the researchers and the line is retrieved by a waiting crew. This procedure is also used in the water, as described below.

NFSs are also captured using a variety of methods depending on their age, size and location. Young pups on rookeries are typically captured by herding into groups where they can easily be picked up by hand. The pups can be maintained in the groups by placing individuals in strategic places around the pups, or with the use of barricades. Captures of individual pups are accomplished by hand, with a hoop net, or with a noose pole (a small version of that described below for NFS juveniles and adult females). When captured with a noose pole or a hoop net, the pup is gently pulled to the researchers, and released from the capture device (typically less than a minute after being first captured). The pup is then carried to a safe location and restrained by hand or with a neoprene wrap placed around the foreflippers and fastened with Velcro bands to restrict foreflipper movement. The pup is constantly monitored for signs of stress.

NFS juveniles and adult females are captured using a hoop net or a noose pole as described by Gentry and Holt (1982). Noose poles are typically 4 cm x 4 cm (2”x 2” dimension lumber) wood cut to varying lengths. Corners are beveled to an octagonal shape, and a 1 cm diameter, 95-110 cm long rope is threaded through two holes drilled 15-23 cm apart near one end of the pole to create a loop 45-50 cm deep. Researchers approach the rookery, keeping a low profile (low walk or crawl) and moving slowly. Considerable time may be spent during the approach to maximize capture opportunities while minimizing disturbance. The hoop net is placed over the fur seal's body, or the noose is placed over the fur seal's head and the pole is rotated until the loop tightens around the neck; both methods allow a single person to control seals weighing up to 60-65 kg. Two people then carry the fur seal to a safe location. While the fur seal is being moved, its condition is closely monitored to detect signs of stress. NFS juveniles and adult females are then physically restrained on a restraint board (a wood platform with a wooden yoke that closes around the neck. "V" notches are cut in the yoke and lined with foam. The downward pressure provides restraint and prevents the seal from turning its head side to side. The upper blade of the yoke is tied into place with a quick-release knot, and pressure adjusted such that restraint is achieved without restricting blood flow or airway. Additionally, the depth of the lower "V" notch helps to prevent obstruction of the airway. A neoprene wrap is placed around the foreflippers and fastened with Velcro bands to restrict foreflipper movement. The animal is constantly monitored during physical restraint.

2.5.1.2 In-Water

SSLs are captured in the water using the lasso technique developed by the ADF&G or floating cage trap developed by NMML. For the underwater lasso technique, two or three divers, supported by a skiff and a larger vessel, approach a haul-out underwater. The natural curiosity of young SSLs draws them to the divers. After a brief period of accustomization, SSLs will approach close enough that a rope lasso tended by personnel in the skiff can be placed around them by the divers, slightly behind the fore flippers. The lasso is tightened and the rope is retrieved by the skiff crew. Animals are wrapped in a restraining net and pulled into the skiff. Animals are placed into a restraint box aboard the skiff, where they are transported to a larger vessel where they will be immobilized with gas anesthesia for handling, sampling, and instrument attachment.

Researchers may also deploy a floating cage trap. The trap consists of a 12-ft wide buoy with a 12-ft by 12-ft platform for a haul-out surface. There are 6-ft high steel cage walls around the perimeter of the platform, with a wide trap door on one side. SSLs are able to haul-out and return to the water freely through the trap door. To capture SSLs, the trap door is dropped when SSLs are hauled-out inside. Captured SSLs are then transferred into a holding cage on a research vessel. They are moved one at a time from the holding cage into a stainless steel squeeze cage (analogous to handling runs and squeeze cages used for livestock). While in the squeeze cage, the animal is weighed, measured, tagged, branded, and samples are taken. When all the procedures are complete, the squeeze cage is opened and the animal is released. The average handling time is approximately 10 minutes.

Another in-water capture method, similar to those used by Goulet *et al.* (2001) and Small *et al.* (2005) to capture other pinnipeds, involves the use of a modified purse seine with small mesh. The purse seine is closed around small groups of sea lions and a brailer is then used to extract and hoist single animals to the deck, where they can be immobilized. The seine can be released at any time to allow animals to escape. This method has been used for captures of NFS by Japanese researchers.

An at-sea net capture technique, which was developed by Simon Goldsworthy (La Trobe University, Victoria, Australia), can also be used to capture larger juvenile and adult Steller sea lions in remote areas. This technique was originally devised to investigate Australian sea lion (*Neophoca cinerea*) interactions with commercial fisheries, so sea lions that were directly interacting with the fleet were captured. Australian sea lions are attracted to catcher/processor vessels, so the capture team worked on board one of the commercial vessels during the fishing season. A pouched net of trawl mesh is strung from a square frame and fish are attached to the bottom of the inside netting. The mesh size sufficiently small to preclude insertion of sea lion noses or heads, and of material strong enough to support the weight of juvenile to adult sea lions. The net assembly is lowered adjacent to the vessel using a boom and suspended just beneath the water surface to a depth encouraging entrance by sea lions, but allowing visibility to the bottom of the net. After a single sea lion becomes interested in obtaining the fish at the bottom of the net, the boom operator lifts the net out of the water, and the sea lion is brought on board. The sea lion will be placed into a capture cage as is done for underwater noose captures, or placed within a pen (on the deck) and directed into a squeeze cage as is done for floating platform captures. This technique is directly applicable to Steller sea lions, which approach vessels trawling or processing catch during certain times among some fisheries in the Aleutian Islands and Bering Sea.

2.5.2 Objectives of Research

The SSL Recovery Plan and NFS Conservation Plan identified the need to monitor the health, condition, and vital parameters of SSLs and NFSs. More specifically, this included developing indices of condition and obtaining measurements and samples using non-lethal techniques. Animals must be handled in order to measure many of the indices used in assessing these parameters. Thus for these purposes, the objective of capturing animals is to continue ongoing studies of the physical condition of pups and juveniles during and outside of the breeding season (particularly during the winter for SSL). Assessing the condition, status, and foraging behavior of pups as they are weaned and of juveniles that are foraging for themselves is the most direct means to understand this critical time in the animal's life.

2.5.3 Use of Data

These data will provide information on the relative health of the population when compared to results from preceding years and known standards. These data particularly address seasonal changes in the physical condition of SSLs and NFSs, which will contribute to assessing the potential impacts of commercial fisheries and environmental changes on the status of these species.

2.5.4 Effects of Research Methods

Restraint procedures constitute one of the most stressful incidents in the life of an animal, and intense or prolonged stimulation can induce detrimental responses (Fowler 1986). Each restraint incident has some effect on the behavior, life, or activities of an animal. A variety of somatic, psychological, and behavioral stressors can be associated with capture and restraint of wild animals. These include strange sounds, sights, and odors, the effects of chemicals or drugs, apprehension (which may intensify to become anxiety, fright, or terror), and territorial or hierarchical upsets associated with displacement of animals by researchers who come onto rookeries and haul-outs. Animals that are stressed can incur contusions, concussions, lacerations, nerve injuries, hematomas, and fractures in their attempts to avoid capture or escape restraint (Fowler 1986). The stress response can change an animal's reaction to many drugs, including those commonly used for chemical restraint, which can have lethal consequences.

As reviewed in Fair and Becker (2000), the physiological responses in dolphins to capture stress include responsive indicators such as decreased eosinophil counts, imbalances of thyroid hormones, responses to glucocorticoids, and elevations of other blood constituents such as glucose, iron, potassium, and several enzymes. Continuous stimulation of the adrenal cortex, as from stress associated with chronic disturbance or repeated capture, can cause muscle weakness, weight loss, increased susceptibility to bacterial infections, and poor wound healing, and can lead to behavioral changes including increased aggressive and antisocial tendencies (Fowler 1986).

Capture myopathy is a possible consequence of the stress associated with chase, capture, and handling in numerous mammal species (Fowler 1986). Capture myopathy is characterized by degeneration and necrosis of striated and cardiac muscles and usually develops within 7 to 14 days after capture and handling. It has been observed both in animals that exert themselves maximally and those that remain relatively quiet, and occurs with either physical or chemical restraint. Fear, anxiety, overexertion, repeated handling, and constant muscle tensions such as may occur in protracted alarm reaction are among the factors that predispose an animal to this disease. A variety of factors may function in concert or individually. The muscle necrosis is likely due to acidemia resulting from a build up of lactic acid following profound muscle exertion: once necrosis has occurred, the prognosis for recovery is not favorable. The number of times an animal is captured, the method(s) of restraint, as well as the age and general condition of the animal are all factors that will affect an animal's response to capture.

The annual reports from the current and previous permits held by NMML and ADF&G indicate that some animals showing distress and/or adverse reactions to drugs or handling that were not immediately released, subsequently died. The annual reports also state that most SSLs (pups, juveniles, and adults) typically struggle initially upon capture, but calm down quickly after being hand-restrained. Additionally, Johnson *et al.* (2004) concluded that the underwater noose method is a safe way of capturing juvenile Steller sea lions, along with the use of isoflurane anesthesia.

2.5.5 Mitigation

To minimize the impacts from capture/restraint, the following methods may be used:

- Pups are processed in small groups. Prior to handling, a small pod of pups is rounded up. These animals are allowed to rest before handling, are watched for signs of distress, are prevented from piling on each other, are kept cool, and animals showing signs of distress are released.

- Pups are restrained by hand, not with a restraint board. The primary handler is always an experienced biologist who monitors the pup for signs of stress.

Methods and equipment for capture/restraint are constantly being refined to limit the amount of stress and reduce any potential pain and suffering associated with the capture. Underwater captures of SSL have greatly reduced the potential for injury compared to land-based captures and have facilitated faster handling times. Efforts to approach or handle a particular animal are immediately terminated if there is any evidence that the activity(ies) may be life-threatening.

2.6 Anesthesia Sedation, and other Drugs

2.6.1 Description of Methods

In order for drugs to be administered, including general anesthesia, to SSLs or NFSs, they must first be captured and restrained (Section 2.5). Occasionally, administration of anesthesia to animals, as well as other drugs, is done through the process of darting without, or prior to, the previous use of capture and restraint (Section 2.5).

Delivery of drugs, including general anesthesia, to marine mammals can be difficult due to their particular anatomical and physiological specializations, as well as the operational logistics precipitated by the marine environment they inhabit. These intricacies are complicated further because determining the proper dosage, which is primarily a function of age, weight, and health, is often difficult. The proper dosage is vital to not only the success of the drug, but also the survival of the animal itself, as overdoses can have lethal consequences (Fowler 1986). Estimation of body mass, which is used to calculate drug dosage, can be done with an accuracy of ±20 kilograms (kg) by an experienced biologist (Loughlin and Spraker 1989; Heath *et al.* 1996). The effective dose of a particular agent varies with species.

Both the safest and most effective site for the insertion of darts, or projectile syringes, is in the deep muscle tissue areas of the hind limbs. For proper absorption and function, the drug should be injected into muscle tissue. However, the blubber layer of pinnipeds can make delivery of an injection to the muscle difficult. The usual induction time for most chemical agents is 10 to 20 minutes following an intramuscular injection (NOAA Fisheries 2005c).

2.6.1.1 Atropine (pre-anesthetic)

Atropine, a naturally occurring alkaloid of Atropa belladonna, is a prescription drug that can only be obtained from a veterinarian. Atropine is a premedication for anesthesia and is usually administered intramuscularly (at about a 0.02 mg/kg dose for California sea lions) about 10 minutes prior to use of immobilizing agents (Haulena *et al.* 2000). Atropine reduces salivation and gastric and upper respiratory tract secretions (Anderson 1982), and in pinnipeds, is usually administered in doses of 0.005 mg/kg (Sweeney 1974). Atropine is a muscarinic-receptor antagonist, meaning that it blocks parasympathetic stimulus to reduce heart rate. This slow heart beat rate, or bradycardia, is an important element of the cardiovascular dive response that is sometimes mimicked during Telazol anesthesia. Thus, atropine can reduce the cardio-respiratory problems associated with the use of Telazol (Calkins 2004).

<u>Effects</u>

The administration of Atropine can result in the accumulation of fluid in the lungs and has been described as the cause of death in two immobilized gray seals (Baker and Gatesman 1985). Also, as with any procedure that breaks the epidermal layer, there is a risk of infection.

2.6.1.2 Telazol

Telazol, a proprietary (Fort Dodge) combination of tiletamine and zolazepam, is a prescription drug that can only be obtained by a veterinarian. It belongs to a class of drugs known as dissociative hypnotics, is similar to phencyclidine, and works by disrupting the central nervous system. Telazol serves as a general anesthetic (or to induce sedation prior to administration of anesthesia) that provides immobility and muscle relaxation, which results in a state suitable for various diagnostics interventions. While the zolazepam component of Telazol has a reversal agent, the tiletamine component does not.

<u>Effects</u>

Telazol is generally safe, but can cause substantial side effects in some animals, like those with hypersensitivity, heart, lung, or kidney disease. Extending immobilization by administering repeated doses of injectable agents is associated with a high risk of mortality, and an additional dose of Telazol should never be given (Gage 1993). A study reported that out of 51 adult female SSLs that were immobilized with Telazol between 1992 and 1994, there were 5 deaths (9.8 percent) (Heath *et al.* 1996). Two SSLs drowned in pools of water on the rookery and another death was the result of a malfunction with the gas anesthesia machine. Only two of the mortalities were due to Telazol complications: 1) in February 1993, under permit No. 771 (64) issued to NMML, an adult female that was darted with Telazol died; and 2) under that same permit and timeframe, a pup died after it was mistakenly darted with Telazol when it moved in front of the target animal. This mortality was apparently the result of the unintentional intravenous injection of a drug intended for intramuscular injection in a larger animal (Merrick 1993). Also, in one study, about 10 percent of animals administered Telazol were observed to become apneic (stop breathing) within five minutes of administration (Gage 1993). Between 1995 and 1997, however, Calkins was involved in 31 Telazol immobilization attempts, and encountered only one (3.3 percent) mortality (R.B. Heath, personal communication). This reduction in mortality could be attributed to the addition of atropine sulfate to Telazol in the injection dart (see relationship between atropine and Telazol described in 2.6.1.1; Calkins 2004).

Another possible effect concerning the administration of Telazol is the effect on the fetus or pup, as it has been shown to cross the placental barrier (Telazol drug information sheet; CI 5129-1; Fort Dodge Animal Health, Fort Dodge, IA).

2.6.1.3 Midazolam

Midazolam is proprietary (Versed) benzodiazepine sedative that depresses the brain, likely through a reduction in serotonin levels. It is a prescription drug that can be obtained legally by a veterinarian as an extra-label drug, even though it is not approved for animal use by the Federal Drug Administration (FDA). Midazolam is often used with other drugs to ease an animal in and out of anesthesia. Midazolam (M) was administered with pethidine (P) (M:P = 0.22:1.1 mg/kg) in three leopard seals (*Hydrurga leptonyx*) and resulted in manageable sedation levels, but a combination of tiletamine and zolazepam (i.e., Telazol) appeared to be more effective (Woods *et al.* 1994a).

Effects

Midazolam is generally safe, but can cause side effects in some animals, such as those with a hypersensitivity to the drug. Midazolam usually will result in disorientation associated with sedation, but can actually induce a paradoxical reaction of excitement in some animals. Administration of Midazolam (with pethidine) has resulted in apneic condition and eventual death of crabeater seals (*Lobodon carcinophagus*) in Antarctica (Tahmindjis *et al.* 2003). Although, one study reported several potential advantages of Midazolam over Diazepam (i.e., Valium): water solubility, high lipophilicity at physiologic pH, and rapid metabolism (Reves *et al.* 1985). Also, if injected, as with any procedure that breaks the epidermal layer, there is a risk of infection.

2.6.1.4 Isoflurane Gas

Isoflurane gas, a halogenated ether, is an inhaled general anesthetic that precipitates reversible depression of the central nervous system, which results in unconsciousness, voluntary muscle relaxation, and inhibition of reflex activity (Fowler 1986). Inhalation anesthetics, such as isoflurane gas, are used to induce anesthesia in animals that can be manually restrained and are often used to increase the depth of anesthesia in animals previously immobilized by an injected agent (NMFS 2005b).

Effects

The effects of inhalation anesthetics, like isoflurane gas, appear to be relatively predictable with increased doses, which is different from injectable agents that often are unpredictable and variable when used on animals (Fowler 1986). Heath *et al.* (1996) reported that one SSL died because of a malfunction in the gas anesthesia machine. Overall, animals in captivity have been observed to fully recover from anesthesia with isoflurane after 8 hours (Gage 1993). Johnson *et al.* (2004) concluded that the use of isoflurane is a safe method for the restraint of juvenile Steller sea lions, along with the underwater noose method of capture. In general, isoflurane gas appears to have the best recovery characteristics, and it is safe and reliable in otariids (Haulena and Heath 2001).

2.6.1.5 Diazepam

Diazepam (valium) is a benzodiazepine that depresses the brain, probably through a reduction in serotonin levels. It is a prescription drug that can be obtained legally from a veterinarian as an extra-label drug, even though it is not approved for animal use by the FDA. Diazepam is usually injected intramuscularly (at a dose of about 5 milliliters (ml) /100 kg for SSLs) and is often used with other drugs to ease an animal in and out of anesthesia. It is metabolized slowly by the liver and excreted by the kidneys; clinical effects generally disappear within 60 to 90 minutes (Fowler 1986). Diazepam is often used during the capture and restraint, tagging, and blood and tissue collection processes (NMFS 2005b).

Effects

Valium is generally safe, but can cause side effects in some animals, such as those with an illness or a hypersensitivity to the drug. Possible side effects include bradycardia (slowed heart rate), respiratory depression, tremor, confusion, blurred vision, nausea, vomiting, depressed gag reflex, lethargy, and ataxia (inability to coordinate muscle activity during voluntary movement) (NMFS 2005c). Generally, Diazepam should not be administered long-term. It usually will result in disorientation and weakness associated with sedation, but can actually induce a paradoxical reaction of excitement in some animals. In one study, Diazepam was safely administered with ketamine, but resulted in apnea and entire-body shaking (Woods *et al.* 1994b). The additional effects of injecting Diazepam are probably incidental, relative to the capture and restraint, but have the potential to be serious and as with any procedure that breaks the epidermal layer, there is a risk of infection.

2.6.1.6 Flumazenil (Anesthetic Reversal for Midazolam)

Flumazenil reverses the sedative effect of benzodiazepines (e.g., Midazolam). At a dose of approximately 0.001-0.003 mg/kg, Flumazenil has been successfully administered to reverse sedation for crabeater seals in Antarctica (Tahmindjis *et al.* 2003).

Effects

The additional effects of injecting Flumazenil are probably incidental, relative to the capture and restraint, and usually do not present the same potential risk as the administration of drugs that depress the brain (i.e., Valium) or inhibit the central nervous system (i.e., Telazol). However, Flumazenil can result in convulsions and other side effects, if it is used to try to reverse the effects zolazepam (one of the two principal components of Telazol) without reversing tiletamine (the other component of Telazol) (NOAA Fisheries 2005c).

Due to its nature as a benzodiazepine receptor antagonist, Flumazenil has been suggested as an antidote to benzodiazepine (i.e., Midazolam) overdoses. However, when Flumazenil (as well as adrenaline and doxapram) was administered to two crabeater seals in response to apnea induced by supplementary doses of Midazolam and pethidine, the two seals did not respond positively and died (Tahmindjis *et al.* 2003).

2.6.1.7 Synthetic Adrenocorticotropic Hormone (ACTH)

Adrenocorticotropic hormone (ACTH) stimulates the adrenal cortex and is used to evaluate adrenal function and screen for problems with the adrenal glands (Gulland *et al.* 1999). ACTH causes the adrenal glands to release hormones including cortisol, which helps to manage stress. Gulland *et al.* (1999) found that an injection of ACTH in free-living seals induced a significant increase in mean plasma cortisol, but not of mean aldosterone levels, 60 minutes after injection. Synthetic ACTH is in the form of cosyntropin, which has the tradename Cortosyn.

Effects

Administration of ACTH can result in side effects such as bradycardia (slowing of the heart rate), tachycardia (increasing of the heart rate), hypertension, and/or rash. Also, as with any procedure that breaks the epidermal layer, there is a risk of infection.

2.6.2 Objectives of Research Methods

Anesthesia sedation, and other drugs, are primarily used for immobilizing SSLs for branding procedures. Immobilization of SSLs and NFSs can also be used as an opportunity to collect vital statistics (i.e., length and weight), conduct physiology studies, and perform other procedures such as ultrasound, tooth extraction, and tagging.

2.6.3 Use of Data

The research methods associated with anesthesia, sedation, and other drugs will produce data that will make a contribution towards the recovery of SSLs and NFSs in particular, and advance the knowledge of marine mammals in general. Moreover, the ultimate reasoning for much of the current research is summarized as three objectives in the SSL Recovery Plan. The objectives are as follows: 1) the collection of information on status and vital rates, 2) research programs to collect information on the remaining threats to recovery, including fisheries and other anthropogenic factors, and 3) the implementation of conservation measures to remove impacts of remaining threats to recovery.

2.6.4 Effects of Research Methods

For the specific effects of a particular agent, please refer to the corresponding section of the previous discussion (Section 2.6.1). The effects of research methods may vary depending on which marine mammal receives the agents, but the differences are not likely to be substantial.

Thus, the following discussion of research methods effects, as well as the previous analysis of various individual drugs, can be applied to marine mammals in general. The administration of drugs is an additive process that begins with the previously mentioned capture and restraint, and its corresponding effects, and then progresses to the administration process and its associated effects.

Under many circumstances, it is probable that the actual capture and restraint of the animal would have a greater proportional impact to aggregate effects than the administration of drugs. Also, sometimes the administration of agents is actually part of the capture and restraint process (Section 2.5). The stress response induced by the capture and restraint process can change an animal's response to many drugs, including those commonly used for chemical restraint, which can have lethal consequences (NOAA Fisheries 2005c). Unintentional injection of drugs into the blubber often results in aseptic necrosis, which is usually the result of the blubber not being well vascularized and can sometimes lead to abscesses (Geraci and Sweeney 1986; Fowler 1986). Subsequently, the subcutaneous administration is usually problematic in marine mammals. One problem associated with subcutaneous drug administration is the possibility of accidentally injecting drugs subdurally (beneath the dura, a fibrous membrane covering the central nervous system) when trying to inject into the extradural vein (Stoskopf 1990).

Also, in some situations an intravenous injection instead of intramuscular can mistakenly occur, which can be problematic. Injections into the chest cavity or stomach region can result in puncture of the lungs or stomach, which can lead to the death of the animal. Also, the lag between the time a drug is administered and when it takes affect (10-20 minutes for most agents) creates a dangerous situation because an animal can be startled by the darting and move into the water before the immobilization has taken affect. The animal then could drown after the agent has become fully active.

Hyperthermia can occur in animals under anesthesia because blubber can make heat dissipation a problem. Otariids over 25 kg tend to become hyperthermic during anesthesia even at cool ambient air temperatures (Gage 1993). Because many drugs can affect thermoregulation, hypothermia is also a possible result of the administration of chemical agents.

2.6.5 Mitigation

There have been numerous steps taken to mitigate potential adverse impacts associated with administration of certain agents. Some of these attempted mitigation measures include:

- Adding atropine sulfate to Telazol in the dart has helped to reduce the cardio-respiratory complications of Telazol (Calkins 2004).

- Improving gas anesthesia machines, which have resulted in SSL deaths due to malfunction (Heath *et al.* 1996; Calkins 2004).
- Excluding SSLs close to shoreline, as they can be frightened into the water by the darting and then drown as they become immobilized (Calkins 2004; Woods *et al.* 1994b).
- Allowing only qualified veterinarians, or other personnel with necessary experience, to perform procedures and administer agents (Calkins 2004).
- If a SSL dies, ceasing subsequent research until qualified personnel can review the incident (Calkins 2004).
- Providing for a pup left behind due to the death of the mother. The pup should be handled in a humane manner in consultation with NMFS regional office and ASLC veterinary staff (Calkins 2004).
- Realizing that during target research months in which a female might be pregnant (June through August), the embryo will be at the arrested blastocyst stage and thus the effects from a drug like Telazol would be negligible (Calkins 2004).

- Increased availability of resuscitation equipment and monitoring equipment, e.g. pulse oximeters, carbon dioxide monitors, heating and cooling devices.

2.7 Temporary Marking: bleach, dye, paint, and hair shearing

2.7.1 Description of Methods

The protocol for temporary marking of animals using paints, hair bleaches, and dyes has been used successfully to mark many species of wildlife including marking individual SSLs and other pinnipeds (Hobbs and Russell 1979; Melin *et al.* 2006). Bleaches remove pigments from hair whereas dyes add pigment to the hair. Temporary marking techniques, similar to permanent marking, initially involve the capture and restraint of animals, usually a pre-weaned pup (Section 2.5). The purpose of temporary marking is generally similar to permanent marking: to identify an individual from a relatively long distance without having to recapture or disturb it multiple times. However, because pinnipeds molt annually, these marks are only good for a period of several weeks to several months. In some cases, bleached hair will last for up to a year (Gentry and Holt 1982).

The techniques for creation of these temporary marks depend on the type of hair bleach, paint, or dye used. The time of year, weather during application, wetness of the pelage, and the amount of drying time before the animal enters the water, are all factors in the longevity of these temporary marks. The success of these substances to mark individual animals also depends on the ability of the substance to adhere to wet fur or hair. One of the advantages of using paints or dyes is that they can be applied by hand, or remotely by a carbon dioxide (CO_2) gun that propels paint-filled pellets. Paint-filled pellets can also be used on mature adults too large to capture and restrain.

A drawback of this type of marking is that it does not allow for long term identification of the individual and is very limited in application. The firing of pellets has potential drawbacks in that researchers need to be relatively close to the target animal to be accurate.

Shearing of hair or fur to create temporary marks is useful in situations where short-term identification of a few individuals or a group of individuals is needed. Hair in a prominent part of the body can be sheared in the form of letters or numbers, or a single patch can be removed. With NFS, hair shearing removes the outer guard hairs to expose the light inner pelage and leaves a lighter colored patch.

If animals can be captured and restrained, paints, bleach, and dyes can be used to make unique alphanumeric marks on their fur. The marks need to be made large enough to be easily read from a distance. Large color marks of numbers and letters are painted on the sides of NFSs using human blue hair dye. Within 2-3 days, bright beige to dark orange color appears in the affected area of the pelage (Gentry and Holt 1982). Capture and restraint likely involves more stress to the animal than remote marking, and may cause incidental disturbance of other seals at the rookery.

2.7.2 Objectives of Research Methods

The SSL Recovery Plan identifies the need to monitor the health, condition, and vital parameters of SSLs. More specifically, this includes conducting intensive studies on rookeries in order to develop indices of condition and obtaining measurements and samples using non-lethal techniques. The NFS Conservation Plan identifies the need to continue census of adult males and estimates of pup production and survival. The objective of temporary marking by these methods is for short-term identification of individual animals for purposes of census activity, behavioral studies, and collection of data on vital parameters such as survival, reproductive success, and site fidelity.

2.7.3 Use of Data

2.7.3.1 Steller Sea Lions

Temporary marking of individual animals can be used for many of the same purposes as permanent marking techniques, but to a much more limited extent. For short term investigations at rookeries and in coordination with remote video camera studies, temporary markings of individuals can substitute for more permanent markings and cause less stress on the animals.

2.7.3.2 Northern Fur Seals

On the Pribilof Islands, highly visible temporary marks are placed on captured animals in addition to other more permanent marking such as tags (Gentry and Holt 1982). This allows for better re-sighting of tagged animals from a distance.

Census of NFSs up to the late 1950s relied on direct pup counts. Beginning in 1960, more sophisticated mark-recapture studies were developed to estimate pup production. Experimenting with different methods resulted in the use of marks and tags to help estimate numbers, and in 1963 the method of shearing a small patch of guard hair from the pup’s head to expose the light underfur was instituted (Chapman and Johnson 1968). The sheared pups were used as a method for estimating total numbers of pups in the rookeries (Antonelis *et al.* 1988; York and Towell 1997).

During rescue of entangled two to four year-old male NFSs, animals captured are shear-marked, by cutting the guard hairs using hand-held shears to expose the lighter under-fur. These shear-marked NFSs can be resighted during subsequent searches and round-ups, and provide some evaluation of the success of the disentanglement efforts and overall degree of entanglement during the round-up period (Gentry and Holt 1982).

2.7.4 Effects of Research

Similar to other methods of marking, animals have to be initially captured and restrained prior to application of marking substance or use of shears. Effects are generally due to capture and restraint, similar to other marking methods (Section 2.5). Because these methods are noninvasive, no anesthesia is required.

2.7.4.1 Steller sea lions

Temporary marking of SSLs with bleach, paints, or dyes has not been identified as affecting survival of pups or adults. Toxicity of the marking substance is potentially an issue in that it can be removed during grooming and be ingested by the target animals or others nearby (Hobbs and Russell 1979).

For marking using shears, there have been no reported observations of physical injury or thermal stress in association with this technique (Gentry 1979).

2.7.4.2 Northern Fur Seal

With NFSs in the Pribilof Islands, quick-drying rubber-base highway paint or plastic resin naphtha-based paints have been used to create temporary markings (Gentry and Holt 1982). However, examination of the areas marked with naphtha-based paints shows that the growth of both guard hairs and underfur were affected by the procedure; therefore, this paint was not recommended for further use on NFSs (Gentry and Holt 1982).

Shearing has been extensively used for temporary marking at NFS rookeries in the Pribilof Islands. There is the potential for some degree of thermal stress in marked animals, although there have been no observations of this so far (Gentry 1979).

2.7.4.3 Other Pinnipeds

Using bleach paints or dyes to mark individual harbor seals is a common practice for many pinniped species such as harbor seal, Hawaiian monk seal (*Monachus schauinslandi*), and elephant seals (*Mirounga angurostris*) (Farrell and Jennings 1979; Gentry 1979; Henderson and Johanos 1988). No adverse effects of these temporary marking procedures were reported.

2.7.5 Mitigation

Mitigation of potential effects of temporary marking procedures is similar to that for other marking procedures requiring capture and restraint of the target animal. Efforts to reduce the direct effects of bleach, paints, and dyes include:

- pups that are very young or in poor physical condition (under 20 kg) should be marked only with hair-clipping procedures;
- use of non-toxic substances is preferred; and
- CO^2 – use of fired paint or dye pellets should be limited to short distances to maximize success and limit contamination of the area from missed pellets.

2.8 Flipper Tagging

2.8.1 Description of Methods

Animals captured (including pups) may be marked with tags for future identification. Numerous plastic tags are available from commercial livestock sources in a variety of sizes, colors, and identifying symbols or numbers. In SSLs and NFSs, the tags are affixed through a fore-flipper, anteriorly, in loose skin, near the area where the flipper meets the body. In most cases, each animal receives two tags, one per flipper, to minimize the chance of losing the ability to identify the animal should one tag be lost. Flipper tags are subject to extreme physical abuse which may contribute to tag loss.

2.8.2 Objectives of Research

Flipper tagging positively identifies individual animals but tags can be lost and thus recapture and retagging may be necessary to maintain the mark. The objective of temporary marking by these methods is for short-term identification of individual animals for purposes of census activity, behavioral studies, and collection of data on vital parameters such as survival, reproductive success, and site fidelity.

2.8.3 Use of Data

Because the tags are not typically visible from a distance, recapture may be required to read the tag. This technique is useful as a secondary mark on animals tagged with other methods.

2.8.4 Effects of Research

2.8.4.1 Steller Sea Lions

These tags are best considered semi-permanent markers as they can and do pull out because SSLs use their foreflippers in both aquatic and terrestrial locomotion. In addition, due to the effects of capture and restraint (described in Section 2.5), it is likely that affixing these tags causes more than momentary pain. There is a potential for infection at the wound site or when a tag pulls out of the flipper. In moving about a rookery or haul-out site, there is the potential for a tag to be torn out of the flipper. According to the permit reports, no tag-related mortality has occurred. Merrick *et al.* (1996) reported that flipper tags can become difficult to read as the colors/markings fade over time and that they are not readily visible from any distance. In addition, the gregarious nature of SSLs causes them to group together and obscure the flippers. There is no information on long-term tag retention, average retention rates, or rate of infection caused by flipper tagging in the annual reports from NMFS permit holders.

2.8.4.2 Northern Fur Seals

A study conducted by Trites (1991b) assessed the effects of tagging and handling on NFS pups and found that tagging too early does not alter growth rates, as had been previously suggested (Roppel 1984), but that smaller pups were selected for tagging because they were more easily accessible. The other potential effects of tagging on NFSs would the same as those identified for SSLs.

2.8.4.3 Other Pinnipeds

A study of the effects of flipper tags on Hawaiian monk seals in which tagged pups and untagged pups were treated in a similar fashion, revealed that the tagged pups experienced no increase in mortality over the other group and showed similar behavioral traits as the untagged pups after 32 weeks (Henderson and Johanos 1988).

2.8.5 Mitigation

Care is taken to avoid placing the tag in an incorrect location: if the tag is too low, the animal will walk on it, if the tag is too high, it will irritate the flank area. Only qualified personnel with sufficient experience in this technique should be allowed to perform these procedures. It is also recommended that only animals believed to be in optimal health be captured and subjected to this procedure.

2.9 Hot-brands

Hot-branding for permanent marking of pinnipeds has been successfully used since the early 20th century (Wells 2002). The practicality of hot-branding as a means of permanently marking pinnipeds in the wild has been demonstrated in several studies (Hobbs and Russell 1979; Calkins and Pitcher 1982). Rigorous resighting efforts are essential components of successful branding programs. Currently, hot-branding is used to mark SSLs, but it is not used on NFSs.

2.9.1 Description of Methods

The protocol for permanent marking of animals using hot-branding involves capture and restraint of animals, anesthesia, and the application of a hot-branding iron to the skin of captured animals to kill the hair follicles and pigment-producing cells. This creates a permanent bald brand with large visible numbers and letters that can be seen and used to identify an individual from a relatively long distance without having to recapture or disturb them multiple times (NMFS 1993a). Hot-branding is a preferred method of permanently marking pinnipeds (Gentry and Holt 1982; Merrick *et al.* 1996; NMFS 2002). However, this technique is currently not used to mark NFSs because of difficulties in reading the brands and concerns about permanently exposing bare patches of skin on this species.

The great majority of SSLs are branded as pups because they are relatively easy to capture and handle but, more importantly, their age and natal site are known. Resighting data from these animals in future years provides critical life history information and the means to track regional differences in population structure. The process of branding SSL pups on rookeries involves slowly herding juvenile and adult animals away from selected areas of the rookery and corralling small groups of pre-weaned pups against a cliff or boulders where they are taken one by one to be weighed, measured, anesthetized, and branded. Only pups larger than 20 kg are branded to avoid affecting very young pups. Pups are restrained by hand and administered gas anesthesia (isoflurane) through a mask to render them unconscious. This reduces pain and stress on the pups and improves the quality of brands by preventing movement during branding. NMFS and ADF&G have been using anesthesia on pups for branding since 1993.

Commercial branding irons have been found to be unsuitable for SSLs; therefore, specifically designed brands have been developed to minimize injury to the animals and to maximize the readability of the marks (Merrick *et al.* 1996). Rounded steel (rolled steel stock) is used for the brand materials because it is believed that square steel used in commercial brands would tend to burn the edges of the mark, making the area slow to heal, scab over and produce a blurred brand mark (Merrick *et al.* 1996). The shaft of the brand is approximately ½ inch thick with a wooden handle. A pair of locking pliers on the shaft is also used as a second handle. The branding irons are heated to red hot with a portable propane forge and applied perpendicularly to the animal’s shoulder with light, even pressure for 2-4 seconds. Each brand has a unique letter and number combination with a different letter designated for each rookery. Brand characters are approximately 5 cm wide by 8 cm high and are spaced 4-5 cm apart to insure clarity of numbers. A 3-digit brand requires about 1-2 minutes to complete. Brands on SSLs in Oregon used numbers slightly larger (6 cm by 10 cm) (NMFS 1992). Brands of this general size have been found to be sufficient to be visible at 100 m with 7 X binoculars (Merrick *et al.* 1996). NMFS, ADF&G, and ASLC currently brand animals on only one shoulder, the left side, to minimize handling time and affected skin area.

2.9.2 Objectives of Research

The SSL Recovery Plan identified the need to monitor the health, condition, and vital parameters of SSLs (NMFS 1992). More specifically, this included conducting intensive studies on rookeries in order to develop indices of condition and obtain measurements and samples using non-lethal techniques. The NFS Conservation Plan identifies the need for studies on the long-term survival and reproduction rate and on the general condition and health of NFS populations (NMFS 2006b). Permanent marking and resighting of individuals is an effective technique in these types of studies but is currently only used for SSL.

2.9.2.1 Steller Sea Lions

The purpose of hot-branding SSLs is to be able to identify individual animals in the populations and follow the survival, reproduction, and movements of these individuals through resighting (Merrick *et al.* 1996). The branding and resight program is designed to provide age-specific survival rates for both the eastern and western Distinct Population Segments (DPSs) with the ultimate goal of identifying the age and sex of highest mortality which may facilitate identification of reasons for decline in abundance. The program also provides regional age-specific reproductive rates, dispersal from natal rookeries by age and sex, site fidelity, and validation of genetic stock dispersal models.

2.9.2.2 Northern Fur Seals

Branding has been attempted on NFS in the past (Gentry and Holt 1982, Melin *et al.* 2006) but is no longer used as a marking technique for this species. Animals must be physically restrained or chemically immobilized while the brand is applied. Hot-branding of NFSs was complicated by the thick guard hairs and underfur, which had to be removed before branding the skin. Three or four applications of the hot iron were sometimes necessary before the brand contacted the skin directly (Gentry and Holt 1982). Bald brands (either cold or hot) are not viable for NFS and could have serious consequences because they rely on their pelage for thermoregulation. Removal of the guard hair and underfur to create a visible mark would compromise the thermoregulatory capabilities of the animal and could pose health risks due to heat loss (Melin *et al.* 2006). Branding of pre-weaned pups and resighting these animals as two- or three-year-olds had limited success in the 1980s (Gentry 1998).

2.9.3 Use of Data

2.9.3.1 Steller Sea Lions

Data from resighting of branded animals are useful in determining seasonal use and movement patterns, dispersion from natal sites, site fidelity and distribution and dispersal of SSLs. Collecting useful data on each of these parameters requires marking animals at several sites over multiple years. Using consistent resighting methods is also an essential part of the branding program. To this end, ADFG and NMFS have convened two workshops to develop brand resight protocols and methods to assure data and analysis compatibility from all land-based and vessel-based observers, develop training materials for observers, and develop standardized data entry forms to be used by all observers. Data from resighting of individual animals have been instrumental in the separation of the western and eastern DPSs, documenting seasonal movement, immigration and emigration of animals between haul-out and rookeries, site fidelity, and in determining age-specific survival rates. Data are routinely distributed among all researchers conducting brand resighting work so that the central database of marked animals is kept up to date.

2.9.3.2 Northern Fur Seals

Hot-brands were used to permanently mark NFSs for behavioral studies on the rookeries in the past and some branded animals were followed for five years (Gentry and Holt 1982). Because NFSs move offshore after the breeding season, the potential for re-sighting animals away from the colonies is limited.

2.9.4 Effects of Research

2.9.4.1 Steller Sea Lions

Animals are anesthetized before branding so there is no pain during the initial procedure. However, the procedure produces burns that penetrate the entire outer layer of the skin and into the inner skin layer, causing blisters, swelling, and fluids to seep from the burned area. These wounds likely produce some pain but pups released after branding do not show obvious signs of distress (Merrick *et al.* 1996). Mellish *et al.* (2007) used captive juvenile SSLs to examine physiological responses to hot branding. They found no elevation in cortisol levels (an indicator of stress response) at any time during the monitoring period (two to seven weeks), including 90 minutes after branding, indicating that physical stress from the procedure was temporary. As with any open wound, there is the potential for infection of the burned area, especially with the unsanitary conditions on rookeries and haul-outs (NMFS 1992). Mellish *et al.* (2007) found statistically significant increases in white blood cell count, platelet levels, globulin and haptoglobin concentrations up to two weeks after branding, indicative of immune system responses. The changes in health parameters after branding were consistent with responses to minor tissue trauma and all parameters were indistinguishable from baseline levels after seven to eight weeks. Mellish *et al.* (2007) concluded that branding does not appear to have any lasting physiological effects that might lead to impaired function or mortality.

There is risk of injury or death from the process of capture, restraint, and anesthesia of animals before branding (see section 2.5 and 2.6 in this appendix). Essentially all observed mortality associated with branding of pups involves pups drowning in pools or getting suffocated under piles of other pups during roundups rather than the branding procedure itself. After branding, some injuries to pups could occur from trampling when adults return to the rookery or when a pup comes too close to a lactating female that is not its mother and is rejected. However, one study of branded and unmarked pups on Marmot Island found no differences between the survival rates of branded and unmarked animals after nine months (Merrick, *et al.* 1996).

Hastings *et al.* (in review) conducted a mark-recapture study on Lowrie Island in southeast Alaska that examined survival rates of pups after branding was conducted on some portions of the rookery. This study found that weekly survival rates of branded pups was nearly identical to estimates from a control group of unbranded pups at an undisturbed part of the rookery. Assuming there was no natural mortality in the two weeks after branding, the data from this study indicate that the potential mortality attributable to the branding event was five to six animals out of 1000. However, pups (both marked and unmarked) are often found dead on rookeries so this estimate of branding mortality is probably high. Based on the numbers of observed mortalities of pups during branding activities (all found either suffocated or drowned as a result of roundups), it appears that mortality rates during branding are higher in southeast Alaska than in rookeries of the western DPS (NMFS and ADFG permit reports for the years 2000-2004). This may be due to the larger rookeries in southeast Alaska that have higher densities of animals and rock structures with numerous cracks and pools that can trap the pups.

2.9.4.2 Northern Fur Seal

Little work has been conducted on the effect of hot-branding of NFSs. However ,Troy *et al.* (1997) used both hot-iron and freeze branding on adult male New Zealand fur seals (*A. forsteri*). In one year, all fur seals were freeze-branded, whereas all were hot-iron branded the following year. Freeze brands were not legible after the first molt, but became legible following the second molt. Hot-iron brands were legible after the first molt, but 2 had infections 6 months later. They recommended freeze-branding for New Zealand fur seals over hot-iron branding because of the lower chance of infection and "over-branding." If first-year resights were necessary, then freeze branding should be supplemented with temporary markings such as tags. Larger males regained territories following the procedure; those that were unsuccessful were significantly lower in weight. The majority of seals under anesthetic regained territories within 5 days.

2.9.4.3 Other Pinnipeds

Hot-branding is a common method of permanently marking several species of pinnipeds around the world including harbor seal, elephant seal, gray seal (*Halichoreus grypus*), California sea lions, New Zealand fur seals, Weddell seals (*Leptonychotes weddelli*), and Cape fur seals (*Arctocephalus pusillus)* (Carrick and Ingham 1962; Hobbs and Russell 1979). Hot-branding has been conducted in the United States on harbor seals and SSLs on Rogue Reef and Orford Reef in Oregon, and St. George Reef in Northern California (NMFS 1992). Van den Hoff *et al.* (2004) found that 98% of 4932 southern elephant seal pups that were hot-branded healed within the first year. Studies of fitness in southern elephant seals have indicated that branding does not negatively influence survival in the short- or long-term (McMahon *et al.* 2005, 2006).

In a study of New Zealand sea lions (*Phocarctos hookeri*) 435 adults and pups were hot-branded. Examination at 12 weeks showed the brands on 10 out of 27 pups had healed. In 2 pups, healing was > 95 percent; in 3 pups 90-95 percent of the wounds had healed, and in 6 pups, 80-90 percent of the brand had healed (Wilkinson *et al.* 2001). There was no effect on pup growth when compared with unbranded pups. After one year, adults were examined for degree of brand healing. In the adults branded, 63 of 94 (64 percent) had healed, and 28 showed >95 percent healing of the brand (Wilkinson *et al.* 2001). Survival of the branded females appeared to be unaffected by the branding.

2.9.5 Mitigation

Researchers have found that hot-branding, in comparison to freeze-branding, requires less application time and less pressure, with less chance of infections (Carrick and Ingham 1962; Warneke 1979). Branding irons should be hot enough that little pressure is required to make the brand, avoiding the potential of internally wounding the animal (Merrick *et al.* 1996). Other measures to minimized harm to animals during branding operations include:

- To reduce the stress on the animals and possible increased risk of mortality, do not brand pups that are very young or in poor physical condition (under 20 kg).
- Allow only highly experienced and well-trained personnel to perform invasive procedures (including branding) according to their skills and qualifications.
- Process animals in groups small enough that all animals can be adequately monitored and to minimize handling/restraint time.
- Separate and monitor pups when collected, to ensure that they are not suffocating, being crushed, or aspirating milk.
- Immediately cease research-related procedures if an animal shows signs of acute or protracted alarm reactions that may lead to serious injury, capture myopathy, other disease conditions, or death; and monitor or treat the symptoms as determined appropriate.
- Restrain pups by hand, without using either a restraint board or drugs (except where the use of gas anesthesia is indicated for branding) and minimize handling time.

Additional mitigation measures for capture/restraint and anesthesia are found in Sections 2.5 and 2.6.

2.10 Freeze-Branding

2.10.1 Description of Methods

The protocol for permanent marking of animals using cryobranding (freeze-branding) is similar to hot-branding in several aspects. Initially it involves the capture and restraint of animals, usually pre-weaned pups, and the application of branding irons with large visible numbers or letters that can be seen and used to identify an individual from a relatively long distance without having to recapture or disturb it multiple times. Cold-branding involves application to the skin of a branding iron that has been cooled well below freezing (requiring a substantially longer exposure time than hot-branding). Freeze-branding can create two different types of marks: short contact kills the pigment producing cells (melanocytes), longer contact kills the hair follicles and pigment producing cells to create a permanent bald brand (NMFS 1993a; Merrick *et al.* 1996; Melin *et al.* 2006). Melanocytes can return on some brand marks and make the mark less readable (Keys and Farrell 1979).

2.10.1.1 Branding Irons

Branding irons used for freeze-branding are generally similar to those used for hot-branding but are often made of copper, lead, brass or stainless steel (Farrell 1979; NMFS 1993a). There is typically only one letter or number per brand with characters large enough to be seen at a distance. The size of brands has been found to be sufficient if they are visible at 100 m with 7X binoculars (Merrick *et al.* 1996).

The branding iron is chilled in a liquid coolant of alcohol and dry ice (–67°C to –77°C) or liquid nitrogen (-190°C) (Cornell et al 1979, Freeman and Lee 1989, Whittenburg 1987). The refrigerant materials can be dangerous to the researchers and impractical in the field, and safety equipment is often required to use them (Hoover 1988). The cooled brand is placed against the skin for 25 to 60 seconds per numeral at approximately 10-15 pounds/square inch to produce a bald brand. This compares to only two to four seconds per character for a hot-brand (Merrick *et al.* 1996). There is some potential for smudging the brand since it has to be held in place under greater pressure for an extended period. Anesthesia with isoflurane gas is preferable in order to not smudge the brand from animal movement due to the extended time required to keep the branding iron in contact with the animal (NMFS 2005b). Anesthesia functions as a temporary anesthetic to reduce the pain of freeze-branding and also reduces the chance of blurred brand marks from sudden movements (Cornell *et al.* 1979).

There can be more preparation required for producing bald freeze-brands than hot-brands if animals are clipped or shaved and the skin swabbed with methylated spirits (an alcohol/glycerin mixture), a bald brand rather than an unpigmented brand (NMFS 1993a). However, if animals being hot-branded need to be dried prior to branding, the preparation time may be roughly equivalent to that needed for a freeze-brand. Freeze-branding could take several minutes longer per animal than hot-branding due to the longer contact times required for a bald brand (Farrell 1979).

2.10.1.2 Liquid Spray

Another method involves spraying a specially formulated liquid, such as Freon 22 or combinations of chlorodifluoromethane and dimethyl ether, from an aerosol can through a set of uniquely designed stencils. The fur or hair is clipped to expose the skin, which is then wiped with alcohol. The stencil is placed against the skin and the liquid is spayed over the open markings. Evaporation results in freezing the outer layers of the skin, killing the pigment producing cells in the hair follicles. The time required is approximately 10-20 seconds (NMFS 2002).

2.10.2 Objectives of Research

The SSL Recovery Plan identified the need to monitor the health, condition, and vital parameters of SSLs. More specifically, this included conducting intensive studies on rookeries in order to develop indices of condition and obtain measurements and samples using non-lethal techniques. The NFS Conservation Plan identifies the need for studies of the long-term survival and reproduction rate and on the general condition and health of NFSs. Permanent marking of individuals is an effective technique in these types of studies.

2.10.2.1 Steller Sea Lions

The objectives of freeze-branding are similar to hot-branding in that there is a need to identify individual animals over a period of years for the purposes of determining seasonal use and movement patterns, dispersion from natal sites, site fidelity, and distribution and dispersal of animals.

2.10.3 Use of Data

2.10.3.1 Steller Sea Lions

Data from freeze-brand re-sightings, similar to hot-brands, have been very useful in determining important life history and vital parameters of the SSL. Brand re-sighting data in general is used for determining vital parameters such as age-specific survival and documenting immigration and emigration of animals between haul-outs and rookeries.

2.10.3.2 Northern Fur Seals

Attempts to use freeze-branding on NFSs were conducted between 1966 and 1978 for the purpose of mark and recapture studies to determine pup numbers (Keyes and Ferrell 1979). The pigment cells of the hair follicles and skin of adult NFSs seem to be insusceptible to cryogenic treatment during the spring and summer but were more responsive in the fall with the onset of molt (Keys and Farrell 1979). However, freeze-branding pre-weaned pups has had limited success as a reliable means for re-sighting marked pups as two- or three-year-olds as they return to the rookeries (Gentry and Holt 1982, NMFS 2006b). Additionally, standardizing brand application can be difficult and long-term data suggest that fur can re-pigment (Melin *et al.* 2006).

2.10.4 Effects of Research

As with other marking techniques including hot-branding, capture and restraint is the major stress-inducing activity (Section 2.5). Anesthesia for restraining animals for freeze-branding also adds risks for the animals.

Freeze-branding is considered by some to be more acceptable for marking wildlife than hot-branding because, if done correctly, there is a negligible risk of infection (Cornell *et al.* 1979; Day *et al.* 1980; Harkonen 1987; Boyle *et al.* 1994; Troy *et al.* 1997). However, other researchers have found that freeze-branding requires greater time and increased pressure of application, with a greater chance of infections, than hot-branding (Carrick and Ingham 1962; Warneke 1979; McMahan *et al.* in press). Daoust *et al.* (2006) found that freeze-brands tend to heal faster than hot-brands, although legibility over time was an issue in freeze-brands. In the NMFS Environmental Assessment on the effects of branding pinnipeds, hot-branding was said to be preferred over freeze-branding because freeze-branding required longer restraint times that could result in increased stress on the animals (NMFS 1993a).

2.10.4.1 Steller Sea Lions

Since 1993, both NMML and ADF&G have been using isoflurane gas to anesthetize SSLs during hot-branding or freeze-branding. There also has been concern about the safety of using anesthesia to restrain the SSLs. Because the animals being hot-branded under existing permits are anesthetized, a longer restraint time for a freeze-brand would not necessarily result in more stress due to the drug (Hobbs and Russell 1979). However, the use of anesthesia is not entirely without risks, and the risk of adverse effects increases with the duration of use.

Freeze-branding was not considered a viable alternative to hot-branding in the 1993 Environmental Assessment because:

- Freeze-brands require longer contact time with the animal which could result in additional stress and increased illegibility if the iron moved.
- Animals would have to be anesthetized to obtain legible brands, and the use of anesthesia was cautioned against because of the potential for overdose and overheating.
- The equipment needed for freeze-branding was considered too cumbersome and logistically difficult in the field.
- The unpigmented skin produced by a freeze-brand could be difficult to distinguish from the light pelage of harbor seals and SSLs.

2.10.4.2 Northern Fur Seal

Freeze-branding has been used to permanently mark NFSs over a several-year period, between 1966 and 1978. Effects of freeze-branding on this species are generally similar to freeze-branding in SSLs. The amount of time required for each brand was a limiting factor for large numbers of pups. Effects of freeze-branding of NFS pups was not observed to adversely affect survival of the individual animals, although pups did appear to be sensitive to the super-chilled temperatures during the process (Keys and Farrell 1979).

2.10.4.3 Other Pinnipeds

Freeze-branding has been used to create permanent marks on a number of other pinnipeds, such as harbor seals, gray seals, elephant seals, California sea lions, Australian fur seals, and New Zealand fur seals (Hobbs and Russell 1979; Troy *et al.* 1997; Harkonen 1987; Warneke 1979). Researchers found that in freeze-branding of New Zealand fur seals, brands were not legible after the first molt but were after the second molt. This suggests that if re-sighting during the first year after branding was necessary, freeze-brands should be accompanied by other markings such as tags (Troy *et al.* 1997).

2.10.5 Other Marine Mammals

Freeze-branding has been effectively used on bottlenose dolphins in the past (Irving *et al.* 1982). Application time was 15 seconds and brands were recognizable at a distance for several years. Freeze-branding has been used on spinner dolphins (*Stenella longirostris*) in Hawaii with few negative effects (White *et al.* 1981). Tissue response from the freezing varies among individual animals, and is also related to the skill and experience of those applying the brands.

2.10.6 Mitigation

Researches have found that freeze-branding, in comparison to hot-branding, requires greater time and increased pressure of application, with greater chance of infections. Mitigation measures to minimize this potential for injury to animals during freeze-branding operations are similar to those for hot-branding and include:

- To reduce the stress on the animals and possible increased risk of mortality, do not freeze-brand pups that are very young or in poor physical condition (under 20 kg).
- If anesthesia is used, isoflurane gas is the preferred method.
- Allow only highly experienced and well-trained personnel to perform invasive procedures (including branding) according to their skills and qualifications.
- Process animals in groups small enough that all animals can be adequately monitored and minimize handling/restraint time.
- Separate and monitor pups when collected to ensure that they are not suffocating, being crushed, or aspirating milk.
- Immediately cease research-related procedures if an animal shows signs of acute or protracted alarm reactions that may lead to serious injury, capture myopathy, other disease conditions, or death; and monitor or treat the symptoms as determined appropriate.
- Restrain pups by hand, without using either a restraint board or drugs (except where the use of gas anesthesia is indicated for branding) and minimize handling time.

2.11 Venipuncture and Blood Collection

2.11.1 Description of Methods

Venipuncture and the subsequent collection of blood from SSLs, NFSs, and other marine mammals involves the capture, restraint, and (in some cases) anesthesia of the animal prior to collecting the sample (Sections 2.5 and 2.6). Each capture and restraint event will have some effect on the behavior, life, or activities of the animal and can create a variety of somatic, physiological, and behavior stressors (Section 2.5). Therefore, capture and restraint, and the use of anesthesia, adds to the potential effects of the venipuncture and blood collection procedures.

Once captured and sedated, the animal is restrained on as smooth a surface as possible. An attending veterinarian or other qualified personnel monitors the respiration, heart rate, and temperature of the animal. If the animal continues to struggle or shows signs of stress, it is released immediately. Blood samples are generally taken by venipuncture from a rear flipper or the caudal-gluteal vein while the animal is restrained. In SSL pups, blood samples are drawn from the pelvic venous plexus (Castellini *et al.* 1993). After the blood is collected, along with any other experiments, the animal is monitored until it can be released.

Venipuncture is also practiced with the injection of Evan's blue dye and deuterium oxide. For both deuterium and Evan's blue dye, blood samples must be taken before and after the administration of the experimental chemical.

2.11.2 Objectives of Research Method

The objective of conducting venipuncture is to collect blood samples that can be used to determine animal health and condition. This information can then be used to determine the current status of the SSL or NFS population for evaluation relative to recovery criteria. Blood sampling following the injection of Evan's blue dye is a process which can determine blood volume and, when combined with muscle biopsy, estimate aerobic dive capacity. The injection of deuterium is used to quantify water (and milk) influx, determine total body water, and estimate body composition in free-ranging animals.

2.11.3 Use of Data

Analysis of components of blood can give insight into the general health of animals. Bishop and Morado (1995) examined blood characteristics of SSL pups captured live on rookeries in Southeast Alaska and the Gulf of Alaska. White blood cell counts suggested mild physiological stress responses that were perhaps due to capture and handling or chronic infection. Red blood cell counts were suggestive of anemia, especially in animals sampled in the Gulf of Alaska. Zenteno-Savin *et al.* (1997) found higher levels of haptoglobin in SSL blood in the Aleutian Islands than in Southeast Alaska sea lions. In other animals, elevated haptoglobin levels are known to be associated with stress (e.g., trauma, infection), but no explanation was suggested for the results in SSLs. The recovery actions outlined in the SSL Recovery Plan provide the following recommendations related to blood and serological samples:

- Examine blood and tissue samples for evidence of contaminant-linked endocrine effects.
- Monitor health, body condition, and reproductive status.
- Collect blood samples for archiving, and for health and condition studies.

2.11.4 Effects of Research Method

The effects of venipuncture (*not* including the effects of capture, restraint and possibly anesthesia that are discussed elsewhere in this document) on SSLs, other pinnipeds, and cetaceans, are similar across the groups and minor overall. However, multiple attempts to obtain a blood sample are stressful to the marine mammal and likely cause some degree of pain. If improperly conducted or conducted too frequently on the same animal, venipunctures can result in damage to the vein, clotting, and infection or abscess. Removing too much blood relative to the animal's size may result in fatigue, anemia, and weakened immunity. Problems with clotting and excessive bleeding can also occur. However, these risks are greatly reduced by following the mitigation recommendations provided in Section 2.11.5; when the procedure is performed by qualified experienced personnel, following accepted standards, the risk is negligible.

2.11.5 Mitigation

Mitigation techniques specifically related to venipuncture include the use of sterile, disposable needles to reduce the risk of infection and cross contamination. The volume of blood taken from any individual animal should not exceed 1.0 ml of blood per kg of body mass, either as a single blood draw or over the course of several days.

2.12 Skin, Blubber, and Muscle Biopsy

2.12.1 Description of Methods

2.12.1.1 Capture

The collection of skin, blubber, and muscle samples from pinnipeds usually involves the capture, restraint, and possible anesthetizing of the animal prior to collecting the sample (Sections 2.5 and 2.6). Once captured and sedated, the animal is restrained on as smooth a surface as possible for collection of the samples. Skin and blubber samples are typically collected near the hind flippers using a surgical biopsy punch 7 mm in diameter.

For various reasons, some researchers use remote sampling techniques to collect skin and blubber samples from certain cetacean species and some pinnipeds including South American fur seals and SSL (Best *et al.* 2005; Hooker *et al.* 2001; and Gemmel and Majluf 1997). A typical biopsy dart has a cylindrical punch that is about 2.5 cm long and fitted with a barbed filament to hold the sample (Hooker *et al.* 2001). The dart is then attached to a standard cross-bow bolt. To allow recovery of the biopsy dart, a spinning reel is attached to the stock and a monofilament retrieval line (11-kg) is attached to the dart and wound on the reel. The use of the monofilament tether greatly impairs the flight of the dart; however, with practice it is easy to compensate and a high level of accuracy can be obtained (Gemmel and Majluf 1997). The dart can be shot from on board a vessel or while observing animals on the ground. The main disadvantages of remote sampling compared to sampling restrained animals are the increased potential for injury if a dart hits off target and the inability to ensure the dart has collected the appropriate amount of tissue.

2.12.2 Objectives of Research Method

The objectives of collecting tissue samples including skin, blubber, and muscle from SSLs and NFSs is to analyze the samples to determine general condition, nutrition, reproductive state, contaminant load, and other aspects of marine mammal health. This information can then be used to determine the current status of the SSL and NFS population for evaluation relative to recovery criteria.

2.12.3 Use of Data

Biopsies can often provide data that cannot be obtained by non-destructive means. Skin samples can undergo genetic analyses that can subsequently provide information on social organization, kinship, mating, individual gender, and identification and variability within and among populations. Blubber, muscle, and other tissue samples are often used to determine contaminant levels and for obtaining information on feeding ecology and nutritive condition. The recovery actions outlined in the SSL Recovery Plan provide the following recommendations:

- Continue to collect information on food habits using SSL tissue samples.
- Analyze reproductive hormone levels in tissue samples to better estimate birth rates.
- Examine blood and tissue samples for evidence of contaminant-linked endocrine effects.
- Use tissue samples collected from pups to indicate the pregnancy status of nursing mothers.
- Further develop indirect methods, such as the analysis of stable isotopes and fatty acid (FA) signatures in tissues, to determine the diet of SSLs at both the individual and population levels. The isotopic measurement of several tissues from the same individual can provide short-, intermediate-, and long-term dietary information depending upon rates of metabolic activity.

2.12.4 Effects of Research Method

Each capture and restraint event will have some effect on the behavior, life or activities of the animal and can create a variety of somatic, physiological and/or behavioral stressors (Section 2.5). The effects of using standard or remote methods of biopsy retrieval (*not* including the effects of capture, restraint and possibly anesthesia) on SSLs, other pinnipeds, and cetaceans are similar across the groups and minor overall. Biopsy punches for skin and blubber samples produce a small wound that has the potential for infection, especially when considering the unsanitary conditions of the environment. However, an otherwise healthy animal would be able to heal and recover from a properly performed procedure. Muscle biopsies produce a small-diameter deep wound that would tend to close on the surface prior to deep tissue healing, thereby increasing the chances of an abscess forming. This is more likely if the dart or punch is not disposable or is not sanitized properly between uses.

Specific to remote sampling, no damage other than the small biopsy puncture (and associated chance for infection) was detected in South American fur seals regardless of where the point of impact was on the animal's body (Gemmel and Majluf 1997). There was no other tissue damage, bone fracture or bone chipping from the impact of the dart. The animals themselves showed no adverse effects of the sampling. In most cases, male fur seals paid little or no attention to being struck by the biopsy dart and did not move off of their territory and were not at additional risk of attack from neighboring males. The immediate typical response was for the seal to recoil from the impact and search briefly for the "assailant." Similarly bottlenose whales (*Hyperoodon planifrons*) showed no or low-level reactions to biopsy attempts (Hooker *et al.* 2001).

Other hazards of remote biopsy sampling include missed shots, stuck darts or broken tips remaining attached to the animals causing irritation and possibly abscess and infection, snagging of the retrieval line on flukes or other body parts, and the repeated sampling of one individual thereby compounding the effects on that animal. One study (Best *et al.* 2005) found that thinner darts were not as likely to become stuck in the animal and were more easily retrieved. A single humpback whale (*Megaptera novaeangliaen*) that was biopsied three times showed progressively increasing reactions (Weinrich *et al.* 1992). However, Brown *et al.* (1994), recorded 16 occasions of duplicate sampling of humpbacks and the response to biopsy sampling remained the same or decreased in 14 cases and increased in only two cases. Other researchers found that when the whales were sampled two to four times but in different months or years, the intensity of the behavioral response appeared the same as the first and subsequent biopsies (Gauthier and Sears 1999).

2.12.5 Mitigation

Mitigation techniques specifically related to the collection of biopsy samples include the use of sterile, disposable punches. Where disposable equipment is not available, liquid chemical sterilizers should be used with adequate contact times and the punch should be rinsed with sterile water to remove any chemical agents that might irritate the animal's skin. When taking muscle biopsies from captured sedated animals, leaving the wound open to drain, rather than suturing it closed, may promote healing and reduce abscess formation. Disinfection of the surgical site is paramount to the promotion of healing. If the animal continues to struggle or shows signs of stress, it is released immediately. In order to minimize the risk of infection or cross-contamination, sterile, disposable biopsy punches should be used to obtain the skin, blubber, or muscle sample.

For remote biopsy sampling, the researcher should practice the efficiency of the shot on standard archery targets prior to attempting use in the field. Repeated sampling of the same animal within a single study period of a month or less should be avoided.

2.13 Digestive Tract Sampling

2.13.1 Description of Methods

Endoscopy, enema, stomach intubation, and fecal loops are all used to sample the digestive tracts of SSLs, NFSs, and other marine mammals. Often the use of these methods involves the capture, restraint, and possibly anesthesia of the animal prior to collecting the sample (Sections 2.5 and 2.6). Each capture and restraint event will have some effect on the behavior, life or activities of the animal and can create a variety of somatic, physiological and/or behavioral stressors (Section 2.5). Therefore, capture and restraint, and the use of anesthesia, adds to the potential effects of the endoscopy, enema, intubation, or fecal loop procedure alone.

Once captured and sedated, the animal is restrained on as smooth a surface as possible. An attending veterinarian or other qualified experienced personnel monitors the respiration, heart rate, and temperature of the animal. If the animal continues to struggle or shows signs of stress, it is released immediately. Stomach intubation, endoscopy, enemas, and fecal loops are used to allow analysis of stomach contents and other digestive tract samples without destruction of the animal. In the past, animals have been sacrificed in order to obtain this type of information.

Intubation is used by researchers to conduct lavage for stomach content analyses on live, sedated, animals. The procedure entails introducing an intubation tube into the animal's stomach and using fluids to flush out the contents, which are then collected and analyzed. First the length of the stomach tube needed for a given animal must be estimated by measuring the distance to the stomach along the outside of the animal's body. The tube is then smoothly inserted into the mouth, down the left side of the throat and into the stomach. If the animal cannot vocalize, then it is assumed that the tube has been inserted into the trachea and must be removed. To further determine the proper location of the tube, a small amount of air is blown into the tube while listening for gurgling either through the tube or by using a stethoscope placed on the left abdominal wall (Dierauf 1990).

After the stomach tube is properly in place, it is connected to a manually operated suction pump and sea water is pumped into the animal's stomach (Antonelis *et al.* 1987). The suction fitting of the pump is then connected to one of two hose fittings on an airtight collecting bottle while the other fitting is attached to the lavage tube. A vacuum is created in the collecting bottle and the slurry of water and undigested food parts are suctioned from the stomach.

Enemas are used to collect fecal samples from live, sedated animals (Staniland *et al.* 2003). In order to obtain the sample, a plastic bottle is filled with warm water. A soft polyethylene hose (12 mm diameter) is connected to the bottle via a one-way valve; the hose is then inserted into the animal's colon via the anus. The warm water is then introduced via the hose by gently squeezing the bottle. Once the bottle is empty or the resistance becomes too great, the hose is removed and the animal's rear flippers are held over a plastic tray in which the material naturally expelled by the animal is collected. Fecal loops are also used to collect fecal samples from live animals. A flexible plastic loop is inserted into the anus and a sample of the material is obtained.

Endoscopy is a minimally-invasive procedure used to evaluate the interior surfaces of an organ by inserting a small tube into the body, often, but not necessarily, through a natural body opening such as the mouth or anus. Through the scope the researcher is able to see lesions and other surface conditions.

After the endoscopy, intubation, fecal loop, or enema, and any other experiments are completed, the animal is monitored until it can be released.

2.13.2 Objectives of Research Methods

The objectives of conducting endoscopy, stomach intubation, enemas and fecal loops are to collect digestive tract samples that can be used to determine animal diet and condition. This information can then be used to determine the current status of the SSL population for evaluation relative to recovery criteria.

2.13.3 Use of Data

Endoscopies, stomach lavage, enemas, and fecal loops can provide data that cannot be obtained by non-destructive means. The recovery actions outlined in the SSL Recovery Plan provide the following recommendations related to digestive tract samples:

- Collect and analyze stomach contents to determine prey consumption in SSLs.
- Monitor health, body condition, and reproductive status.
- Collect samples of feces and other bodily fluids from live animals for assessment of the intensity and effects of infestations.

2.13.4 Effects of Research Methods

The effects of conducting stomach intubation, enemas, endoscopy, and fecal loops (*not* including the effects of capture, restraint and possibly anesthesia that are discussed elsewhere in this document) on SSLs, pinnipeds, cetaceans, and other marine mammals are similar across the groups and minor overall.

Anytime a foreign object is inserted into the rectum, as in the case of endoscopy, enemas, and fecal loops, there is the possibility of perforation which can lead to peritonitis resulting in death. However, when the procedure is performed by qualified experienced personnel, following accepted standards, the risk is negligible. Disturbance due to the procedure, even when properly performed, can also occur, but is likely to be minor and short-term. For example, in conducting enemas on Antarctic fur seals (*Arctocephalus gazella*), Staniland *et al.* (2003) found that of the animals sampled, all were observed suckling their pups within the same season and no aberrant behavior was visually observed. Eleven animals received a series of enemas (7-16) after successive foraging trips. Upon each recapture and close visual inspection, no obvious external signs of damage were recorded.

Stomach intubation involves the risk of introduction of liquid into the trachea, initiating aspiration pneumonia or death. Therefore, procedures and checks to ensure that the tube is properly inserted into the stomach must be carefully completed before the introduction of fluids. There is also a risk of introducing infection or cross-contamination among animals if the intubation equipment is not properly sterilized between animals. This also applies for enemas, endoscopy, and fecal loops.

2.13.5 Mitigation

Mitigation techniques specifically related to conducting studies using endoscopy, stomach intubation, enemas, and fecal loops include the use of sterile, disposable stomach, endoscopy, and enema tubes and loops. Where disposable equipment is not available, liquid chemical sterilizers should be used with adequate contact times and the equipment should be rinsed with sterile water to remove any chemical agents that might irritate the animal's skin. Because cold sterilization techniques take time, researchers should bring an adequate number of tubes or loops to ensure that all are properly sterilized between animals or that there is one tube or loop available per animal.

For stomach intubation, only qualified personnel (veterinarians or biologists) who know how to properly pass a stomach tube to avoid introduction of liquid into the trachea should attempt the procedure. Rounding the edges of the end of the tube and coating it with surgical lubricant facilitates passage of the tube into the stomach (Antonelis *et al.* 1987).

For enemas, there is a concern that if the water pressure inside the animal became too high (i.e., through too vigorous pumping) it could cause internal damage. However, it was found in all cases that with the diameter of hose used, any build-up of pressure was dissipated through leakage via the animal's anus.

2.14 X-Ray

2.14.1 Description of Methods

In most cases bones and teeth of marine mammals that are stranded or perish due to other means are chosen for x-ray studies (e.g., Arkowitz and Rommel 1985; Cranford 1999; Dalebout, *et al.* 2003). However, in some studies of ring seals, animals were sacrificed and their teeth or bones are removed and x-rayed (Stewart *et al.* 1996; Stewart *et al.* 1998). In these studies, the jaws, teeth, or other bones were removed from the animal, frozen, and returned to the laboratory for x-ray analyses.

If done, x-ray studies of living, non-captive, SSLs, NFSs, and other marine mammals would involve the capture, restraint, anesthesia, and transport of the animal (Sections 2.5 and 2.6). Once captured, sedated, and transported to the laboratory, the animal is restrained on a smooth surface while the x-ray is completed. An attending veterinarian or other qualified personnel monitors the respiration, heart rate, and temperature of the animal. After the x-ray is completed, and other experiments are done, the animal is monitored until it can be transported and released.

2.14.2 Objectives of Research Method and Use of Data

X-raying marine mammals is most often used to determine age. In the absence of known-age specimens, age is interpreted from growth layers in hard tissues, such as teeth. X-rays of these hard tissues show the growth layers. For example, Stewart *et al.* (1998) used x-rays of mandibles from ringed seal fetuses, newborns, and young-of-the-year to determine the presence, location, and eruption patterns of deciduous and permanent teeth. A detailed knowledge of the growth and development of those tissues enhances researchers' ability to interpret annual markers used for age estimation. This information can then be used in conjunction with other studies to determine the current status of the sea lion population for evaluation relative to recovery criteria.

2.14.3 Effects of Research Method

If x-raying of live marine mammals is done, the effects (*not* including the effects of capture, restraint and possibly anesthesia) on SSLs, other pinnipeds, and cetaceans, are similar across the groups and minor overall.

2.14.4 Mitigation

Mitigation techniques include proper care during capture and restraint, and ensuring that the same animal is not x-rayed repeatedly.

2.15 Urinalysis

2.15.1 Description of Methods

Collection of urine for urinalysis in SSLs, NFSs, and other marine mammals involves the capture, restraint, and anesthesia of the animal prior to collecting the sample (Sections 2.5 and 2.6). Once captured and sedated, the animal is restrained on as smooth a surface as possible. An attending veterinarian or other qualified personnel monitors the respiration, heart rate, and temperature of the animal. If the animal continues to struggle or shows signs of stress, it is released immediately. Urine samples are collected by catheterizing the animal while it is restrained and anesthetized. After the urine is collected, along with any other experiments, the animal is monitored until it can be released.

2.15.2 Objectives of Research Method

The objective of urinalysis is to collect samples that can be used to determine animal health and condition. This information can then be used to determine the current status of the sea lion population for evaluation relative to recovery criteria.

2.15.3 Use of Data

The recovery actions outlined in the SSL Recovery Plan provide the following recommendations related to urine samples:

- Examine urine samples for evidence of contaminant-linked endocrine effects.
- Monitor health, body condition, and reproductive status.

Urinalysis can also be used to study the role hormones play in water conservation in marine mammals. For example, Ortiz *et al.* (1996) analyzed urine from elephant seal pups serially throughout the postweaning period to quantify changes in urine concentrating ability and electrolyte homeostasis at various stages of fast.

2.15.4 Effects of Research Method

The effects of catheterization to collect urine for urinalysis (*not* including the effects of capture, restraint and possibly anesthesia discussed in Section 2.5) on SSLs, other pinnipeds, and cetaceans are similar across the groups. Anytime a foreign object is inserted into the urethra and bladder, there is the possibility of perforation which can lead to infection and death. In addition, cross-contamination among animals can occur if disposable catheters are not used and are not adequately sterilized between uses. However, when the procedure is performed by qualified experienced personnel, on healthy animals, following accepted standards, the risk is negligible.

2.15.5 Mitigation

Mitigation techniques include proper care during capture and restraint and the use of sterile, disposable catheters. Where disposable equipment is not available, liquid chemical sterilizers should be used with adequate contact times and the catheter should be rinsed with sterile water to remove any chemical agents that might irritate the animal's skin. Because cold sterilization techniques take time, researchers should bring an adequate number of tubes to ensure that all are properly sterilized between animals or that there is one tube available per animal. To ensure proper placement of the catheter, qualified personnel (veterinarians or biologists) who know how to properly collect the urine sample should conduct the tests.

2.16 Ultrasound

2.16.1 Description of Methods

Ultrasound of SSLs, NFSs, and other marine mammals is generally done on captive animals (e.g., Brook *et al.* 2002) or using portable ultrasound transducers in the field (Sections 2.5 and 2.6). Both external and internal (transrectal and transvaginal) ultrasound procedures have been proposed. Once captured and sedated, the animal is restrained on as smooth a surface as possible. An attending veterinarian or other qualified personnel monitors the respiration, heart rate, and temperature of the animal. If the animal continues to struggle or shows signs of stress, it is released immediately. After the ultrasound is done, and other experiments are completed, the animal is monitored until it can be released.

2.16.2 Objectives of Research Method

The objectives of conducting ultrasound on SSLs and NFSs are to determine general body condition and reproductive state and health of the animals. This information can then be used to determine the current status of the sea lion population for evaluation relative to recovery criteria. The SSL Recovery Plan recommends that health, body conditions, and reproductive status be monitored in SSLs. Ultrasound can be used to further those objectives.

2.16.3 Use of Data

Ultrasound can provide data that cannot be obtained by non-destructive means. It has now been proven to be a very useful and effective method by which to monitor and document reproductive events in captive dolphins (Brook *et al.* 2002). In addition, researchers have used portable ultrasound transducers to determine blubber thickness in SSL pups on Marmot Island (Gemmel and Maljuf, 1997).

2.16.4 Effects of Research Method

There are no known effects of conducting ultrasound procedures (*not* including the effects of capture, restraint and possibly anesthesia discussed in Section 2.5) on SSLs, other pinnipeds, and cetaceans.

2.16.5 Mitigation

Only qualified personnel (veterinarians or biologists) who know how to properly care for the animal during capture and restrain and conduct an ultrasound test should attempt the procedure. There are no other mitigation measures necessary.

2.17 Skin and Mucosal Swabs

2.17.1 Description of Methods

Swabbing of the skin and/or mucosa of SSLs, NFSs and other marine mammals, is done on captured, restrained, and possibly anesthetized animals. Once captured and sedated, the animal is restrained on as smooth a surface as possible. An attending veterinarian, or other qualified personnel, monitors the respiration, heart rate, and temperature of the animal. If the animal continues to struggle or shows signs of stress, it is released immediately. Skin samples are collected by using a sterilized nylon scrub pad. Harlin *et al.* (1999) used this technique on dusky dolphins (*Lagenorhynchus obscurus)* and found that it did not puncture the skin and minimized the time spent in physical contact with the dolphins. Cetacean researchers have used skin that sloughs naturally from large whales for genetic analysis. However, such non-invasive collection of tissue is not possible with small cetaceans who do not shed a sufficient amount of skin.

Mucosal swabs can be collected of the nasal passages, eyes (ocular swabs), vagina, and rectum. Clean, cotton-tipped swabs are used to collect the mucosa. After the swabbing is done, and other experiments are completed, the animal is monitored until it can be released.

2.17.2 Objectives of Research Method

The objectives of collecting skin and mucosal swabs of SSLs and NFSs is to collect deoxyribonucleic acid (DNA) samples that can be used to determine general body condition and health of the animals. This information can then be used to determine the current status of the sea lion population for evaluation relative to recovery criteria. The SSL Recovery Plan recommends that health, body conditions, and reproductive status be monitored in SSLs. Data from skin and mucosa samples can be used to further those objectives.

2.17.3 Use of Data

Analysis of skin and mucosal swabs can provide information on disease and overall health of the animal. For example, Goldstein *et al.* (2006) collected nasal swabs from captive and free-ranging Hawaiian monk seals. Samples were collected by swabbing the nasal cavity of each animal with a clean cotton-tipped swab. The swabs were then placed into a sterile cryovial and frozen at -70°C until analyzed. DNA was extracted from the samples. Information from sequencing the DNA was used to determine the role that viral diseases may play in the decline of these seals. Harlin *et al.* (1999) collected skin samples from free-ranging dusky dolphins, and found that a sufficient amount of skin was collected in this manner to provide for DNA sequencing analyses.

2.17.4 Effects of Research Method

Effects of collecting skin and mucosal samples from SSLs, NFSs and other marine mammals (*not* including the effects of capture, restraint and possibly anesthesia) would be similar across the group. There may be some remaining skin irritation from the scraping action of the pad, or irritation in the mucosal linings from the cotton swab. There is the possibility for damage to the cornea of the eye if ocular swabbing is done incorrectly. When performed by a qualified, experienced person using commonly accepted standards of good practice, these risks are likely to be negligible.

Skin samples can also be collected from free-ranging (not restrained or captive) animals as demonstrated by Harlin *et al.* in the dusky dolphin research mentioned above. Their research showed that eleven percent of 128 contacts resulted in no visible behavioral response. 89 percent of dolphins responded to contact, with 29 percent and 34 percent responding by making a lateral move to the right or left, respectively. Tail slap and startle occurred only once each in 114 responses. Overall, dolphins showed little or no aversion to the sampling conducted in this study.

2.17.5 Mitigation

Only qualified personnel (veterinarians or biologists) who know how to collect the samples should attempt the procedure. To minimize cross-contamination and infection, clean cotton swabs and sterilized nylon scrub pads should be used. There are no other mitigation measures necessary.

2.18 Tooth Extraction

2.18.1 Description of Methods

Teeth may be extracted from of SSLs and NFSs collected as part of subsistence harvest, from dead stranded animals, or from live free-ranging animals. If collected from non-captive marine mammals, the animal is first captured, restrained, and anesthetized. Once captured and sedated, the animal is restrained on as smooth a surface as possible. An attending veterinarian or other qualified personnel monitors the respiration, heart rate, and temperature of the animal. If the animal continues to struggle or shows signs of stress, it is released immediately. Arnbom *et al.* (1992) first immobilized individual Antarctic fur seals and southern elephant seals with a 1: 1 mixture of the anesthetic tiletamine hydrochloride and the tranquilizer zolazepam after capturing them in the wild. Before extraction, teeth and gums were cleaned with antiseptic solution and the mouth of the seal was kept open by placing a soft wood block between the jaws. The extraction area was cleansed with antiseptic disinfectant before, during and after the extraction. These researchers found that it took one to two minutes to remove a tooth from an Antarctic fur seal.

After the tooth is extracted, and other experiments are completed, the animal is monitored until it can be released.

2.18.2 Objectives of Research Method

The objectives of collecting teeth from harvested or living SSLs and NFSs is to collect information regarding age, general body condition, and health of the animals. This information can then be used to determine the current status of the sea lion population for evaluation relative to recovery criteria. The SSL Recovery Plan recommends that demographic modeling of the SSL population be continued. Age data collected from tooth annuli can provide information on the age and reproductive status of these animals.

2.18.3 Use of Data

Teeth are often collected from mammals to assist in determining age and population statistics. For example, Baker and Fowler (1998) collected teeth from harvested juvenile (mostly three- and four year-old) male NFSs throughout the annual commercial harvest (five weeks from late June to early August) on St. Paul Island for all but two years between 1948 and 1984. The objectives of this study were to use the tooth weight of harvested seals as a record of growth of individuals over several decades in order to: (a) characterize the relationship between tooth weight and body length; (b) investigate the relationship between growth and population density; and (c) explore evidence for differences in growth of seals associated with different rookeries.

Other researchers have used teeth from SSLs to determine diet. Stable isotope analysis of teeth of marine mammals can provide valuable information on trophic level and source of feeding (Hobson and Sease 1998). Hobson *et al.* (2004) used stable isotope values of individual tooth annuli of female SSLs collected from the

1960s through the 1980s for retrospective analyses of temporal changes in food webs in the Gulf of Alaska and North Pacific Ocean. Arnbom *et al.* (1992) extracted post-canine or incisor teeth from live antarctic fur seals and southern elephant seals, respectively, and used the teeth to determine age in a field situation.

2.18.4 Effects of Research Method

Effects of tooth extraction in SSLs, NFSs, and other marine mammals (*not* including the effects of capture, restraint and possibly anesthesia) would be similar across the group. The potential adverse effects of tooth extractions alone relate to the possibility of infection following extraction. The procedure may result in more than momentary pain, which could temporarily interfere with the animal's ability to forage. However, there are no data on the long-term effects of this procedure. When performed by a qualified, experienced person using commonly accepted standards of good practice, these risks are likely to be negligible. For example, Arnbom *et al.* (1992) found that no seal recaptured up to one year after tooth extraction showed any signs of infection.

2.18.5 Mitigation

Only qualified personnel (veterinarians or biologists) who know how to safely remove teeth should attempt the procedure. Cleaning and disinfection of the mouth, teeth, and gums as described in Section 2.18.1, and possibly the administration of antibiotics, could serve to reduce the possibility of infection. However, Arnbom *et al.* (1992) found that it was important to keep the animal's head pointing down during extraction to prevent disinfectant fluids from being swallowed.

2.19 Vibrissae, Hair, and/or Nail Collection

2.19.1 Description of Methods

Collection of vibrissae, hair, and nails from SSLs, NFSs, and other marine mammals is done on captured, restrained, and possibly anesthetized animals. Once captured and sedated, the animal is restrained on as smooth a surface as possible. An attending veterinarian, or other qualified personnel, monitors the respiration, heart rate, and temperature of the animal. If the animal continues to struggle or shows signs of stress, it is released immediately. Aurioles *et al.* (2006) collected hair samples from pups without the need for restraint or anesthesia. Hair samples were collected with scissors at the base of the hair without removing the follicle and then rinsed with distilled water to eliminate salt and sand residues. Caudron *et al.* (2006) adapted an existing method (crossbow skin biopsy) to remotely sample seal hair without causing skin puncture.

Researchers have also used photography of vibrissae, in lieu of collection of the whiskers, as an even less invasive method. Greaves *et al.* (2004) photographed the vibrissae of female grey seals biweekly over a 5 month period. Seals were captured and immobilized on a spinal board outfitted with Velcro™ straps, and the nose and mystacial vibrissae were inserted through a hole in a photography board while the jaws were held closed manually. After the collection or photography is done, and other experiments are completed, the animal is monitored until it can be released.

2.19.2 Objectives of Research Method

The objectives of collecting vibrissae, hair, and nails from SSLs and NFSs are to collect tissue samples for genetic research and/or stable isotopes that can then be used to determine general body condition and health of the animals. This information can then be used to determine the current status of the sea lion population for evaluation relative to recovery criteria. The SSL Recovery Plan recommends that health, body conditions, and reproductive status be monitored in SSLs. Data from vibrissae, hair, and nail samples can be used to further those objectives.

2.19.3 Use of Data

Analysis of vibrissae, hair, and nails can provide information on disease and overall health of the animal. For example, Caudron *et al.* (2006) extracted DNA from seal hair samples although they have not proven to be as reliable as tissue samples. DNA from hair, vibrissae, and nails can be used for population studies. Aurioles *et al.* (2006) sought to gain insight into the foraging behavior of elephant seals in Mexican waters through study of natural variation in stable carbon and nitrogen isotope values in hair samples from the animals. Stable isotopes can provide information on migration and foraging location and trophic level of prey consumed by marine mammals. As described above, Greaves *et al.* (2004) used photographs of seal vibrissae in an attempt to investigate their applicability for stable isotope diet analysis. However, they found that because the growth of vibrissae is neither continuous nor synchronous, it is a challenge to accurately identify the dates when the isotopes were incorporated into the tissue.

2.19.4 Effects of Research Method

Effects of collecting vibrissae, hair, and nails from SSLs, NFSs and other marine mammals (*not* including the effects of capture, restraint and possibly anesthesia that are discussed elsewhere in this document) would be similar across the group. Clipping whiskers, hair and nails is not likely to result in any pain. The effects on the animal of clipping a whisker, toenail, or patch of hair or pulling a whisker are probably largely incidental to the effects of capture and restraint. When performed by a qualified, experienced person, these risks are likely to be negligible.

2.19.5 Mitigation

Only qualified personnel (veterinarians, biologists) who know how to collect the samples should attempt the procedure. To minimize cross contamination and infection during nail clipping, sterilized nail clippers should be used and care should be taken such that the "quick," or attached portion, of the nail is not cut. There are no other mitigation measures necessary.

2.20 Bioelectric Impedance Analysis

2.20.1 Description of Methods

Bioelectrical impedance analysis (BIA) measures resistance and reactance of a current as it passes through an organism (Gales *et al.* 1994; Arnould 1995). BIA is conducted on animals that have been captured, restrained, and anesthetized. Once captured and sedated, the animal is restrained on as smooth a surface as possible. An attending veterinarian or other qualified personnel monitors the respiration, heart rate, and temperature of the animal. If the animal continues to struggle or shows signs of stress, it is released immediately. For the BIA, vacutainer needle electrodes are placed on and in the sedated animal (Bowen *et al.* 1998). Resistance (Rs) and reactance (Xc) are measured using a tetrapolar impedance plethysmograph. This unit comprises a localized current injection system that provides a measure of total body resistivity via two pairs of electrodes placed on and in the animal (Gales *et al.* 1994; Arnould 1995). The voltage drop between the inner and outer electrodes is measured with a high input impedance amplifier. Electrodes remain in place on the animal until readings of Rs and Xc stabilize, usually <30 seconds. Biological impedance (Z), Rs, and Xc vary inversely with the volume and composition of the body. After completion of the test, and collection of any other samples, the animal is monitored until it can be released.

2.20.2 Objectives of Research Method

The objective of conducting BIA on SSLs and NFSs is to estimate body composition. This information can then be used to determine the current status of the sea lion population for evaluation relative to recovery criteria. The

SSL Recovery Plan recommends that health and body condition be monitored in SSLs. BIA can be used to further this objective.

2.20.3 Use of Data

Measures of body composition in seals have been used as an index of the animals' response to variation in environmental quality (Gales *et al.* 1994; Arnould 1995). Accurate evaluation of body composition of living animals is critical for understanding their energy and material flux rates. This is true for many marine mammals which show dramatic seasonal shifts in body mass, primarily due to changes in the extent of their subdermal blubber layer. This fat layer functions in part as an energy store and, as such, is essentially a measure of body condition. Because fat-free mass, including the protein matrices of fat, contains most of the body water and electrolytes, conductivity is greater in fat-free tissues than in fat. Therefore, the conductance of an electrical current through an organism is dependent on body composition. BIA measures this conductance. Determination of body composition allows the estimation of body condition, which is essential for examining population health and, in some cases, availability of prey.

2.20.4 Effects of Research Method

The effects of BIA on SSLs, NFSs and other marine mammals are likely to be incidental to those effects associated with capture, restraint, and anesthesia (Section 2.5 and 2.6). Pain would not be expected to be associated with placement of the needles because the animals are sedated. However, Bowen *et al.* (1998) found that although sedated, most seals reacted to the placement of the electrodes and exhibited some movement during the period of measurement. In most cases the reaction appeared to be transient and animals seemed relaxed while the measurements were taken. However, some seals continued to react to gentle restraint and the electrodes while measurements were taken. Gales *et al.* (1994) observed that initially it was necessary to restrain seals in a net, but this later proved unnecessary as the animals became accustomed to the procedure. At that time, only four people were required to hold the seal and insert the needle electrodes. Needles were in for less than 10 seconds and the entire procedure was completed in about 2 minutes.

Subsequent to disturbance effects, the insertion of the needles also poses a risk of infection. Infectious agents may be present on the animal's skin or hair that can then be introduced under the skin. In addition, cross-contamination among animals can occur if disposable needles are not used and equipment is not adequately sterilized between uses. Repeated use of BIA on the same animal could cause skin and subcutaneous lesions. For example, an instance of a subcutaneous abscess on a captive adult female SSL was attributed to apparent tissue necrosis induced by the focal electrical current at the site of the a BIA electrode (Annual Report for Permit No. 881-1443, Alaska Sea Life Center).

2.20.5 Mitigation

Only qualified personnel (veterinarians or biologists) who know how to place the needles and conduct a BIA test should attempt the procedure. In general, if an experienced person uses commonly accepted standards of good practice, risks of the procedure can be greatly minimized. Mitigation techniques specifically related to BIA include the use of disposable needles. Where disposable needles are not available, liquid chemical sterilizers should be used with adequate contact times and the needles should be rinsed with sterile water to remove any chemical agents that might irritate the animal's skin. Because cold sterilization techniques take time, researchers should bring an adequate number of needles to ensure that all are properly sterilized between animals or that there is one set available per animal.

2.21 Diet Manipulation Studies

2.21.1 Description of Methods

Diet manipulation studies are conducted on captive, living marine mammals that are short or long-term residents at universities, marine laboratories, or aquariums. The animals are either not fed for a period of time (induced fasting), or are fed a diet consisting of specific prey items that may or may not mimic natural conditions. After the fasting or feeding period, blood and digestive tract samples are collected, and other studies such as bioelectrical impedance analyses (as described in Section 2.20) are conducted to determine body composition, health, nutritional stress, and general condition of the animal.

2.21.2 Objectives of Research Method

The objectives of conducting diet manipulation studies on captive marine mammals is to collect dietary and food web information that can be used to assess and predict the health of the animals. This information can then be used to determine the current status of the sea lion population for evaluation relative to recovery criteria. The SSL Recovery Plan recommends the energetic costs to foraging sea lions be determined to assess population status.

2.21.3 Use of Data

Dietary manipulations are often combined with blood chemistry and other physiological analyses to characterize the potential for nutritional stress in an animal, especially where nutritional stress has been implicated in population declines (Trumble *et al.* 2006). These researchers quantified changes in plasma metabolites and hematology values in captive harbor seals fed different diets over two years. However, captive seals are often maintained on a single species of fish and have activity patterns that bear little resemblance to those of free-living animals. Thus, data obtained from these studies provide little more than a general guide to the range of consumption rates that are likely to occur in wild populations (Harwood and Croxall 1988).

2.21.4 Effects of Research Method

Effects of conducting diet manipulation studies on SSLs, NFSs and other marine mammals (*not* including the effects of short or long-term captivity and the effects of subsequent blood and other tests) would be similar across the group. When the test animals are closely monitored during the study and the study is performed by a qualified, experienced person using commonly accepted standards of good practice, any risks are likely to be negligible.

2.21.5 Mitigation

Only qualified personnel (veterinarians or biologists) who know how to safely conduct feeding and fasting studies should attempt them on captive animals. SSLs undergoing fasting should be monitored daily and removed from the trial (i.e., returned to feeding) if there is any indication of illness. The experiment should be terminated for any animal whose rate of mass loss is greater than 3 percent of initial mass per day or whose total mass loss exceeds 15 percent of initial body mass. Finally, any SSLs subjected to the controlled fasting experiments should be allowed time to recover and readjust metabolism prior to being returned to the wild, if applicable.

2.22 Internal Scientific Instruments

2.22.1 Description of Methods

Direct measurements of mortality events can be obtained through the use of implantable, satellite-linked life history transmitters (LHX). LHX transmitters are capable of continuously monitoring five built-in sensors, including pressure, motion, light levels, temperature, and conductivity. The transmitter will establish the death of an animal. When the instrument is exposed to the ambient conditions outside of the carcass, all information stored in the LHX will be transmitted to the Satellite and Information Data Collection System (ARGOS) system on board a NOAA satellite. LHX transmitters have only been in use since 2004.

The tags are surgically implanted intraperitoneally while the animal is under anesthesia. Because the surgery can take up to two hours, animals would need to be intubated and maintained under gas anesthesia. An incision of 7-8 cm long, through the abdominal wall including abdominal muscles and peritoneal layers, is required to insert each tag. The incisions are closed using absorbable sutures. The skin incision may also be further secured by application of surgical glue or dissolvable staples.

A system designed by Andrews (1998) to monitor foraging behavior of pinnipeds includes a stomach temperature transmitter (STT) and a data logger with a built-in telemetry receiver for recording dive depth, swim speed, and water temperature. The STT is inserted into the stomach of the SSL while the animal is under anesthesia.

An additional internal instrument that has been applied for is a heart rate sensor. The sensor has a data logger attached to the dorsal pelage, which is attached to two electrocardiogram electrodes. The electrodes are attached subcutaneously under anesthesia to locations on the body that provide the cleanest electrocardiogram signal.

2.22.2 Objectives of Research

LHX transmitters are specifically designed to obtain long-term data records from individual animals over a period of up to 10 years and for estimating age-specific survival rates.

STTs are designed to record the precise timing of prey ingestion in marine mammals.

2.22.3 Use of Data

LHX transmitters provide survival and longitudinal cumulative dive effort data from individual animals for up to 10 years. Researchers specifically monitor two major areas: 1) dive effort and dive behavior and 2) body condition and health characteristics.

STTs are used to determine timing of prey ingestion by relying on the drop in stomach temperature that occurs when a relatively warm animal ingests much cooler prey (Mackay 1964).

2.22.4 Effects of Research

In addition to the effects of capture and restraint described previously, the predominant problems of this method are related to excessive tissue reaction, infection, and subsequent rejection of implanted materials. The surgery itself will not result in pain as the animals will be anesthetized. However, a certain amount of post-operative pain and discomfort is likely due to trauma associated with incisions through the abdominal wall. Any pain or discomfort associated with the surgery or subsequent wound healing may adversely affect an animal's ability to forage or escape predation. However, for animals held in captivity during wound healing, both infections and post-operative pain can be treated with appropriate antibiotics and analgesics.

Subcutaneous and intraperitoneal transmitters have been used successfully in birds (Petersen *et al.* 1995), polar bears (Mulcahy and Garner 1999), sea otters (Ralls *et al.* 1989; Siniff and Ralls 1991; Thomas *et al.* 1987), harbor seals (Lander *et al.* 2005), and a number of other pinnipeds (Haulena *et al.* 2005) with no deleterious effects. LHX transmitters were implanted into rehabilitated California sea lions with no short- or long-term effects noted (Horning and Hill 2005).

2.22.5 Mitigation

In early applications of implantable telemetry devices, the predominant problems were related to the issues of relative size, packaging, and sterility of instruments and procedures. Subsequently, recommendations were made not to exceed 3 to 5 percent of animal body mass (MacDonald and Amlaner 1980). Modern implantable telemetry tags typically remain under 1 percent of body mass. Using appropriate instrument sterilization and sterile surgery techniques, infections from implant procedures have been substantially reduced.

2.23 External Scientific Instruments

2.23.1 Description of Methods

Instruments that are externally attached to SSLs and NFSs that record diving depths over time (time-depth recorder or TDR) have existed since the 1970s, and have allowed researchers to track pinniped movements vertically in the water column. Coupled with a separate very high frequency (VHF) radio transmitter and a ship/aircraft, it is possible to obtain specific movement information at fine spatial scales. For example, Kooyman *et al.* (1983) and Gentry and Kooyman (1986) measured diving behavior and foraging ecology of pinnipeds using a TDR from which dive data were retrieved after the animals returned from feeding trips. Merrick *et al.* (1994) and Brandon (2000) presented information on female pup-attendance behavior of SSLs with VHF radio transmitters and Lea and Wilson (2006) used ship-based VHF telemetry to examine the fine-scale tracks of coastal and pelagic movements of juvenile Steller sea lions in Southeast Alaska.

Developments in satellite telemetry allow tracking of marine animals using satellite-linked tags or platform transmitter terminals (PTT). Through the ARGOS system on board the NOAA Tiros-series satellites, it is possible to track and retrieve data from free-ranging animals using uplinked communications between PTT attached to the animals and receivers onboard satellites. Locations at sea are determined from the Doppler shift of the frequencies of a series of signals received by the satellite. Baba *et al.* (2000) were able to follow a yearling SSL for 5 months using two location-only satellite-linked tags (conventional PTTs). Numerous studies of NFS have utilized PTTs for tracking habitat use during the summer season in the Bering Sea and during the winter migration into the North Pacific (Robson et al, 2004; Sterling and Ream, 2004; Ream et al, 2005).

Archival external instruments, such as TDRs, provide complete and non-generalized high-resolution dive, temperature, saltwater conductivity, and light level data. By combining a PTT and TDR it is possible to simultaneously determine locations and collect diving information while the animal is at sea. TDRs collect dive data, and need to be retrieved in order to recover the data. If animals cannot be recaptured to retrieve the TDR, the instrument can be encased in materials that float (e.g. syntactic foams), mounted with corrodible attachments, or deployed with a release mechanism. When the recovery of external instruments is not practical, satellite-linked time-depth recorders (SLTDR) are used and the data are transmitted by the PTT while the animal is at sea or saved for later while the animal is on land. SLTDR is now commonly used on SSLs and NFSs. For the purpose of this EIS, SLTDR is used to describe any externally-mounted satellite-linked behavior monitoring technologies including, but not limited to, Satellite Data Recorders and SPLASH (Wildlife Computers, Inc.), Satellite-Relay Data Loggers (SRDL, Sea Mammal Research Unit, St. Andrews, Scotland), and others. Because the SLTDR transmits dive and transmitter status to orbiting satellites when the animal surfaces, the need to recapture the animal is eliminated (e.g., Merrick *et al.* 1994). In the event an instrument is recovered, more detailed dive data that are archived in the instruments can be obtained.

Since the early 1990s, hundreds of Steller sea lions have been successfully monitored with SLTDRs (Merrick *et al.* 1994, Merrick and Loughlin 1997, Loughlin *et al.* 2003, Raum-Suryan *et al.* 2004, Pitcher *et al.* 2005, Fadely *et al.* 2006, Call et. al 2007).

The method most commonly used to attach SLTDRs is to glue them mid-dorsally either directly to the hair (Loughlin *et al.* 1993) or to a mesh patch fixed to the hair using fast-setting epoxy (Merrick *et al.* 1994). The tags currently used weigh between 170 grams (g) and 425 g, depending on the make, model, and battery configuration of the transmitter.

Modified PTT tags that also measure position and temperature, Smart Position and Temperature tags, weigh as little as 82 g. Because of their size, these units are commonly attached to the top of the animals' head via epoxy. Because the transmission time on these instruments is much shorter than that of an SLTDR, the head-mounted units allow for more at-sea positions to be transmitted. Both units fall off during the annual molt and are often not recovered. However, ADFG was able to retrieve more head-mounted instruments than dorsally-mounted instruments in a March 2006 study, likely because of increase in girth associated with growth causing dorsally-mounted instruments to pull the fur away from the hide. Additional concerns regarding the ability of SSLs to reach the antenna on dorsally-mounted devices with their teeth have been reported. Head-mounted instruments did not seem to have this problem (ADFG, pers. comm.). Dorsally-mounted SLTDR devices have been shown to not break the surface while the animal is at sea, causing artificially long dive durations to be reported because the technology used requires that the device break the surface of the water to transmit data (Frost *et al.* 2006; Pitcher *et al.* 2005). It has been observed that head-mounted devices break the surface more often, which would allow transmitted data to provide a more accurate picture of dive behavior (ADFG, pers. comm.).

Ultrasonic acoustic transmitters may also be used to track sea lions. An ultrasonic tag is approximately 90 mm in length and weighs 14 g in the water. The tag is attached to the animal by a mesh patch fixed to the hair using epoxy at the dorsal mid-line of the animal. Lea and Wilson (2006) found Steller sea lions tagged with acoustic transmitters could be tracked within 800 m.

Animal-borne cameras have been used to determine energy expenditure and prey ingestions in SSLs. However, there are limits to and biases associated with this technique. For example, commercially available portable video cameras are still fairly large and could potentially introduce a substantial amount of drag to the animals as they forage under water, thereby inflating the estimated cost of foraging. In addition, while it is possible to identify common prey species from captured footage even with low light levels, setting the rate of recording to ensure such brief feeding events are captured is limited by the data storage and power supply capabilities of this technology (Andrews *et al.* 2005).

Other external instruments that have been applied for include buoyancy devices to increase swimming drag, jaw opening sensors, breathing sensors that may include a flexible band around the chest, heat sensors and heart rate monitors attached to shaved areas, other data loggers, GPS, pop-up tags and digital cameras.

2.23.2 Objectives of Research Method

The SSL Recovery Plan identified the need to identify habitat requirements and areas of biological significance for SSLs and to investigate feeding ecology. Participants in a telemetry workshop convened by the Recovery Team in 1997 reiterated the importance of telemetry studies, especially those targeting feeding ecology and movements of juvenile SSLs.

2.23.3 Use of Data

Data obtained from SLTDR and VHF transmitters will contribute to ongoing investigations into seasonal movements, diving behavior, habitat selection, and foraging ecology of SSLs and NFSs. They are the only practical tool for following the movements of SSLs and NFSs during foraging trips, and for monitoring diving behavior. It will be particularly important for identifying winter foraging areas and refining the knowledge of the foraging capabilities of young sea lions. It will be crucial in assessing the potential effects of commercial fisheries on the status of SSLs and NFSs, though conducting studies on these effects is problematic.

2.23.4 Effects of Research

2.23.4.1 Steller Sea Lions/Northern Fur Seals

In addition to the effects of capture and restraint described previously, the attachment of an instrument can have both short- and long-term effects. It is conceivable that carrying the instrument itself might influence the animal's diving behavior through increased hydrodynamic drag or altered buoyancy. Possible short-term effects can include either a reduction or increase in foraging activity, or an increase in grooming at the expense of other behaviors (Kenward 1987). These types of effects are likely to be present after most tagging events and may be as much a delayed result of the capture and handling as the tag's presence.

The attachment of instruments to the hair with epoxy should not cause any pain if done properly, but may result in discomfort if the placement of the instrument causes pulling of the hair or skin as the animal moves. In addition, if the ratio of the resin and catalyst is not correctly measured, the resultant exothermic reaction can burn the animal's skin. Both the resin and the catalyst, or an excessive amount of epoxy can cause skin irritation and prolonged or repeated skin contact may cause sensitivity. The low vapor pressure of the resin by itself makes inhalation unlikely, especially because instrument deployment occurs in well ventilated areas. There is the possibility that an instrument would be knocked or torn off, pulling out the hair and/or some of the underlying skin, which would then be open to infection.

The first satellite-linked transmitters (PTT) were used to tag SSLs in 1987. Studies showed that if a tag was placed on the shoulder region of the animal, it cleared the water and was able to transmit a signal, but it slowed down the animal and required it to expend more energy. The first (Type 2) SLTDR units were deployed in 1990 and many of these units became detached during the molt or fell off because the fur was damaged by the application of too much glue. In 1992, the Type 3 SLTDR was used for a few years before being replaced with the SDR-T16, which generally has few problems.

2.23.4.2 Pinnipeds

Baker and Johanos (2002) found that there were no deleterious effects on survival, migration, or condition associated with research handling (including tagging) of Hawaiian monk seals. Henderson and Johanos (1988) also found no indication that tagging pups resulted in measurable harmful effects. Walker and Boveng (1995) found that attachment of TDRs to foraging Antarctic fur seals lengthened their foraging cycles.

Ultrasonic tags have been used successfully to track several marine mammal species, including ringed seals (Lydersen 1991), Weddell seals (Wartzok *et al.* 1992), and sea otters (Haverlack *et al.* 2001). Captive and free-ranging ringed seals showed no response to acoustic transmitters in the 50 to 75 kilohertz range (Wartzok *et al.* 1992).

2.23.4.3 Cetaceans

A study on a captive harbor porpoise (*Phoecena phoecena*) by Geertsen *et al.* (2004) found that the attachment of satellite tags had minor long-term effects of the animal's behavior. Changes in behavior were evident in the first hours or days after tagging, but thereafter the animal appeared to behave normally other than a slight increase in the mean dive duration.

2.23.4.4 Other Animals

Froget *et al.* (1998) found that flipper banding resulted in an adverse effect on both the survival and reproductive cycle of king penguins (*Aptenodytes patagonica*) on the Crozet Islands. They showed that returning birds were laying late the following breeding season, double-banded birds laid significantly later than single-banded birds, and that there was a lower return rate for the double-banded birds. Other researchers have reported that many instruments slow penguin swimming speeds significantly (Culik *et al.* 1994). Ballard *et al.* (2001) recommended using the smallest and most streamlined instruments to avoid affecting the animal, as well as for researchers to consider individual variation of timing.

2.23.5 Mitigation

Recent technology has led to miniaturization of instrument packages, which helps minimize effects caused by weight and added drag. Care is also taken to adjust the proportions of resin and catalyst to prevent a “hot” mix, and to use the minimum practical amount of epoxy to prevent burning the sea lion’s skin.

3.0 CONCLUSIONS

3.1 Current State of Knowledge on Effects of Research

At the most basic level of analysis, research activities can be divided into two broad categories: non-intrusive and intrusive. Non-intrusive activities are those that do not result in physical contact between researchers or research tools and SSLs or NFSs. Thus, aerial surveys, vessel surveys, and observational activities would be considered non-intrusive. Anything that requires capture and handling (including blood and tissue sampling, marking, attachment of instruments, administering chemicals) or some form of physical contact with the animal (including remote biopsy sampling, remote marking, and remote darting for sedation) would be considered intrusive.

It should be noted that even non-intrusive activities might have adverse effects that cause an animal to be injured or die, particularly if the activities are repeated or cause substantial disturbance during the breeding season. Although studies of the effects of human disturbance in the marine environment are somewhat limited, the literature on effects of human disturbance of wildlife in general, including that from the terrestrial animal world, indicates there is reason to assume that human disturbance, even when it does not result directly in physical injury, can have substantial adverse impacts on marine mammal individuals or populations. Studies of stress in humans suggest that chronic stress can have serious consequences, such as weakened immunity leading to more frequent illness and shortened life span.

In general, the risks of adverse effects (such as stress, pain, injury, or mortality) on individual sea lions or northern fur seals are greater from intrusive activities than from non-intrusive activities for the following reasons. First, wild animals are often stressed by the presence or close approach of humans, whether on foot or in some kind of vehicle. For example, studies on terrestrial mammals have shown that bighorn sheep (*Ovis canadensis*), mule deer (*Odocoileus hemionus*), and moose (*Alces alces*) have demonstrated greater fear responses to people than to machinery (MacArthur *et al.* 1982; Freddy *et al.* 1986; Andersen *et al.* 1996). Because non-intrusive activities typically take place at a greater distance from the animals than intrusive activities, the potential for this type of stress is reduced relative to intrusive activities. However, long-term effects of human disturbance that interferes with the activity pattern of hauled-out sea lions could potentially have consequences on life cycles and activities (Kucey 2005). For rare or declining species, displacement may reduce reproductive success, presence in the area, parental care, foraging efficiency and prey intake rates, and increase stress and vigilance levels (Andersen *et al.* 1996; Riffell *et al.* 1996; Gill *et al.* 2001a). At a population level, species with high fitness costs and few habitat choices are the ones most likely to be adversely affected by disturbance (Creel *et al.* 2002).

Second, many intrusive activities have an inherent risk of injury or mortality, either direct or indirect, or injuries result in varying degrees of pain and stress. Some injuries may increase an individual animal's risk of infection. Some injuries or secondary infections can lead to reduced fitness or mortality of individual animals. Even those injuries that do not result in infection or death have physiological costs associated with healing. Whether the cost of wound healing leads to reduced fitness would depend on many factors including the body condition of the animal at the time of the injury, the time of year (as it relates to thermoregulatory and other homeostatic demands), and the availability of adequate nutrients.

3.2 Connection with Recovery and Conservation Plans

3.2.1 Steller Sea Lion Recovery Plan

According to the SSL Recovery Plan, the following recovery actions were identified that are specifically tied into the various research activities discussed in this document:

Task 1, Baseline population monitoring.

Baseline population monitoring is necessary to support all of the recovery actions. They describe the status and trends, vital rates, and health and body conditions of individuals. Research methods that provide data on baseline population include aerial and land-based surveys, branding/re-sighting program, tissue sampling, and live capture/restraint. The SSL Recovery Plan also calls for improvement and/or development of methods with which to establish reproductive rates; provision of indices of health and status using chemical methods; and improvement of live capture methods and non-lethal sampling techniques.

Task 2, Insure adequate habitat and range for recovery.

The SSL Recovery Plan identifies the need to better understand habitat and range for recovery of SSLs. This task is, by far, the most dependent on existing and continued research.

To determine critical habitat, sea lion foraging habitat, seasonal distribution patterns, historical aerial and land-based survey data are used, as well as satellite telemetry. The SSL Recovery Plan identifies the need for improved satellite telemetry data to obtain fine-scale data on foraging habitat, seasonal distribution, and environmental factors that influence foraging and survival. Useful technologies include global positioning system, STT in conjunction with SLTDR, sonar tracking, and integration of physical/biological oceanographic data that influence prey and SSL distribution.

To estimate prey consumption and determine essential characteristics of the habitat, the research methods typically used are scat collection, analysis of stable isotopes and FA signatures, analysis of whiskers for period of growth. The SSL Recovery Plan identifies the need to improve upon these methods.

The SSL Recovery Plan identifies the need to develop methods to measure energetic costs and physiological diving capabilities of diving pinnipeds.

The SSL Recovery Plan also identifies the need to assess prey resources for SSLs and interactions with fisheries. Integration of data from SSL research and fisheries research will be important in understanding this interaction.

Task 3, Protect from over-utilization for commercial, recreational, scientific, or education purposes.

The SSL Recovery Plan calls for researchers to use new technologies that reduce disturbance, potential mortality, and the need for invasive methods. Approach and handling methods will be reviewed periodically to minimize the potential for injury or mortality, In addition, studies should be undertaken to evaluate the effects of disturbance by particular research activities.

Task 4, Protect from diseases, contaminants, and predation.

The SSL Recovery Plan calls for analysis for agents or diseases with potential to affect the survival, growth, reproductive, etc. effects on SSLs. Research methods that provide these data include blood sampling, fecal samples, tissue sampling, and stomach content analysis. Research on the effects of predation on SSLs will focus on killer whales. Integration of data collected from those studies with SSL data is important.

Task 5, Protect from other natural or man-made factors and administer the recovery program

The SSL Recovery Plan notes that scientific research is essential for understanding and mitigating the threats to SSL recovery. A new, streamlined process should be investigated to reduce the permitting process for SSL-related research to less than 6 months to facilitate research opportunities that would aid in implementation of the SSL Recovery Plan.

3.2.2 Northern Fur Seal Conservation Plan

According to the NFS Conservation Plan, the following conservation actions were identified as specifically tied to the various research activities discussed in this document.

Objective 1, Identify and eliminate or mitigate the cause or causes of human-related mortality of the Eastern Pacific stock of NFSs.

Research would be directed at examining the distribution and abundance of debris onshore and at sea relative to juvenile and female NFSs at various reproductive stages (beginning of reproduction, lactation, departing of females); determine the probable fate of discarded fishing gear and other debris near areas inhabited by NFSs; and monitor and review data collected from fisheries observers related to NFS incidental takes. Research methods would include aerial and land-based surveys, physiological studies, and collection of telemetry data.

Objective 2, Assess and avoid or mitigate adverse effects of human related activities on or near the Pribilof Islands and other habitat essential to the survival and recovery of the Eastern Pacific stock of NFSs.

Research would be directed at evaluating the potential vulnerability of NFSs to vessel traffic, oil spills, offshore oil and gas development, and harbor development. Studies would need to continue to monitor radio and/or satellite tagged animals to determine seasonal distribution, age-class behavior, etc. Aerial and land-based surveys would continue to provide data on pup production, territory structure, and population trends. The analysis of environmental pollutants/contaminants would be conducted via use of tissue sampling and oceanographic sampling.

Objective 3, Continue and, as necessary, expand research or management programs to monitor trends and detect natural or human-related causes of change in the NFS population and habitats essential to its survival and recovery.

The NFS Conservation Plan identified the need to monitor changes in the size, productivity, and vital rates of the NFS stocks. Research methods used to conduct these studies include aerial and land-based surveys, satellite telemetry, scat collection, marking/re-sighting, and biological/physiological sampling. The NFS Conservation Plan also calls for improvements of these methods to reduce disturbance, as well as coordination and integration of intra- and interspecies research.

Objective 4, Coordinate and assess the implementation of the conservation plan, based on implementation of Conservative Actions and completion of high priority studies.

The NFS Conservation Plan notes that scientific research is essential for understanding and mitigating the threats to NFS conservation. In particular, it states:

> "*Data collected through any research outlined in this plan should be analyzed and reported in a timely manner. Reports should be thoroughly referenced, independently reviewed and be organized to facilitate comparison with existing reports. As much as possible, data should be presented in peer-reviewed periodicals and other open publications to ensure that research programs benefit from regular peer commentary. To the maximum extent possible, research efforts should collect data that can be compared with historical data. Studies may need to be conducted to calibrate results from newly developed techniques with those obtained by previous methods. Data analysis should examine trends over time and attempt to correlate observed changes with physical, biological, or human-induced changes in the environment. Analysis should emphasize correlations between regional differences in fur seal population trends with factors such as physical oceanography, food resources, and human activities (e.g., fishing, habitat degradation, harassment). Such correlations can indicate causes of declines which may lead to more effective management.*"

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Appendix C

Comments Received on the 2007 Steller Seal Lion and Northern Fur Seal Research Draft Programmatic Environmental Impact Statement

2006 NMFS Steller Sea Lion and Northern Fur Seal Research EIS Public Scoping Report

Comments Received on 2005 Environmental Assessment of the Effects of Permit Issuance for Research and Recovery Activities on Steller Sea Lions

Comments Received on 2002 Environmental Assessment on the Effects of NMFS Permitted Scientific Research Activities on Threatened and Endangered Steller Sea Lions

1.0 INTRODUCTION

1.1 The Role of Public Comment

The National Environmental Policy Act (NEPA) is a procedural law intended to facilitate better government decisions concerning the development of our lands and oceans. NEPA does not dictate protection of the environment, but instead assumes that common sense and good judgment will result in the development of the nation's resources in a way that minimizes adverse impacts to our environment. This is achieved by requiring an open, public process whereby the responsible government agency, combined with the stakeholders associated with a particular natural resource and development project, all pull together relevant information for use in making decisions.

Solicitation of public comment on proposed research grants and permits is required under NEPA. Further NMFS must "assess and consider [the resulting public] comments both individually and collectively." Most importantly, such comments are viewed by NMFS as critical in helping managers to shape responsible plans for Steller sea lion (SSL) and northern fur seal (NFS) research that best meet NMFS' mission. During the formal comment period the public can review and comment on a draft Environmental Impact Statement (EIS) on the proposed action. The comment period described in this document is part of a broader effort of public involvement and agency consultation described in Section 2.2 and Appendix C of the *Final Steller Sea Lion and Northern Fur Seal Research Programmatic Environmental Impact Statement* (hereafter referred to as the Final PEIS). The comments received are analyzed and the results considered by NMFS management while developing the Final PEIS. Section 2 The Comment Analysis Process of this Comment Analysis Report (CAR) provides a more complete discussion of how NMFS addresses public comments.

1.2 The Public Comment Period and the Comment Analysis Report

The *Draft Steller Sea Lion and Northern Fur Seal Research Programmatic Environmental Impact Statement* (hereafter referred to as the Draft PEIS) was released for public review on February 16, 2007. This Draft PEIS provided an environmental review of the research grants and permits authorized by NMFS. The public comment period lasted for 45 days and concluded on April 2, 2007. During the public comment period three public hearings were held in Silver Spring, Maryland, Seattle, Washington, and Anchorage, Alaska. Only one person provided oral testimony on the Draft PEIS, and these comments were later submitted as the formal comments by the Humane Society (Submission Number 1). Overall, fourteen submissions were received by NMFS via e-mail, mail or fax by the deadline. Table 1 lists all the submissions received by NMFS on the PSEIS.

Table 1
Submissions

Submission	Name	Organization	Type
1	Young, Sharon	Humane Society of the United States	Written Comment
2	Ianelli, James	Alaska Fisheries Science Center	Email/Fax
3	Eischens, Carrie	Alaska Department of Fish and Game	Email/Fax
3	Rehberg, Michael	Alaska Department of Fish and Game	Email/Fax
3	Clark, Cheryl	Alaska Department of Fish and Game	Email/Fax
4	Ragen, Timothy	Marine Mammal Commission	Email/Fax
5	Hillstrand, Nancy	Pioneer Alaskan Fisheries Inc	Email/Fax
6	Horning, Markus	Oregon State University Marine Mammal Institute	Email/Fax
7	Bengtson, John	National Marine Mammal Laboratory	Written Comment
8	ASLC Committee	Alaska SeaLife Center	Written Comment
9	Cook, Alfred	World Wildlife Fund	Written Comment
10	Ozbenian, Serda	Animal Welfare Institute	Email/Fax
11	Lestenkof, Aquilina	Aleut Community of St. Paul Island	Written Comment

Table 1 (continued)
Submissions

Submission	Name	Organization	Type
11	Zavadil, Phillip	Aleut Community of St. Paul Island	Written Comment
12	Galipeau, Russell	U.S. Department of the Interior, National Park Service	Written Comment
13	Wright, Andrew	Leviathan Sciences	Written Comment
14	Reichgott, Christine	U.S. Environmental Protection Agency	Written Comment

1.3 What is the Response to Public Comments?

NEPA requires government agencies to include in a Final EIS all the substantive comments received on the Draft. The Final document must include responses to the comments or comment summaries, and if changes to the Draft document are made as a result of those comments, indication of where they were made in the document. This CAR serves as the public comment summary and response to comment document for the Draft PEIS. It presents the methodology used by NMFS in reviewing and sorting the comments, and it presents a synthesis of all comments that address a common theme. As will be described in the following sections of this report, a careful and deliberate approach has been undertaken to ensure that all substantive public comments are reviewed, considered, and responded to.

1.4 The Analysis of Public Comment on the Steller Sea Lion and Northern Fur Seal Research Draft Programmatic EIS

All submissions on the Draft PEIS were read and given a unique Submission ID#. Public comments were reviewed and entered into a database application developed for this project called *Testimony Tracker*. The total number of submissions with an assigned tracking submission number is 14. Of these, 200 specific substantive comments were identified and entered into the database for tracking and synthesis. These comments were coded by issue categories, with many comments receiving more than one issue code. Twenty-five issue categories were used to organize the public comments by theme.

The outcome of this phase included identifying issues of public concern and preparing a summary of statements derived from comment submissions. Each public concern presents, in a simple statement, a unique theme found in the body of their comment. The public concern statement is worded from the point of view of the commenters, providing decision makers with a clear sense of the public's intention. Concern summary statements are not intended to replace actual comment submissions. Rather, they summarize for the reader the range of comments on the specific topic in which they are interested.

2.0 THE COMMENT ANALYSIS PROCESS

The analysis of public comments on the Draft PEIS was a multi-stage process that included coding, sorting and summarizing public comment submissions into categories of statements of concern explained in detail below.

All comments were logged into a comprehensive database, referred to as the *Testimony Tracker*, following specific standardized processes for entering the following information associated with each comment: sender's name, address, affiliation (if any), type of comment (i.e. form letter or individual comment), date submitted, and comment text. Each submission was assigned a unique set of numbers representing the type of comment, submission, and form letter. In addition, each organization or individual received a unique identification number, even in the cases where more than one individual signed the same submission.

2.1 Sorting, Analysis and Coding

Each submission was initially reviewed by a minimum of two coders. The coding phase was used to divide each submission or transcript into a series of ‘comments’, each having a unique Comment ID number. The goal of this process was to ensure that each sentence and paragraph in a comment submission containing substantive content pertinent to the Draft PEIS was entered into the *Testimony Tracker* database designed for this project. Substantive content constituted assertions, suggested alternatives or actions, data, background information or clarifications relating to the Draft PEIS document or its preparation. In identifying the ‘comments’, coders attempted to section out single-themed blocks (usually sentences or paragraphs) in order to minimize duplication of issues within a single ‘comment’; although this was not always possible. Coders assigned each ‘comment’ to one or more issue categories.

Next, a second review of the comments within each issue category was conducted to identify specific concerns. These are synthesized into succinct “statements of concern” or SOC that is intended to capture the general issues raised in comments that have similar themes. Each SOC is given an identification number based on the three (or four) character code for the issue category (e.g., AKN for Alaska Native Issues), and numbered consecutively. Each substantive comment was assigned to one or more SOCs.

The final step in the sorting process was a global review of the SOCs to minimize unnecessary duplication. Where possible, similar statements were combined into one statement and placed in an issue category best fitting the overall concern. As a result, in cases where an SOC could feasibly be allocated to more than one category, a decision was made to place it in the one that appeared most logical to NMFS. If the reader is searching for a particular statement of concern, he or she may be advised to check all related categories. NMFS has responded to each SOC (see Section 3.0).

2.2 Public Comment Overview

In order to effectively screen public concerns, NMFS identified a wide range of potential issue categories for comment on the Draft PEIS. Twenty-five issue categories (Table 2) were developed for coding based on an examination of issues raised during public scoping, and the chapter structure of the Draft PEIS.

Table 2
Issue Categories

Issue Code	Issue
AKN	Alaska Native Issues
ALT	Alternatives
ANA	Analysis of Effects
BRD	Hot Branding
CON	Conservation of the Species; Conservation Goals
COR	Coordination
CUM	Cumulative Effects
DUP	Duplication of Research Effort or Goals
EDI	Editorial
EFF	Effects of Research
INA	Inadequate Information to Assess Effects/Unclear Information
MET	Methodology
MGT	Management
MIT	Mitigation
MON	Monitoring
MOR	Mortality
NEPA	National Environmental Policy Act
PBR	Potential Biological Removal

Table 2 (continued)
Issue Categories

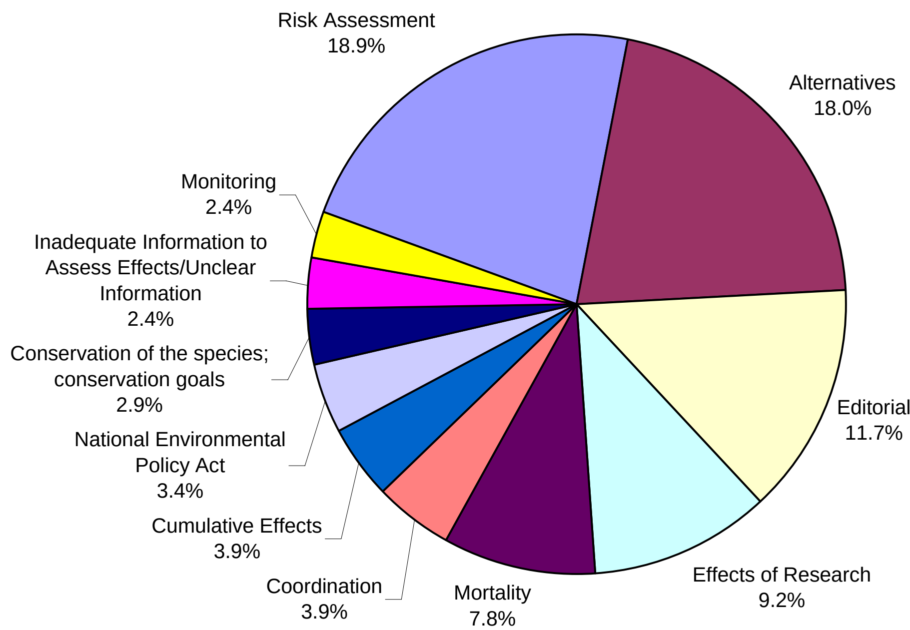
Issue Code	Issue
PER	Permits
REP	Reporting requirements
RES	Research
RISK	Risk Assessment
SST	Sample Size/Techniques
TAKE	Take (Incidental; Direct)
WEL	Welfare of the Animals

The Draft PEIS attracted 14 public comments. This total includes all letters and e-mails submitted to NMFS during the public comment period, as well as testimony provided at the various public hearings held on the Draft PEIS. The majority (8 of 14) of all public comments on the PEIS was received via e-mail.

Following the review and coding of the submissions received, several issues were identified. These issues cover the most common areas of concern about the Draft PEIS as synthesized from the range of public comments. Although major issues, they by no means represent the totality of comments resulting from the public comment period.

The greatest number of substantive comments deal with identifying a Preferred Alternative and the risk assessment used to analyze the potential effects of the proposed action (Figure 1).

Figure 1: Top Issues Identified in the Public Comments on the PEIS



3.0 RESPONSE TO COMMENTS

Responses to comments are organized by SOC. To find the response to specific submissions:

1. Look up the name of the organization in Table 3.
2. Note the SOC associated with that submission.
3. Turn to the section in the Response to Comments Report for that SOC.

Response to comments was a two step process. NMFS has included in this document an official response to each public concern statement listed in the Draft CAR. Additionally, where appropriate, the PEIS project team has addressed public comments regarding the restructuring of the Draft PEIS. References to changes in the document resulting from public comments are indicated in the CAR response.

Table 3
Submissions with Statements of Concern (SOC)

Commenter	SOC CODES		
Alaska Department of Fish and Game	EDI 02		
Alaska Fisheries Science Center	EDI 01		
Alaska SeaLife Center	ALT 08		
	NEPA 04		
Aleut Community of St. Paul Island	AKN 01		
	COR 03		
	EDI 01		
	NEPA 04		
Animal Welfare Institute	ALT 01	CUM 02	MON 01
	ALT 02	DUP 01	NEPA 01
	ALT 04	EFF 02	NEPA 02
	ALT 05	INA 01	RISK 02
	COR 01	MMPA 01	WEL 01
Humane Society of the United States	ALT 09	EFF 01	NEPA 03
	ALT 11	EFF 02	REP 02
	ANA 01	EFF 03	RES 02
	BRD 01	INA 01	RISK 01
	CON 01	MON 01	RISK 02
	COR 02	MON 03	RISK 03
	CUM 03	MOR 02	RISK 04
	DUP 02	NEPA 01	SST 01
	EDI 04		
Leviathan Sciences	ALT 02	MOR 02	
	ALT 03	NEPA 01	
	ALT 05	PER 01	
	ALT 07	PER 02	
	ANA 01	REP 01	
	CON 01	RISK 01	
	COR 01	RISK 03	
	CUM 01	RISK 04	
	EDI 01	RISK 05	
	INA 02	TAKE 01	
Marine Mammal Commission	ALT 06	EFF 03	EFF 01
	ALT 09	MET 01	
	ALT 10	MGT 01	
	ANA 01	MOR 02	
National Marine Mammal Laboratory	EDI 03		
	MOR 02		
Oregon State University Marine Mammal Institute	ALT 03	EFF 04	
	ALT 08	MOR 02	
	EDI 02	MOR 03	
Pioneer Alaskan Fisheries Inc	ALT 01	EFF 03	

Table 3 (continued)
Submissions with Statements of Concern (SOC)

Commenter	SOC CODES		
Pioneer Alaskan Fisheries Inc	ALT 04	MOR 01	
	CON 01	RES 01	
	DUP 01		
U.S. Department of the Interior, National Park Service	ALT 08		
U.S. Environmental Protection Agency	AKN 02	RISK 02	
	EFF 01	RISK 04	
	MIT 01	RISK 05	
World Wildlife Fund	ALT 02	ALT 11	EFF 01
	ALT 04	CON 01	EFF 02
	ALT 05	COR 02	EFF 03
	ALT 07	CUM 01	EFF 05
	ALT 08	EDI 01	MET 01
	ALT 09	EDI 02	MGT 01
	ALT 10	EDI 03	

Alaska Native Issues

Overview:

Includes comments on the analysis of the cultural and social impacts of the alternatives on Alaska Natives and their involvement/consultation in the SSL NFS Research PEIS.

AKN 01

The analysis in the Draft PEIS is productive. However, it is incomplete because it does not incorporate Native traditional knowledge, knowledge that may be more "discovery oriented". By this we refer to investigations whose aim is to discover how things work in a more general sense: the traditional Native approach to understanding nature. It would be appropriate to acknowledge this in the preamble of the PEIS.

Response:

NMFS recognizes the significance of Native traditional knowledge regarding marine mammals. Alaska Native traditional knowledge is addressed in Sections 3.2.1.10 and 3.2.2.9 of the PEIS. Text has been modified in the beginning of the Executive Summary to acknowledge that traditional knowledge provides information regarding SSLs and NFSs in addition to the information provided by research summarized in the PEIS. NMFS currently has two co-management agreements with the communities of St. George and St. Paul (see Section 3.2.1.13 and Appendix G). Co-Management Councils provide a means to incorporate Native traditional knowledge into management of these species. The Councils were established to develop annual management plans, monitoring programs, and research programs; to annually review the contents, performance, and responsibilities in the agreements; to assess progress towards implementation of the agreement; to identify challenges to achieving the purpose of the agreement; to recommend solutions to any identified challenges; to identify future courses of action; and to review applicable laws and regulations governing the subsistence take and use of NFSs and SSLs for the purpose of making recommendations for appropriate change to NMFS.

AKN 02

While there is evidence in the PEIS of consulting with Native tribes consistent with Executive Order 13175 (Consultation and Coordination with Indian Tribal Governments), the document does not contain a specific section discussing these activities undertaken by NMFS.

Response:

NMFS recognizes that they have special obligations to consult and coordinate with Tribal Governments on a Government-to-Government basis pursuant to Executive Order 13175. In January 2006, prior to the release of the Draft PEIS, the Agency formally extended invitations to tribal governments throughout the project area to discuss the details of the project and provide an opportunity to discuss SSLs and NFSs and issues related to research on those species. Additional discussion of the consultation and coordination undertaken for this project has been added to Section 1.7. A summary of additional outreach to other Native groups is provided in Appendix E.

Alternatives

Overview:

Includes comments that support or reject the preferred alternative or suggest new alternatives.

ALT 01

Comments in support of Alternative 1.

Response:

NMFS acknowledges the recommendation to implement Alternative 1 and has taken it into consideration in choosing a Preferred Alternative. The Preferred Alternative provides the opportunity for collection of optimal amount of critical information needed to meet NMFS management requirements for SSLs and NFSs. Alternative 1 does not provide recommended information needed to monitor SSL and NFS population and trends, as identified in recovery and conservation plans.

ALT 02

NMFS has not considered or provided a reasonable range of alternatives

Response:

The 2007 Draft PEIS does examine an adequate range of alternatives consistent with the requirement of NEPA and the Court's order. Alternatives considered but not carried forward are discussed in Section 2.7 of the PEIS. The alternatives developed include the full range of intrusive and non-intrusive research techniques and varying levels of take that would result from proposed research. Alternatives 1 through 4 facilitate the examination of the environmental impacts expected from SSL and NFS research programs which range from issuing no permits (Alternative 1) to being less restrictive about research activities than the current program (Alternative 3 Status Quo). At one end of this spectrum is Alternative 1, no new research permits or authorizations, which would limit research to those methods that do not result in "takes" of marine mammals. No animals in the wild would be exposed to researcher activity under this alternative. Alternative 2 would prohibit any research that requires capturing and handling of animals or researcher presence on rookeries during the breeding season. Alternative 3 represents Status Quo and would include permits that were valid on January 1, 2006, including those permits that were subsequently vacated. Alternative 4, full implementation of the Recovery and Conservation Plans, would include the same types of research as described in the status quo and could include techniques that have not been previously requested or authorized. There are significant differences between Alternative 1 and Alternative 4. Alternative 1 is the no action alternative, which must be examined in an EIS (40 CFR 1508.25(b)(1)). Upon review of the alternatives under consideration in the PEIS, NMFS has concluded that there is an adequate range of and sufficient contrast among Alternatives 1 through 4 to sharply define the programmatic issues for research on SSLs and NFSs.

ALT 03

The Preferred Alternative proposes to exceed PBR by 110%, which is unjustifiable for an endangered population. Alternative 4 should be refined such that it will not result in a continuation of the already unfettered approach to research that necessitated this review in the first place.

Response:

The Preferred Alternative provides the opportunity to collect the optimal amount of critical information needed to meet NMFS management requirements for SSLs and NFS, while Alternatives 1 and 2 could provide a minimum amount of information needed to monitor SSL and NFS populations and trends, particularly for NFS. The direct and indirect effects of the Preferred Alternative at full implementation would represent 13% of PBR, and contribute to a cumulative impacts of 105% PBR (see Section 4.8.1). NMFS will phase implementation of the preferred alternative, limiting intrusive effects to specific rookeries, with a requirement for post-research monitoring. See response to comments CUM 01 and PBR 05 for further explanation of cumulative effects and PBR.

ALT 04

The most viable alternative is to suspend intrusive research for both SSLs and NFSs until there can be adequate post-handling monitoring. Alternatives 3 and 4 are wasteful and non-productive. The most conservative alternative (not the Preferred Alternative) should be chosen due to a lack of information regarding long-term post-capture mortality from invasive research.

Response:

The Preferred Alternative provides the opportunity to collect the optimal amount of critical information that could be used by NMFS for management of SSLs and NFSs. Alternative 1 does not allow collection of information needed to monitor SSL and NFS population and trends, as identified in Recovery and Conservation Plans, and required by MMPA. NMFS has conservatively estimated the potential for unobserved mortality in estimating the potential direct, indirect, and cumulative effects of research. In addition, to further address concerns about unobserved mortality, NMFS will phase in implementation of the Preferred Alternative, limiting intrusive effects to specific rookeries, with a requirement for post-research monitoring. This post-research monitoring information will then be used to re-assess estimates of unobserved mortality, and conditions that are placed on research prior to resumption of more intrusive research contained in the Preferred Alternative.

ALT 05

Comments in support of Alternative 2. This is the most risk-averse alternative and still offers meaningful contributions toward the recovery of both species. Until NMFS establishes an International Animal Care and Use Committee (IACUC), has an implementation plan in place, and has adequate post-procedure monitoring, Alternative 2 is the only reasonable alternative.

Response:

See response for ALT 01. NMFS agrees that a better understanding of the effects of research activities is desirable. As indicated in Chapter 5, NMFS will establish an implementation plan for SSL and NFS research that will assess current research practices and develop best management practices for SSL and NFS research.

ALT 06

NMFS should consider additional alternatives, including prohibiting fishing in areas large enough to ensure that fishing has no effect on prey availability and then observe SSL population trends to see if they respond. If NMFS is committed to investigating and understanding the effects of fishing on the marine ecosystem, including species like SSLs and NFSs, the PEIS should provide a thorough discussion of the costs and benefits of an adaptive experimental approach for assessing potential fishery effects.

Response:

The purpose and need for the proposed action is to award grants and issue permits under Section 104 of the MMPA and Section 10 of the ESA to facilitate research associated recovery and conservation of SSLs and NFSs. NMFS evaluated a broad range of alternatives appropriate to the purpose and need; alternatives evaluated not carried forward for analysis are described in Chapter 2.7. The four alternatives analyzed in the Draft PEIS reflect the full spectrum of existing and foreseeable research activities, and reasonable management policies.

ALT 07

The status quo alternative is incorrectly represented. The Draft PEIS states that this alternative represents activities of the "type and scope" of research permitted prior to the court order that vacated many permits; the charts accompanying this alternative do not reflect that. Nor is there any explanation offered for discrepancies. The Status Quo Alternative (Alternative 3) should not include those permits that were vacated by the court; to present this as the baseline is arbitrary and capricious. Instead, the Status Quo alternative should include research that is currently authorized. An appropriate baseline should be the current level of research as of the Final PEIS but also covering any research that was expired as of publication of the NOI.

Response:

When NMFS initiated preparation of the PEIS in 2005, the status quo for research that had been permitted was the equivalent of Alternative 3. At the time the NOI was published (December 28, 2005), several permits were still in effect. The description of status quo is appropriate for characterizing the research that has occurred in recent years.

ALT 08

We support Alternative 4. The analysis of full implementation of the 2006 Draft SSL Recovery and 2006 Draft NFS Conservation Plan goals (Alternative 4) is important as it provides an evaluation of the full potential for research-related mortality and disturbance. Although this level of research may never be realized, it is important to carefully monitor its effects on wild populations.

Response:

NMFS acknowledges the recommendation to implement Alternative 4 and has taken it into consideration in choosing a Preferred Alternative. The Preferred Alternative provides the opportunity for collecting the optimal amount of information for NMFS management of SSLs and NFSs.

ALT 09

The Preferred Alternative should include development of a research implementation plan that provides a framework for prioritizing goals and guiding research in accordance with the Recovery and Conservation Plans. Such as plan should be used during the 2007 research season and will improve coordination among researchers to avoid unnecessary effects of multiple research projects at particularly accessible rookeries as is indicated in Section 4.8.1.3 of the Draft PEIS. Additional coordination, mitigation and monitoring measures to minimize potential impacts of research should be included in the Preferred Alternative.

Response:

NMFS agrees that a research implementation plan should be developed that addresses, among other items, providing a framework for guiding research in accordance with the Recovery and Conservation Plans. Section 5.2.1 describes the specific steps NMFS will pursue to develop this research imlementation plan. It should be noted that both the Recovery and Conservation Plans are in draft stage, and are likely to be revised based on public comments. Until these plans are finalized, the previous plans remain in place. Researchers must currently identify how their research addresses the Conservation and Recovery Plans, and NMFS reviews this information in permit applications. Section 5.2.1 also addresses additional recommendations regarding coordination, reporting and monitoring activities.

ALT 10

NMFS should explain why alternatives focusing on priorities identified in the Recovery and Conservation Plans, which were discussed in the Focus Group Meetings in August 2006, were rejected from analysis. These alternatives included an adaptive management approach for fisheries, climate change and predation.

Response:

After holding the focus group meetings in August 2006, NMFS received several comments recommending against tying alternatives to the new draft Recovery and Conservation Plans, particularly since they are in draft form, and are likely to be revised based on public comments. In addition, NMFS has recommended that a research implementation plan be developed that addresses, among other items, providing a framework for guiding research in accordance with the Recovery and Conservation Plans. Researchers must currently identify how their research addresses the activities identified in the Conservation and Recovery Plans, and NMFS reviews this information in permit applications.

ALT 11

The Draft PEIS admits that the Preferred Alternative (Alternative 4) “may require the use of techniques or protocols that have not been previously requested or permitted” and “may involve unique or uncertain risks to the animals.” (ES-8). The Draft PEIS makes no attempt to delineate, nor can it, what new research techniques and “unique and uncertain risks” animals will face. Without identifying the type of research that will occur, NMFS cannot possibly meet its burden of considering the effects of research proposed in its preferred alternative. 40 C.F.R. § 1502.16. It is entirely inappropriate for the NMFS to attempt an estimation of impacts when it has admitted it does not know the extent of future research and/or what new techniques, protocols or risks might result from this expanded effort.

Response:

NMFS agrees that techniques or protocols, and their associated effects, that have not been included in an alternative within this PEIS, cannot be considered in compliance with the PEIS and will require a separate NEPA compliance review and approval. However, there may be variations of research techniques that have been discussed within the PEIS and their potential effects have been adequately evaluated. In such cases, it may be appropriate to conclude that the research method and potential effects were evaluated within the PEIS, and NEPA compliance can be documented by a Memorandum to the File.

Analysis of Effects

Overview:

Includes comments on the analysis of effects of the proposed alternatives or the methodology developed to analyze the alternatives.

ANA 01

The Draft PEIS focuses on the analyses of the effects of research and does not adequately consider the benefits of research, or various alternatives to research methods. Both costs and benefits need to be weighed for informed decision-making that considers the net value to the species, particularly endangered and depleted species.

Response:

Section 4.8.1 and 4.8.2 discusses the contribution research provides towards conservation objectives listed in the 2006 Draft SSL Recovery Plan and the 2006 Draft NFS Conservation Plan. Focusing research efforts on these goals and objectives does have to be weighed against adverse effects on the species and should be a key element in the decision making process with regard to protecting these animals. Under Alternative 4, NMFS would consider proposals for research that could pose a higher risk of injury to individual animals only if the permit applicant could demonstrate that the research has a reasonable chance of providing significant data relevant to conservation of the species.

Hot Branding

Overview:

Includes comments on the use and effects of hot branding.

BRD 01

Hot branding should not be used unless there is no less invasive alternative. One of the mitigation measures suggested is that pups be "restrained…without using either a restraint board or drugs…" (Draft PEIS at B-23). Further, it is not clear that all non-pups to be branded will receive anesthesia. This exposure of animals to unmitigated "severe pain" would seem inhumane. This would appear to violate the MMPA's mandate that research be humane. 16 U.S.C. § 1374(b)(1)(B) .

Response:

Section 2.9 of Appendix B of the EIS discusses the potential effects of hot branding as well as the information gained by using this method to mark animals. Hot branding has been used for centuries to mark animals and is an effective way to track distribution of animals within a population. Branding of SSL and non-pups pups is done with the use of anesthesia to prevent acute pain during the procedure and to assure brand quality. Data from resighting studies of branded animals are very useful in determining vital rates (survival and reproduction), population structure, seasonal use and movement patterns, dispersion from natal sites, and site fidelity. Rigorous resighting efforts are essential components of successful branding programs. Alternative methods for permanent marking of individual animals have been assessed and either produce less reliable marks (cold-branding), less permanent marks (flipper tags), or require the animals to be recaptured (tattoos or electronic tags). Hot branding is therefore the technique of choice for providing data on long-term population dynamics. Given the current branding procedures, the risk of injury or mortality associated with branding is minimal compared to the benefits gained from the results. However, as part of a research implementation plan review, the use of hot branding as a research tool will be evaluated and best practices will help determine how and when it should be used. Please also see the response to EFF 02.

Conservation of the Species; Conservation Goals

Overview:

Includes comments and suggestions on priorities for conserving SSLs and NFSs as well as criticisms of how the proposed action meets conservation goals.

CON 01

Research objectives should be coordinated with the overall goal of recovering and conserving the species. NMFS should develop an implementation plan that provides a framework for establishing annual priorities that are in accordance with the Recovery and Conservation Plans.

Response:

NMFS agrees that it is important to develop a formal implementation plan for establishing research priorities in accordance with the 2006 Draft SSL Recovery and 2006 Draft NFS Conservation Plans. Chapter 5 of the PEIS includes a list of specific steps that NMFS will pursue regarding coordination of research and reviewing research priorities in relationship to the Plans. Historically, several entities that have identified research goals in accordance with the Plans that have influenced how research activities are prioritized. The SSL Recovery Team organized workshops to review research conducted to date in pursuit of the Recovery Plan, and to identify necessary changes in the research program. As a result of those workshops, recommendations for further research studies have been made.

Coordination

Overview:

Includes comments related to coordination of research among researchers and within NMFS as well as suggestions for improving coordination of research goals.

COR 01

There is a lack of coordination among permitted research and it must be rectified in order to support species management and to promote conservation and recovery of the species. Coordination is also essential with the Native communities, particularly due to the co-management agreements. Coordination should be required and enforced rather than voluntary.

Response:

NMFS agrees that development of a formal implementation plan for coordination of research is important. Sections 3.2.1.12 and Chapter 5 describe the informal coordination that has routinely occurred since 2000 among researchers prior to each field season. The intent of these meetings was to discuss where and when research activities were to take place and to prevent duplication of effort. Although there is not a formal coordination plan currently in use, coordination among researchers is required by NMFS and is conducted voluntarily by the researchers, as discussed in Section 4.7.2.2. Over the last 6 years, 23 separate meetings, workshops, and symposia focusing on research coordination and collaboration have taken place (See Table 3.2-6). More recently, in January 2007, a formal coordination meetings was held in Anchorage where a coordination matrix was developed that allowed researchers to identify potential areas of overlap or duplication prior to the field season. Researchers plan to further develop this database so that it will be accessible to all SSL/NFS researchers. NMFS also agrees that coordination with the Alaska Native communities is important. As provided in Appendix G and Section 4.7.2.2 in the EIS, NMFS has formally established co-management agreements with Alaska Native organizations for specific marine mammals, including SSLs and NFSs. In addition, the agency recognizes both the special relationship provided under Government-to-Government Consultation requirements (Executive Order [E.O.] 13175), and potential contribution of traditional knowledge to the management of SSLs and NFSs. Chapter 5 in the EIS includes a list of recommendations to further develop coordination with the Alaska Native communities. Chapter 5 of the EIS also includes a list of specific steps that NMFS will investigate further regarding coordination of research.

COR 02

NMFS has authorized permits without regard to how they all fit together to answer questions related to recovery and conservation of the species. Without such an approach, there will continue to be unnecessary impacts on the stocks and over-sampling or under-sampling of certain populations and areas. Without having any idea of where, when and on exactly which populations or trend sites the research is being conducted, the agency cannot determine the direct, indirect or cumulative effects of research as is required by NEPA (42 USC §4332 (C); 40 CFR § 1502.16).

Response:

NMFS agrees that development of a formal implementation plan for coordination of research is important. NMFS will work to develop a formal plan with researchers and stakeholders. Section 5.3.1 on the EIS includes a list of specific steps that NMFS will investigate further regarding coordination of research. Responses to statements of concern CON 01 and COR 01 outline informal coordination currently utilized by researchers.

COR 03

Throughout the document, the need for coordination is emphasized. We believe the recent closure of NMFS Region housing (St. Paul Staff Quarters) to all non-federal researchers regardless of availability, actually works against coordination and isolates making communication more difficult.

Response:

The NMFS Alaska Regional Office has not closed housing to all non-federal researchers. On the contrary – considerable funds are being invested to upgrade and maintain research, logistics, and housing facilities in the Pribilof Islands with the specific goal of supporting the important program of research that is identified in the NFS Conservation Plan.

A principal motivation for investing in these facilities is to ensure that they will be able to accommodate the increased levels of research activity (by both federal and non-federal researchers) that are anticipated to develop in the coming years as pressing conservation issues are addressed. The commenter may be confusing the recent decision by the Alaska Regional Office to begin charging a per diem rate for use of these facilities; this charge applies to all researchers, federal or non-federal. This administrative change was necessary due to funding realities and the high costs for repairs and maintenance of the facilities.

Furthermore, there has been a long history of close scientific and logistic coordination among researchers working on NFSs in the Pribilof Islands. It is deemed important that this coordination continue; as in the past, any coordination of research would likely occur long before individual scientists actually arrived in the Pribilofs expecting to inhabit and use the housing and research facilities.

Cumulative Effects

Overview:

Includes comments on the cumulative effects analysis and the need for better understanding of the potential cumulative effects of research.

CUM 01

There are significant adverse effects on the species from past, present, and proposed intrusive research. The DEIS underestimates the cumulative effects that permitted research and other human actions will have on the populations. The cumulative effects of research coupled with other anthropogenic factors may exceed the sustainability of the population.

Response:

The EIS considered the past, present, and reasonably foreseeable future impacts on SSLs, NFSs, and the environment. The analysis led us to conclude that the activities described in the Preferred Alternative would not adversely affect the sustainability of any species affected.

CUM 02

The cumulative effects analysis must be explained before any conclusions regarding the level of impact can be determined.

Response:

Section 4.4 provides a description of the methodology used to analyze cumulative impacts which is based on CEQ guidance. Section 4.8.1 presents a detailed description of the mortality assessment procedure, a multi-step process for determining the magnitude or intensity of research activities separately as well as cumulatively. Specifically, Step 4 of this procedure includes calculating estimated mortality associated with an animal's individual response to a research activity, which is then multiplied by the number of animals exposed to that activity to provide an understanding of the potential mortality for the stock or population affected. Step 5 then calculates mortality for all types of research procedures by adding these mortality estimates, thereby addressing the potential for additive or cumulative effects.

CUM 03

The DEIS underestimates the Native subsistence harvest due to potential problems with how subsistence harvest is reported both in the United States as well as Russia.

Response:

NMFS has used the best available information regarding subsistence harvest and disagrees that it underestimates Native subsistence harvest. Two types of information are available on harvest levels of SSLs that are applicable across a broad geographic base. The first type of information derives from comprehensive, in-depth ADF&G subsistence surveys that are intended to provide an overall baseline for the contemporary subsistence harvest patterns in a given community. Most communities in Alaska now have such baseline documentation dating to the mid-1980s through the late 1990s. This baseline information has the benefit of closely documenting actual take, and allows analysis of the role of the harvests of SSLs and NFSs within the entire round of subsistence activity in a given community, notably the proportional contribution of harvest of these species to overall subsistence production in a community. However, these comprehensive studies have not been repeated in most communities, and therefore suffer the limitation of not being particularly useful in examining time-series trends.

The second type of information derives from an annual sampling effort managed by ADF&G specifically directed toward SSL (and harbor seal) takes. This effort results in consistently produced annual estimates by community, providing the ability to more easily look at trends over time for over 60 communities. Most recently this research has been conducted by the Subsistence Division of ADF&G, the Alaska Native Harbor Seal Commission, and the Aleut Marine Mammal Commission, under contract with NMFS. Different sampling and statistical expansion methods were involved in the two types of studies. ADF&G considers the time-series data to be the more accurate assessment of SSL harvest (personal communication, Fall 2006).

Duplication of Research Effort or Goals

Overview:

Includes comments stating there is unnecessary duplication of research effort and techniques which is causing harm to SSLs and northern fur seals.

DUP 01

Due to the lack of coordination of permitted research activities, there is duplication of effort that is harmful to the species. Some of the methodologies, sampling areas, and permit applications are unnecessarily duplicative.

Response:

NMFS agrees that unnecessary duplication of effort may pose harm to the species. However, some degree of duplication or replication may be necessary to ensure that research results are not anomalous or to provide statistically robust results. The duplication of methodologies in permit applications are intentional and reflect the level of coordination between permit applicants. In the past, applicants have made an effort to use similar methodologies to ensure that data collected by different parties can be shared and consolidated into collaborative works. In addition, the permit applications have often used the exact same language so that the permit office would have clear indication of similar methods and objectives being used by different permit holders.

These comments have illuminated one of the products of collaborative work. The annual coordination meetings by researchers serve as an opportunity to coordinate these efforts. In order to come up with a mechanism to promote cooperation among research entities that received federal funding, NMFS developed a research coordination framework, as outlined in Ferrero and Fritz (2002), to clarify the context of individual research projects, to show their relationships to each other, and to link them to the underlying hypotheses that might explain the continued decline of SSLs. All SSL research activities have been catalogued using the research coordination framework and can be searched from the SSL Coordinated Research Program website, located at www.afsc.noaa.gov/stellers/coordinatedresearch.htm. Since 2000, all permittees are required to notify the Regional Administrator of NMFS of intended field sites/dates, coordinate with other researchers, and to work with the SSL Research Initiative Research Coordinator to develop a research coordination and monitoring plan. Information listed for each project includes the specific questions that relate factors to the decline of SSLs, funding source, principal investigator information, institution where research is being conducted, geographic location of the research, project type, expected date of completion, keywords to describe the project, list of related projects, project description, and project reports.

DUP 02

Researchers who propose to employ similar methodologies on the same populations should have to conduct research in conjunction with one another in order to avoid duplicative sampling of animals. The DEIS does not consider the utility of granting a single permit for aerial surveys or a single permit for captures, as is done for North Atlantic right whales, as a means to avoid duplication of effort.

Response:

NMFS agrees that researchers should closely coordinate research and field efforts. Coordination of research is discussed in Sections 4.7.2 and 5.0 of the Final PEIS. Alternatives considered but not carried forward is discussed in Section 2.7, including the concept of single permits. The research community has been coordinating annually through informal meetings prior to the beginning of each field season in order to ensure research efforts are not duplicative. NMML recently held a more formal meeting with the research community in January 2007 to coordinate future proposed field research and discuss how efforts can be conducted efficiently. The report from this meeting is available from NMML and provides information on the spatial and temporal distribution of research activities on SSLs and NFSs. It is NMFS' intent to continue this coordination effort formally every year in order to collaborate on future research and determine where activities can be combined in order to avoid duplication of effort.

Editorial

Overview:

Includes comments providing suggestions for improving the organization and readability of the document as well as accuracy of the content.

EDI 01

Editorial comments regarding grammatical changes or content to be added to text in the DEIS.

Response:

NMFS appreciates the suggested editorial changes regarding the presentation of information in the marine mammal sections. Where NMFS agrees with the suggestions, your comments have been incorporated.

EDI 02

Editorial comments or supplemental information regarding external instruments.

Response:

NMFS appreciates the suggested editorial changes regarding the presentation of information regarding external and internal scientific instruments. Where NMFS agrees with your recommended edits, we have made the changes to appropriate sections of the PEIS.

EDI 03

Editorial comments regarding suggested changes or clarification to description of alternatives.

Response:

Where NMFS agrees with the suggestions, your comments have been incorporated. Given their importance, and the size of this document, the environmental consequences of the alternatives presented in the Executive Summary is intended to be brief and refers the reader to more detail of the analysis of each alternative in Chapter 4.

EDI 04

Editorial comments on specific research techniques, supplemental information or literature cited related to Appendix B of the DEIS.

Response:

NMFS appreciates the suggested editorial changes regarding citations, information regarding research techniques and supplemental information. Where NMFS agrees with your recommended edits, we have made the changes to appropriate sections of the PEIS.

Effects of Research

Overview:

Includes comments on the analysis of effects of research, effects of multiple techniques, inclusion of scientific literature provided in the PEIS on effects of research, requests for justification of using research techniques that have adverse effects.

EFF 01

NEPA requires NMFS to consider impacts of all scientific research activities the agency intends to be covered by this EIS (40 CFR §1508.16). Yet, a number of procedures have not been considered. This problem affects the cumulative impact evaluation (including synergistic effects) which is not only intended to evaluate activities currently permitted but also those in the future to fully implement the Recovery Plan. For example, the DEIS does not evaluate the use of injectible substances (e.g., Evan's blue dye or deutered water, etc.) or external devices requested in new permit applcations (e.g., ASLC 881-1890). Either NMFS has failed to fully analyze all potential agency actions or has arbitrarily limited the scope pf the DEIS. See id. § 1508.25.

Response:

Appendix B of the Final PEIS has been revised to incorporate descriptions of all known research methods previously used or recently proposed. To the extent that any methods not mentioned in the Final PEIS are within the categories of methods analyzed in Chapter 4, the effects of these methods have been considered. The risks of injury and mortality for different procedures are assessed in Section 4.8.1 for SSL and 4.8.2 for NFS. Procedures that entail a similar level of injury or mortality are grouped together in the risk assessment sections. The combined numbers of similar procedures from all permits (combined numbers of takes as defined by each alternative) are analyzed for potential population level effects. If researchers propose to use procedures that are substantially different or entail substantially different types of risks to animals than are presented in the PEIS, NMFS will require supporting documentation and an appropriate level of additional NEPA review before taking action on the new requests.

EFF 02

Some types of research are inhumane and their use lacks justification. For example, the DEIS continues to calculate risk from drive-counts as though there was no other risk averse alternative available (e.g., use of photography to count animals as in New England). NMFS must evaluate methods to mitigate risk to animals using procedures which cause less harassment and potential harm. See 40 CFR §1508.20. NMFS has not demonstrated that the effects of research are insignificant. Some research methods (e.g., squeeze cages instead of anesthesia, holding animals for longer than needed after completion of research activities, biopsy sampling) are inhumane or more intrusive than is necessary; alternative methods should be evaluated and less invasive ones should be used. It is not clear why certain methods are used in some circumstances and others are not (i.e., some branded animals receive anesthesia and others do not).

Response:

Because this PEIS is programmatic in scope, it does not assess the justifications given in each permit application but assumes that the normal permit and grant processes would review individual applications for sufficient justification of proposed techniques.

Part of the criteria for issuance of scientific research permits is that the applicant must demonstrate that the proposed activity is humane and does not present any unnecessary risks to the health and welfare of marine mammals. The AWA requires that treatment be humane but does not define the term. “Humane” is defined in the MMPA as “that method of taking … which involves the least possible degree of pain and suffering practicable to the mammal involved.” The question of whether a given research technique is humane or not therefore depends on the type of information that is sought and how the research is carried out. Invasive procedures can provide different types and quality of data that cannot be acquired by non-intrusive research techniques and, when carried out with appropriate care and qualified personnel, are “humane” and can be permitted. The justification for using particular techniques in a given research effort is specific to each proposed project and is part of the application for a research permit.

In some cases, intrusive techniques may need to be used even though there are less intrusive methods available. For example, aerial surveys for NFSs in the Pribilof Islands is not a viable technique given the difficultly in accurately distinguishing NFSs from SSLs on the beach. Therefore, drive counts are used to assess populations. There are also a couple of trend sites for SSLs where the topography of the site (i.e., overhanging cliffs) prevent the use of aerial photogrammetry for pup counts so drive counts may be needed in these sites.

EFF 03

The effects of administering multiple research methods on the same animal are not well documented and should be analyzed. Of particular concern are the effects of multiple procedures on individual animals. NMFS should expand monitoring and reporting requirements to ensure collection and maintenance of information on handling of individual animals from endangered, threatened or depleted species in a database that over time, can provide a basis for assessing cumulative effects. This should be addressed in the Final EIS.

Response:

To the extent that information on various procedures is available, the effects of doing multiple procedures on individual animals are analyzed in section 4.8.1 for SSLs and 4.8.2 for NFSs. The risk assessment tables treat each procedure as an additive effect but do not assume synergistic effects because there is currently no evidence to support that conjecture. NMFS maintains a database for all animals that have been captured over the years by different research teams (NMML, ADFG, ASLC, and ODFG). When marked animals are recaptured, their growth rates and general health conditions can be compared to unmarked animals of the same age. This type of comparison has been made and no significant differences have been found between branded and unbranded animals (see Section 4.8.1). However, relatively few animals have been recaptured so there is not enough data to test for effects of other procedures other than the marking procedure (e.g. capture, handling, anesthesia, and branding of pups). These types of studies may be conducted in the future as more data become available. Chapter 5 provides more detail on NMFS' intent to require more post-capture monitoring of the effects of research.

EFF 04

The EIS analysis shows that research contributes a minor amount of impact to the SSL population and therefore should be given priority over non-research activities that are likely to have population-level effects.

Response:

NMFS agrees that the PEIS analysis shows that research contributes a minor amount of mortality to the western DPS of SSLs. However, NMFS does not prioritize or allocate incidental mortality resulting from research over mortality from other activities such as subsistence harvest or incidental mortality in fisheries.

EFF 05

The EIS provides information on the effects of research on these keystone species given the level of research on SSLs and NFSs.

Response:

Comment acknowledged.

Inadequate Information to Assess Effects/Unclear Information

Overview:

Includes comments stating the information provided in the analysis of the alternatives and the potential effects of research is inadequate or confusing.

INA 01

There is inadequate information to fully understand the effects of research. This lack could undermine potential contributions to species recovery and conservation. Examples of requested information include the effects of drugs on pups who are dependent on milk from a mother who has been sedated multiple times, more detailed explanations of how invasive sampling may impair survival, and more information on incidental mortality.

Response:

NMFS agrees that more information on the effects of research would be very useful in further identifying any contribution that effects of research has on the population compared to information gained from the research. NMFS permit review process includes considerations to ensure that procedures are justified, that the effects of these procedures are understood, and adverse effects minimized. There is always some level of risk with most procedures administered involving wild animals. Minimizing the risk and maximizing the information gained is one of the primary goals of researchers conducting studies on SSLs and NFSs. Proposed procedures are reviewed through the grant and permit application process and the potential risks associated with individual procedures are evaluated. Standard conditions with every permit include mitigation to minimize potential impacts of research activities. These conditions are discussed in detail in Section 4.7 of the EIS. Further, NMFS has recommended that a review of research 'best practices' be incorporated into a review of research activity implementation during 2007 through 2008.

INA 02

The DEIS inadequately addresses issues identified in the Notice of Intent and scoping process.

Response:

Both the Executive Summary and Chapter 1 identify where issues raised during the scoping process have been addressed in the PDEIS. Issue identified in the Notice of Intent and scoping with regard to alternatives have been addressed in Section 2.6, Alternatives Carried forward for Analysis, and Section 2.7 Alternatives Not Carried Forward Analysis. Finally, several of these issues are addressed in Chapter 5 National Policy Act Compliance and Recommendations.

Methodology

Overview:

Includes comments on the methodology used to assess potential effects of research on Steller sea lions and northern fur seals as well as suggestions for standardizing research methods.

MET 01

Additional effort should be put into standardizing research methods and metrics for assessing disturbance associated with research and other causes. Researchers should seek to use "best practices" whenever possible. Doing so may require new monitoring schemes and extra efforts to track handled animals. These efforts will not only mitigate some of the potential adverse effects of handling but also the potential for controversy associated with issuing permits for these activities.

Response:

As identified in Section 5.3.3, NMFS plans to collaborate with researchers and other stakeholders to develop protocols for assessing impacts of research on animals. Researchers typically utilize standard techniques employed throughout wildlife and marine mammal research and seek to use "best practices" whenever possible. It is NMFS' intent to conduct an independent review that would help the agency identify these best practices. In addition, NMFS is considering the incorporation of "standard protocols" for routine research protocols authorized by permits. These protocols would define best practices for various research activities, which researchers would be required to follow as conditions of their research permits. NMFS agrees that wherever feasible, such protocols should incorporate metrics for assessing disturbance or other impacts associated with research activities. Over time, the information derived from these metrics will aid in refining the estimates of mortality risk associated with research activities. This will, in turn, improve the scientific basis upon which to evaluate the potential cumulative impacts of research authorized by research permits.

Management

Overview:

Includes comments and suggestions for ways to improve management of SSLs and NFSs, and tools for improving species management such as Geographic Information Systems (GIS).

MGT 01

A geospatial database linking: 1) research type, 2) estimated level of take and 3) observed disturbance, to data on population trends could provide an invaluable tool for resource planning and implementation of future research and management. This could provide an institutionalized mechanism for coordination among researchers and a means to do cross-study assessments of the effects of disturbance and research-related mortality over time.

Response:

NMFS agrees the development of a geospatial database could provide an invaluable tool for planning and future research and management. Chapter 5 of the PEIS includes a list of specific steps that NMFS will investigate to further coordinate research and data results, which includes the development of a GIS-based database. Although there is not currently a formal database, a coordination matrix was recently developed for the January 2007 SSL research coordination meeting that will allow researchers to identify potential areas of overlap or duplication prior to the 2007 field season. Researchers plan to further develop this database so that it will be accessible to all SSL/NFS researchers. Additional collaborative databases have been developed to assist researchers both in planning and implementing their research. For example, a database of all satellite telemetry work on SSLs conducted by the NMML and ADF&G was compiled in 2004. A paper recently published in the online version of Deep Sea Research II (Call et al. 2007) illustrates the existence and potential utility of that database. NMML also keeps a database of all SSLs branded by all researchers throughout the range in North America as well as a second database that includes all SSLs branded in Russia. These databases are routinely used to plan and coordinate research and to assist other researchers in identifying specific animals.

MGT 02

Without an indication of how research will be distributed and how the activities inter-relate to one another, it is difficult to assess the impact of these activities at the permit stage. NMFS must consider other ways of conducting its analysis of potential effects of research. Research would benefit from having an implementation plan that prioritizes objectives.

Response:

NMFS is working to improve the methods by which research is coordinated and impacts of research activities are assessed. Chapter 5 in the Final PEIS include recommendations for coordinating research, prioritizing research goals with Recovery and Conservation Plans, improving reporting, and monitoring the effects of research.

Mitigation

Overview:

Includes comments stating that more information is needed on measures to mitigate effects of research on SSLs and NFSs.

MIT 01

The EIS should discuss in detail steps that are taken to minimize unintentional lethal takes of SSLs and NFSs to minimize impacts during research activities and the effectiveness of those mitigation activities.

Response:

Mitigation and efforts to minimize unintentional lethal takes is important, and has been discussed throughout Appendix B and summarized in Section 4.7.4. Each permit would include mitigation measures that are common to all alternatives (see Section 4.7). Permits issued under any alternative would include requirements for any specific measures NMFS determined necessary to minimize adverse impacts of research.

Monitoring

Overview:

Includes comments on the need for a monitoring program to better assess potential effects of research, as well as requests for more detail on monitoring currently required by NMFS.

MON 01

The short- and long-term effects of research should be monitored. The "short period" of monitoring stated in the DEIS to take place after procedures, is insufficient to document fatal capture-related myopathy that occurs 7-14 days post-capture or the sub-lethal effects such as reduced foraging efficiency.

Response:

As described in Chapter 5 of the Final PEIS, a major challenge to long-term observation of animals post-research is the logistics of remaining in the field to monitor animals. It is not always possible to conduct monitoring without causing additional disturbance of a site. Further, animals may leave the research site and can be difficult to track at sea for extended periods of time given limitations of currently available scientific instruments and attachment methods. However, certain scientific instruments attached to SSLs and NFSs have provided a way to monitor the animals many months post-capture and handling. Data from those instruments suggests animals subjected to the procedures authorized by permits do not experience capture-myopathy. Data from these instruments also provide information on foraging effort. As indicated in Chapter 5 in the Final PEIS, NMFS will investigate development of a monitoring protocol.

MON 02

A monitoring program administered by NMFS should include ways to assess cumulative effects, including methodologies for assessing post-handling and post-capture effects.

Response:

NMFS is working to improve the methods by which effects of research is monitored, including assessing cumulative effects, as recommended in Chapter 5 of the PEIS.

MON 03

Potential effects should be monitored prior to issuing permits. NEPA recommends that monitoring be implemented particularly where the effects of an action are unclear (40 CFR §1505.3). The consequences of an inadequate monitoring program is likely to substantially underestimate adverse effects.

Response:

Permit applicants are currently required to include an evaluation of potential effects of each individual research activity in the application. It is not possible to monitor the effects of research without authorizing permits to do so as mandated by MMPA and ESA. NMFS is working to improve the methods in which effects of research is formally monitored, as recommended in Chapter 5.

Mortality

Overview:

Includes comments on the assessment of direct, indirect and cumulative effects of mortality related to research, and suggesting the estimates of mortality are incorrect.

MOR 01

Comments expressing concern over the level of mortality described in specific permit applications; the rate of mortality described in some permit applications does not appear insignificant as NMFS concludes.

Response:

As summarized in Section 4.11, the contribution of research to SSl or NFS mortality ranges from negligible to minor, based on the impact criteria presented in Section 4.4. Research permits contain mitigation measures intended to avoid or minimize incidental mortality due to research activities. NMFS will continue to permit research as he agency recognizes the importance of research for conservation purposes. Permits will continue to include takes for incidental mortality, as appropriate, as well as mitigation measures for research activities.

MOR 02

The mortality assessment process outlined in the DEIS is flawed and the mortality assessment tables need to be revised. NMFS should include data and assumptions that form the basis of the mortality rate associated with post-research mortality and non-lethal effects, not simply base these estimates on conjecture of a permittee. Information on such rates from scientific reports and other sources should be included to the extent practicable. The EIS does not explain how cumulative mortality was calculated. The risk assessment also states that a fraction of an animal can be killed and this is clearly not possible. How can cumulative likely unintentional mortalities be estimated through multiple distinct procedures and discrete projects? Mortality rates between 0.0 and 1 should be rounded up to 1. This will result in a more realistic estimate of mortality.

Response:

The Final PEIS has been revised to include additional documentation and research results to support the estimates and risk classifications used in the mortality assessment tables. A new table was added to Appendix A that indicates how many takes for different research activities came from different permits in order to provide the reader with more information about how the tables were constructed. Text has also been added to clarify why fractions of mortalities are reported and how these should be interpreted.

MOR 03

The estimates of mortality due to various research activities appear realistic. However, it is notable that different efforts at quantifying these effects are based on observations covering a wide temporal scale.

Response:

The risk assessment methodology developed for this PEIS will be refined in the future as new information on the effects of research as it becomes available, including potential differentiation between short-term and long-term effects, differences in effects between different geographic areas, and among sex/age classes.

National Environmental Policy Act

Overview:

Includes comments on the legal adequacy of the Draft PEIS under NEPA, including compliance with other statutes including ESA and MMPA.

NEPA 01

This document does not address research uncertainties or unknowns as NEPA requires. The DEIS also does not always properly acknowledge when incomplete data exist as required by NEPA (40 CFR §1502.22).

Response:

The PEIS discloses the level of uncertainty regarding the data used in the analyses, consistent with CEQ guidelines. Section 4.3 of the PEIS also identifies those areas of the document or in the analysis of impacts where information on environmental impacts is unavailable and how NMFS proceeded given the available information. Section 4.3 of the PEIS acknowledges that information may not be available to support thorough evaluation of the environmental consequences of the alternatives and identifies those areas of the document or in the analysis of impacts where this is the case.

NEPA 02

This document does not address all reasonable alternatives as NEPA requires.

Response:

See response to ALT 02.

NEPA 03

It is apparent that not all scientific literature was considered in the DEIS analysis of the effects of research. NEPA requires NMFS to insure "scientific integrity" in its analysis. Failure to include highly relevant science violates this mandate (40 CFR §1502.24). The agency cannot use this EIS as a basis for its decisions to issue permits in the future because the MMPA requires the agency to use the "best scientific evidence available" in making permit decisions (16 USC § 1371(a)(3)(A)).

Response:

The assessment of effects in Chapter 4 of the PEIS is consistent with NMFS responsibility to use the best available information in its decision-making. In cases where there is insufficent information or an effect on a species is unknown, the rationale behind the direct, indirect, or cumulative effects rating is provided. NMFS relied on previous agency analyses and the opinions of agency experts with regard to the effects of the research on these species populations. Available scientific literature and agency documents have been incorporated into the PEIS by reference.

NEPA 04

Regarding future NEPA analysis, does the Preferred Alternative cover "discovery" oriented research (i.e., Native traditional knowledge), or is it limited by equating research to goals stated in the Conservation Plan? If the later, the result could limit the constructive approaches recognized under the co-management agreements.

Response:

When NMFS initiated preparation of the PEIS in 2005, the status quo for research that had been permitted was the equivalent of Alternative 3. After the court decision, the allowable research was the equivalent of Alternative 2.

Potential Biological Removal

Overview:

Includes comments on the use of Potential Biological Removal (PBR) as a tool for analyzing potential effects of the proposed alternatives, as well as criticisms for using PBR in an assessment on an endangered population.

PBR 01

NMFS' "Guidelines for Preparing Stock Assessment Reports Pursuant to Section 117 of the Marine Mammal Protection Act" (GAMMS 2005) states that some stocks may be endangered and declining and thus do not conform to the underlying PBR model. Accordingly, the guidelines state that PBR may be considered "undetermined", such as has been done for Cook Inlet beluga whales. The PBR for North Atlantic right whales has been reported as "zero". NMFS should follow these examples and not calculate a value of PBR for the declining stocks of SSLs and NFSs.

Response:

A case-by-case approach is taken when assessing whether the PBR should be set to "undetermined" for a declining stock. The "undetermined" assessment was appropriate for the Cook Inlet beluga stock because the stock has been at a critically low abundance (2005 abundance of 278) for several years and the stock shows no signs of recovery, even after initiating very conservative management of the subsistence harvest, which was the largest source of human-related mortality. North Atlantic right whales also have very low population level of about 300 individuals. In contrast, although the western DPS of SSLs is currently at a low level relative to the historical size of the population, the number of animals (47,885) is substantially larger than the abundance of either the Cook Inlet belugas or North Atlantic right whales and the ability of the population to sustain some level of human-related impact is larger. Further, it is no longer clear that the western Steller sea lion population remains in decline. While the population was clearly in decline until 2000, recent estimates in 2002 and 2004 may indicate that the population may have stabilized. The eastern stock has been increasing throughout most of its range. Thus, it is not necessary to set the PBR level as "undetermined" as a precautionary management step for either stock of SSL or the eastern Pacific stock of northern fur seals (population of about 720,000).

PBR 02

PBR values are open to debate and scientific criticism, and may be significantly inaccurate. The use of PBR to analyze the effects seems disingenuous as MMPA describes PBR in terms of annual per capita increase. Some SSLs and NFSs populations are still in decline thus there is no positive rate of increase from a negative number. There may be statistically better methods to estimate combined impacts of research. Generally, estimates of PBR are not applicable to declining or endangered stocks.

Response:

NMFS' rationale for using varying levels of take relative to PBR as a way to compare alternatives is presented in Sections 4.0 and 4.8.1. PBR is used primarily in this PEIS analysis as an analytical tool for comparing the alternatives. NMFS has established over a long history that the PBR approach is an appropriate and conservative tool for evaluating the effects of human-caused mortality on marine mammal stocks even for many declining populations (NMFS 1992, Barlow et al. 1995, Wade and Angliss 1997, Wade 1998, Wade 2005 [revisions to the guidelines for assessing marine mammal stocks, GAMMS II, sometimes cited as GAMMS 2005]). Background material on the PBR approach is presented in Section 2.5 of the DEIS.

The calculation of PBR is defined in the MMPA (section 3(20)) as the product of three factors: (1) the minimum population estimate of the stock (Nmin), one-half the maximum theoretical or estimated net productivity rate of the population at a small size (Rmax), and a recovery factor (Fr). The MMPA also states that "net productivity rate" means "the annual per capita rate of increase in a stock resulting from additions due to reproduction, less losses due to mortality." The definition and calculation of PBR is almost identical to a legislative proposal NMFS submitted to Congress for a regime to govern mortality and serious injury of marine mammals incidental to commercial fishing operations (NMFS 1992).

PBR describes an upper limit of animals that could be removed from a population of marine mammals without causing the population to drop or remain below its optimal sustainable population (OSP). This limit is not meant to imply that if human-mortality is below PBR, a population below OSP would necessarily increase, because other resource limitations could be limiting population growth. Rather, this limit implies that for a declining population in which direct human-caused mortality is below PBR, the human-caused mortality is the cause of neither the decline nor the failure of the population to recover.

In the 1992 proposal to Congress, NMFS proposed that the Rmax used in developing PBR occurs when a population is at a very small size (near zero). Therefore, NMFS proposed that Rmax was the intrinsic rate of increase (i.e., at a very low abundance, environmental resources would be unlimited). The MMPA also notes that the PBR calculation used a value for Rmax that occurred "at a small population size". This intrinsic rate of increase is the same whether or not the population is actually increasing or decreasing at any given time (i.e. the observed rate of population change). Skalski et al. (2005) contrast the intrinsic rate of population change with the realized or observed rate of population change. The intrinsic rate of change occurs under the most favorable conditions for maximal growth and is the rate of growth in an unlimited environment (consistent with the definition associated with PBR). The realized or observed rate of change is the actual rate of change under the prevailing environmental and demographic conditions.

The PBR approach was tested extensively through simulation trials (Wade 1998) to evaluate robustness to variability or biased abundance estimates, mortality estimates and other parameters. These simulations demonstrated that 95% of the trials equilibrated within OSP levels when default parameters for Nmin, Rmax, and an appropriate recovery factor were used. Consequently, NMFS concluded that the PBR approach was an appropriately conservative mechanism to evaluate the effect of human-caused mortality on a stock. Such a conclusion applied when the value for the recovery factor was 0.5. When the recovery factor value was 0.1, more than 95% of simulations equilibrated within OSP levels; thus, the approach is even more conservative for those stocks with the recovery factor of 0.1 (e.g., the western DPS of SSLs). Using the information from Wade (1998), human-caused mortality at a level equal to PBR of a stock with a recovery factor of 0.1 would cause the population to equilibrate within 95 percent of the abundance it would have achieved without such mortality. An equilibrium level so close to an unexploited population level indicates minimum impact to the population.

There may be signs that the western stock of Steller sea lions is beginning to increase in some parts of the range. The very low level of human-caused mortality, when analyzed by a PBR approach, indicates that human-caused mortality and serious injury is not the cause of the decline, particularly in recent years.

PBR 03

The methodology used in the DEIS linking the permitting process with the stock assessments mandated by MMPA is useful. The use of benchmarks relative to PBR provides a better cumulative assessment of anthropogenic mortality and the potential role of the effects of research.

Response:

Comment acknowledged.

Permits

Overview:

Includes comments on the permit process.

PER 01

Permit applicants should be required to address how their activities address a critical need and justify why certain methodologies must be used, particularly if they are invasive.

Response:

Permit applicants are required to explain how their activities address a critical need in their permit application. Permit applications must include a statement of the purpose of the research, its relation to status of stock, and justification of methodologies. Permit reports must reiterate how data collected under the permit satisfies the stated purpose of the research.

PER 02

Permit violations should result in suspension.

Response:

NMFS regulations and the Administrative Procedure Act specify the process for addressing permit violations, including provisions for suspension, revocation, or modification. As described in Section 4.7.3.2 of the PEIS, verified permit violations have resulted in permit revocations. In some cases, the appropriate remedy to a permit violation is modification of the permit, rather than suspension, while in other cases, permit revocation is the appropriate remedy.

Reporting Requirements

Overview:

Includes comments and suggestions for improving research reports, as well as statements on NMFS' commitment to fulfill permit requirements.

REP 01

Researchers utilizing new techniques should be required to monitor and report animal effects back to NMFS. Ideally, an independent party would accompany researchers and monitor effects.

Response:

NMFS permits contain a condition requiring the permit holder to allow observers during conduct of permitted activities. Researchers are currently required to report effects of research activities in the annual and final reports, including new techniques. NMFS will continue to require that researchers provide information on effects of research of individual activities.

REP 02

Documents submitted to Federal District Court during the research permit litigation indicate that many permittees, including the NMML, have either not submitted required reports in a timely manner, as required by their permits, or/and have exceeded the number of permitted takes for one or more categories. This calls into question the commitment to assure accuracy of reporting.

Response:

If reports are not submitted by the date specified in the permit, the permit may be suspended, revoked or modified as provided for in NMFS regulations. In addition, new permits or amendments may be deferred or denied pending receipt of reports required under any Scientific Research Permit.

Research

Overview:

Includes suggestions for how research should be prioritized and which conservation goals should be the focus of research.

RES 01

Research should focus on these four issues: 1) Depleted Pacific herring stocks need to be rebuilt through comprehensive management strategy 2) Fishermen need to be educated to stop killing marine mammals from getting into their nets and buoys 3) Researchers need to stop killing and harassing marine mammals in the name of rebuilding declined species 4) Essential habitats that support marine mammal food fish must be protected and kept clean and productive.

Response:

Diet is one of the key issues research on both SSLs and NFSs is attempting to address. Rebuilding Pacific herring stocks, such as in Cook Inlet and Prince William Sound, would be beneficial to SSLs in this region. Illegal shooting of SSLs in U.S. waters was thought to be a potentially significant source of mortality prior to the listing of SSLs as “threatened” under the ESA in 1990. Although some shootings go unreported, records from NMFS Office of Enforcement from 1999-2003 indicate that there are no records of illegal shooting of SSLs from the eastern stock (NMFS, unpublished data).

In the past, aquaculture facilities in Canada accounted for approximately 10 SSL shootings a year; however, shooting is not believed to currently be a major source of mortality. Mortality from research activities on SSLs is discussed in Section 4.8.1. Research mortality under each alternative is considerably less than the PBR for SSLs. NMFS agrees that protection of essential habitat for prey species of the SSLs and NFSs is an important factor in aiding the recovery of these species.

RES 02

We support research that can provide knowledge to implement meaningful management measures to mitigate and reverse these declines. Research should be done carefully and not present an added pressure on these populations. The EIS represents progress in that direction.

Response:

NMFS agrees that research is vital to providing the information needed to develop and implement management measures to reverse the declines of the SSLs and NFSs. SSL and NFS research is aimed at providing information on key issues affecting these populations in order to facilitate the goals and objectives of the 2006 Draft SSL Recovery Plan and the 2006 Draft NFS Conservation Plan. More information can be found in Sections 4.8.1 and 4.8.2 of this document.

Risk Assessment

Overview:

Includes comments on the adequacy of the methodology used in the assessment, questions on how and why certain categories of research were grouped in the risk assessment, and the basis for the estimates of risk for research techniques.

RISK 01

The risk categories developed for the mortality assessment tables inappropriately lump various techniques into categories that do not make sense according to their effects. The lumping of these different techniques into these categories does not have adequate supporting documentation or rationale.

Response:

The Final PEIS has been revised to include additional documentation and research results to support the estimates and risk classifications used in the mortality assessment tables. Additional information has been provided in Appendix A to help the reader understand how the numbers of takes was derived for each alternative. The text has also been revised to clarify how the results have been interpreted.

RISK 02

The DEIS bases its risk and mortality estimates for NFSs on "professional judgment" of a permittee, and arbitrarily equates NFS mortality to SSL mortality which is inappropriate. It is not clear why the risk estimates were only based on one report. It is not clear how takes were calculated based on the permits in Appendix A. Solely utilizing NMML data to estimate mortality in the DEIS is insufficient, unethical, and a conflict of interest because they are a NMFS permitee. There is reason to doubt the adequacy of permittee reports used in the assessment as they conflict with NMFS documents submitted to U.S. District Court for the District of Columbia as part of previous litigation (Humane Society of the U.S. v. DOC, 432 F. Supp. 2d 4 (DDC 2006)).

Response:

The risk assessment tables for NFSs are not the same as those for SSLs and account for differences in the biology of the species as well as differences in research techniques used and data on the observed effects of research. Additional data on known mortalities due to research has been added to Chapters 3 and 4 and this data has been incorporated into the risk assessment tables. This data originated from state and federal agency experts on these species. NMFS has appropriately consulted with and use the data from these experts on the effects of research as they are the world's experts on the species in question. The risk assessment tables do contain a number of estimates on unobserved mortalities (i.e., those mortalities for which there is no documentation) and these are based on the professional judgment of agency experts. NMFS' intent is to update and refine the risk assessment methodology developed for this EIS as new scientific data become available, regardless of its source or whether it conflicts with the original estimates.

RISK 03

The DEIS arbitrarily estimates risk of various research techniques on SSLs and NFSs. The risk estimates are unfounded; NMFS does not identify any methodologies used or scientific basis for these estimates.

Response:

Text, data, and citations have been added to the Final EIS to clarify the derivation of the risk assessment methods and values used for both SSLs and NFSs. Some comments imply that there is factual evidence of impacts that are not considered in the PEIS but they offer no citations or data to support such claims. The Final PEIS represents the agency's best effort to incorporate all known effects of research and it welcomes additions to this record for future consideration.

RISK 04

The DEIS acknowledges that sub-lethal effects are likely unknown and that some portions of the population may be disproportionately affected but does not stipulate whether these risks might affect a segment of the population that is least able to afford them.

Response:

The PEIS explains that pups, juveniles, and adult males are unlikely to suffer sub-lethal effects of research that would reduce the overall productivity of the population. Thus, breeding age females are the only segment of the population that could experience reduced reproductive success through a major injury. Although the number of breeding age females targeted for capture and invasive procedures is very small, there is no data on the proportion of the animals incidentally disturbed by research that may be breeding age females and that may be injured enough to experience long-term effects on reproduction. The PEIS therefore concludes that the magnitude of this potential effect is unknown and explains that efforts to acquire this information would require permanent marking, satellite telemetry, and other intrusive research methods that would exacerbate the risks of mortality and sub-lethal effects to those individuals.

RISK 05

The EIS should better define the impact criteria presented in Chapter 4 so that an impact value cannot meet more than one criterion. For example, a minor impact is defined as 10% to 15% of PBR while a moderate impact is defined as 15% to 25%. Thus there is overlap between a minor and moderate rating if an impact is 15% of PBR.

Response:

There were several inconsistencies in the way takes were tabulated from existing permits in the Draft PEIS and those errors carried over into the number of takes used in the Alternative 4 risk assessment tables. The numbers of takes for different research activities under all the alternatives have been recalculated and the mortality assessment tables have been revised for the Final PEIS. In the Final PEIS, the impact criteria have been modified to be clear what type of impact would be considered minor versus moderate based PBR as described in Section 4.4 and 4.8.1. For example, the criteria presented in the methodology section (4.4) state that an impact less than 10% would be considered negligible, between 10% and 30% would be minor while greater than 30% would be moderate, and so on.

Sample Size/Techniques

Overview:

Includes comments on appropriate sample sizes, locations and techniques used in research, as well as suggestions for standardizing sample sizes and techniques.

SST 01

Concerns related to sample sizes, location and techniques for specific types of research. There is an apparent lack of integration and coordination of research for determining appropriate sample sizes.

Response:

NMFS agrees that integration and close coordination of research is essential to addressing the goals and objectives of the 2006 Draft SSL Recovery Plan and 2006 Draft NFS Conservation Plan, especially when there are multiple research efforts being conducted simultaneously. Coordination of research is discussed in Sections 3.2.1.12 and 5.3.1. Developing and implementing a formalized plan for coordination of research is a necessary step in the process (see COR 01). Considerable attention is given to considering the experimental design and relevant sample sizes for various studies. Detail and background for developing sample sizes and techniques is typically part of both the grant and permit applications which do go through separate review processes. The permit applications are available to the public for a 30-day comment period prior to authorization as described in Section 3.2.1.12. These evaluations are conducted by oversight groups such as the Alaska Scientific Review Group created by the MMPA, the Marine Mammal Commission, funding agencies, and internal and external peer-review during the analysis and publication phase of research. Information on sample size and locations of research activities can also be found in the annual and final permit reports required by NMFS for each permit. In addition, researchers routinely participate in annual research coordination meetings to plan, integrate, and coordinate specific research projects. This process will be formalized as part of the implementation of the Preferred Alternative identified in this EIS (see COR 01).

Take (Incidental; Direct)

Overview:

Includes comments on how takes are calculated in permit applications.

TAKE 01

Take activities need to be accurately and clearly identified in applications.

Response:

NMFS agrees that the take activities associated with each permit need to be clearly identified during the grant and permit application process. In fact, this is a requirement for all permit applications for research on these species. The permitting process is discussed in further detail in Section 3.7.2 of this document. Section 3.7.4 discusses several factors of the granting and permitting processes that lead to a situation where the requested number of takes by researchers, and therefore the numbers of takes authorized on their permits, are almost always greater than the numbers of takes they report after their research is complete. These factors include differences in timing between the grant cycles and the permit process, uncertainties about future logistical and personnel considerations, and uncertainties about field conditions. The difference between the authorized take and the actual take is presented in Table 3.7-1.

Welfare of the Animals

Overview:

Includes comments and concerns that the techniques used and level of takes requested in permits do not satisfy requirements of the Animal Welfare Act.

WEL 01

The techniques used and the level of take requested do not satisfy the Animal Welfare Act. Each permit application should be able to pass scrutiny of an independent animal welfare/care committee.

Response:

All research conducted by a "research facility" as defined in the AWA must comply with the requirements of the statute. The USDA APHIS is the federal agency responsible for implementing the AWA. NMFS does not have the authority to enforce compliance with the AWA. However, permit applicants are encouraged to submit proof of Institutional Animal Care and Use Committee (IACUC) approval of the activities in their permit application. NMFS is in the process of developing an IACUC within the agency to address issues concerning the humane treatment of animals. This internal IACUC will be responsible for reviewing permit applications that have not already been reviewed by an IACUC and will provide feedback to both the permittee and the agency on issues regarding research on endangered, threatened or depleted species.

2006 NMFS Steller Sea Lion and Northern Fur Seal Research EIS Public Scoping Report

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NMFS Steller Sea Lion and Northern Fur Seal Research EIS Public Scoping Report

NOAA 2005

NOAA 2005

URS

May 2006

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Acronyms

AEB	Aleutians East Borough
AFSC	Alaska Fisheries Science Center
ASLC	Alaska SeaLife Center
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act of 1973
F/PR1	Office of Protected Resources, Permits Division
FONSI	Finding of No Significant Impact
HSUS	Human Society of the United States
MMC	U.S. Marine Mammal Commission
MMPA	Marine Mammal Protection Act of 1972
NEPA	National Environmental Policy Act of 1969
NFS	Northern Fur Seal
NMML	National Marine Mammal Laboratory
NMFS	National Marine Fisheries Service
NPFMC	North Pacific Fishery Council
NPRB	North Pacific Research Board
NAO	NOAA Administrative Order
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NOS	National Ocean Services
NPUMMRC	North Pacific Universities Marine Mammal Research Consortium
ROD	Record of Decision
SSL	Steller Sea Lion
UAF	University of Fairbanks
URS	URS Corporation
U.S.	United States

1.0 INTRODUCTION

The National Marine Fisheries Service (NMFS) administers a Research Program that includes (1) directed grants from the Alaska, and other Regions' operational budgets, (2)"pass-through" grants detailed in the federal budget, and (3) permits issued pursuant to the Marine Mammal Protection Act (MMPA) and Endangered Species Act (ESA). These federally funded grants for projects and services constitute federal actions subject to compliance with the National Environmental Policy Act (NEPA) (40 Code of Federal Regulations [CFR] Pts. 1500 – 1508).

NMFS administers a permit program from the Office of Protected Resources (F/PR1) in NMFS Headquarters, Silver Spring, Maryland. Permits issued pursuant to Section 104 of the MMPA and Section 10(a)(1)(A) of the ESA provide exceptions to the moratoria on "taking"[1] marine mammals and species listed as threatened or endangered for bona fide scientific purposes and for activities that enhance the survival or recovery of the species in the wild. As with the grants, these permits constitute federal actions subject to compliance with NEPA.

NMFS is preparing a programmatic Environmental Impact Statement (EIS) that will satisfy the requirements of Council on Environmental Quality's (CEQ) regulations and the National Atmospheric and Oceanic Administration (NOAA) Administrative Order (NAO) 216-6 for those federal permits allowing research or federal grants funding research that may have impacts on Steller sea lions (SSL) and northern fur seals (NFS) throughout their range in the United States (U.S.) (Figure 1). This document, as a programmatic analysis, will cover expected and projected federally granted and permitted research projects for future years, until such time that a revision of the programmatic document is deemed necessary. The challenge is to develop an EIS that:

- Recognizes existing and anticipated research needs
- Identifies potential effects of research on SSL and NFS
- Is responsive to the SSL Recovery Plan, NFS Conservation Plan, and NEPA, ESA and MMPA compliance requirements

1.1 Purpose and Need

The purpose of the research on SSL and NFS, as stated in the SSL Recovery Plan (1992) and NFS Conservation Plan (1993), is to promote the recovery of the species' populations to levels appropriate to justify removal from ESA listings and to delineate reasonable actions to protect the depleted species under MMPA. The need for research is rooted in the fundamental questions related to understanding factors that are limiting the populations such as habitat requirements, population trends, reproduction, mortality rates, predation, parasitism, and disease, and feeding and energetics.

1 Under the MMPA, "take" is defined as to "harass, hunt, capture, collect or kill, or attempt to harass, hunt, capture, collect or kill any marine mammal." The ESA defines "take" as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."

The need for this action is to facilitate research to: 1) prevent harm and avoid jeopardy or disadvantage to the species; 2) promote recovery; 3) identify factors limiting the population; 4) identify reasonable actions to minimize impacts of human-induced activities; 5) implement conservation and management measures; and 6) make data and results available in a timely manner for management of the species. As part of this action, NMFS will evaluate measures that would improve efficiency and avoid unnecessary redundancy in SSL and NFS research, utilize best management practices, facilitate adaptive management, and standardize research protocols.

The intent of this programmatic EIS is to facilitate the funding and permitting process for necessary research on SSL and NFS such that NMFS can administer grants and issue permits subject to compliance with NEPA (40 CFR Parts 1500-1508) in a timely manner. The EIS will analyze alternatives for federally funded research grants and permits that may impact SSL and NFS on rookeries and haul outs and in waters off Alaska, Washington, Oregon, and California. The programmatic EIS is also intended to satisfy requirements of NEPA for federally granted and/or permitted research projects in subsequent years (40 CFR 1502.4[b]). By providing up-to-date scientific information on the cumulative impacts of SSL and NFS research grants and permits on the physical, biological, and human environment, this programmatic EIS will serve as the environmental baseline for evaluating current and future research-related activities.

The process of preparing an EIS identifies planning issues and concerns, develops and evaluates reasonable alternatives for the proposed action, describes the affected environment, assesses potential environmental consequences of alternatives, and adequately involves the potentially affected public in the process of preparing the EIS. The EIS will be prepared in compliance with NEPA, CEQ regulations implementing NEPA, MMPA, ESA, and other relevant laws and regulations.

The following factors have been identified for evaluation in the EIS. Additional issues identified through the scoping process will be analyzed and considered in the EIS:

- Types of research
- Level and effectiveness of research effort
- Coordination of research
- Qualification of researchers
- Effects of research on marine mammals
- Alternative methods for research

Preparation of the SSL and NFS Research EIS will provide the public an opportunity to:

- Understand the need for research; funding and permitting requirements; and NEPA compliance
- Make recommendations on how research should be conducted

- Review the decision-making options for acceptable research techniques and protocols on SSL and NFS in the study area
- Comment on potential environmental impacts that should be considered in decision-making

The programmatic EIS will identify the potential impacts of various research activities conducted on SSL and NFS, and identify acceptable research protocols and activities that could mitigate those impacts.

1.2 Description of the Project Area

NMFS is preparing a programmatic EIS that will address NMFS' administration of research permits and federal grants that may have impacts to SSL and NFS throughout their range in U.S. waters. A map of the project area is shown in Figure 1.

Steller sea lions range along the North Pacific Rim from Northern Japan to California (Loughlin et al. 1984), with centers of abundance and distribution in the Gulf of Alaska and Aleutian Islands, respectively.

Northern fur seals range from southern California north to the Okhotsk Sea and Honshu Island, Japan. During the breeding season, approximately 74 percent of the worldwide population of NFS is found on the Pribilof Islands in the southern Bering Sea, with the remaining animals spread throughout the North Pacific Ocean (Lander and Kajimura 1982). Approximately one percent of the NFS in U.S. waters outside of the Pribilof Islands population is found on Bogoslof Island in the southern Bering Sea and on San Miguel Island off southern California (NMFS 2003).

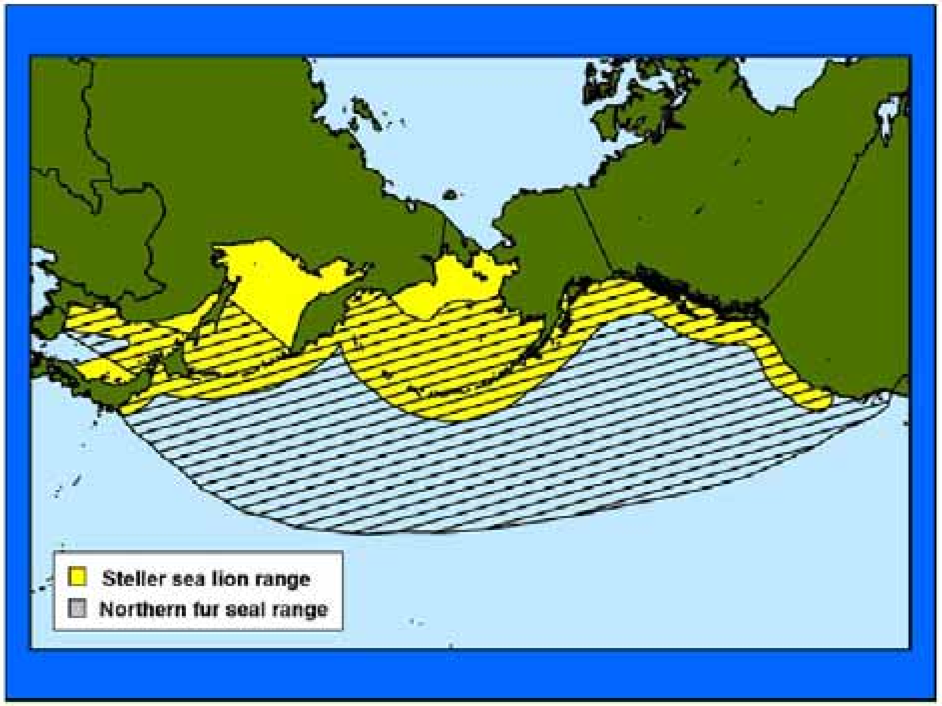

Figure 1 Project Location Map

1.3 Description of the Scoping Process

The scoping process is a requirement of preparing an EIS, and provides persons affected by the project an opportunity to express their views and concerns. Scoping is designed to be an open, public activity for identifying the scope of significant environmental issues related to the proposed project that should be addressed for NEPA compliance. These issues may stem from new information or changed circumstances, the need to address environmental protection concerns, or a need to reassess the appropriate mix of allowable grants and research permits based on new information. Scoping is typically accomplished through written communications, public scoping meetings, and formal and informal consultation with agency officials, interested individuals, and groups.

The scoping process for the Steller Sea Lion and Northern Fur Seal Research EIS involves presenting the proposed scope of analysis for preparation of the EIS for public comment. The research grants and permits are subject to certain parameters related to: 1) the provisions of the ESA of 1973, as amended; 2) the provisions of the MMPA of 1972, as amended; 3) NMFS regulations implementing these statutes, and 4) public involvement.

Endangered Species Act: Section 10 of the ESA allows research on endangered species. Further, it states that NMFS may issue permits for otherwise prohibitive acts for scientific purposes or to enhance the propagation or survival of the affected species. In issuing permits pursuant to Section 10, NMFS must also comply with Section 7 of the ESA by ensuring that any action it authorizes, funds, or otherwise carried out, is not likely to jeopardize the continued existence of a listed species or result in destruction or adverse modification of critical habitat.

Marine Mammal Protection Act: Section 104 of the MMPA allows research on marine mammals. Specifically, it states that NMFS may issue a permit for scientific research purposes to an applicant who submits with their permit application information indicating that the taking is required to further bona fide scientific purpose. The permit applicant must also demonstrate that the permit will be consistent with the purposes of the MMPA.

NMFS Regulations: All permit applicants must demonstrate that their research will comply with NMFS regulations.

Public Involvement: Integral to the NEPA process is the public participation program, which keeps the public, research institutions, affected state and federal agencies, and Native corporations and councils engaged in the project's progress. Preparation of the Steller Sea Lion and Northern Fur Seal Research EIS will provide the public an opportunity to: 1) understand the requirements for research and NEPA compliance; 2) make recommendations on how research should be conducted; and 3) review decision-making options for research permitting and grant funding by NMFS. The public involvement program provided a number of opportunities, described later in this report, to submit comments on the scope of the EIS.

This document represents a public record of the scoping activities that began on December 28, 2005, when the Notice of Intent (NOI) was published in the Federal Register to prepare the Steller Sea Lion and Northern Fur Seal Research EIS (70 FR 76780). A supplemental NOI was published in the Federal Register extending the scoping period due to public interest (71 FR 7927). The NOI established a deadline for the submittal of scoping comments, and listed the time and location of public scoping meetings for the purpose of submitting oral comments. Comments were received through February 27, 2006, and are summarized in this document. Project scoping materials are located in the Appendices and include:

- Appendix A — Federal Register NOI
- Appendix B — Project Mailing List
- Appendix C — Public Notices
- Appendix D — Project Newsletter and Comment Form
- Appendix E — Public scoping meeting information including sign-in sheets, and meeting transcripts (formal and informal comments).
- Appendix F — Agency scoping meeting information including agency coordination letters, sign-in sheets, and meeting minutes.
- Appendix G — Native tribal communication including Native Government-to-Government invitational letter, other Native groups information letter, and meeting minutes.
- Appendix H — Comment Summary by Issue (public and agency comments organized by issue category)

Mechanisms used to inform the public and solicit their comments on the scope of EIS included:

- development of a mailing list that will be updated throughout preparation of the EIS,
- development and distribution of an initial project newsletter,
- creation of a project website,
- teleconferences with interested federal and state agencies and with federally recognized Native tribal organizations, and
- three public scoping meetings to disseminate project information and identify issues and concerns that 1) should be addressed in the EIS, and 2) should be used to select the best overall alternative that would meet the purpose and need objectives of this project.

A brief overview of public scoping tools and approach are summarized below.

Mailing List: An initial mailing list of over 300 people was developed that included members of the general public; federal, state and local government agencies and groups; public interest groups; Alaska Native organizations; and media groups. The mailing list is included in Appendix B.

Newsletter and Comment Form: A project newsletter and public comment form was distributed to the entire project mailing list beginning December 28, 2006. The newsletter was the first in a series of newsletters planned for publication throughout the project to keep the public informed on project status and opportunities for public input. A copy of the newsletter and comment form is included in Appendix D. The newsletter was also included on the project website.

Public Notices: Public notices for scoping meetings were prepared that included information on the project and location of scoping meetings. Public notices were advertised twice in each of the following newspapers. Copies of the public notices for scoping meetings are included in Appendix C.

NEWSPAPERS	
The Washington Post P.O. Box 17370 Arlington, VA 22216 (703) 469-2500 √ January 4 & 11, 2006	The Seattle Times 1120 John Street Seattle, WA 98109 (206) 464-2111 √ January 6 & 13, 2006
Anchorage Daily News 1001 Northway Drive Anchorage, AK 99501 (907) 257-4272 √ January 9 & 16, 2006	

Native Tribal Governments Consultation and Coordination: Consultation and Coordination with federally recognized Native Tribal governments (Executive Order [EO] 13175) was extended to tribes in Alaska and Washington located within the project area that have an expressed interest in or have previously had an interest in SSL or NFS. A letter describing the project and encouraging participation in the planning process was mailed on January 27, 2006. The Native Tribal government mailing list is included in Appendix B, and the coordination letter is in Appendix G. A teleconference was held with representatives of tribal governments on February 7, 2006. Similar to the public meetings, participants were presented background information on the project and then provided an opportunity to make formal public comments followed by an informal question and answer period. A summary of the government-to-government teleconference is provided in Appendix G.

Agency Consultation and Coordination: Consultation was extended to federal, state and local agencies located within the project area that have an expressed interest or regulatory responsibility related to SSL or NFS within the project area. A letter describing the project and encouraging participation in the planning process was mailed on January 27, 2006. The agency mailing list is included in Appendix B, and the coordination letter is in Appendix F. A teleconference was held with representatives of interested agencies on February 7, 2006. Similar to the public meetings, participants were presented background information on the project and then provided an opportunity to make formal public comments followed by an informal question and answer period. A summary of the agency teleconference is presented in Appendix F.

Public Scoping Meetings: Three public scoping meetings were conducted. The scoping meeting format and all information presented were the same at all meetings. During the open house session, attendees viewed presentation boards and maps that displayed conceptual project information including purpose and need, project area maps and preliminary issues identified by the agency. A project overview was then presented by NMFS personnel and consultant staff, and was followed by a formal comment period. The formal public comment period was then closed and an informal question and answer session began. A summary of substantive formal comments submitted during the public comment period are included in Appendix H. Questions and comments made during the informal question and answer session are not summarized in this Scoping Summary Report but will be considered by NMFS in its analysis; Comment forms were available at the meetings, which could be filled out during the meeting or mailed later. The following table is a list of locations and dates for the public scoping meetings.

PUBLIC SCOPING MEETINGS	
Silver Spring Metro Center, Building 4 1301 East-West Hwy. Silver Springs, MD √ January 18, 2006	Alaska Fisheries Science Center, Building 9 7600 Sand Point Way, NE Seattle, WA √ January 20, 2006
Hilton Hotel 501 W. 3rd Avenue Anchorage, AK √ January 23, 2006	

2.0 ISSUE SUMMARY

2.1 Source of Scoping Comments

Scoping comments submitted on preparation of the Steller Sea Lion and Northern Fur Seal Research EIS came from a variety of sources:

- Public scoping meetings
- Agency scoping meeting
- Federal recognized tribes scoping meeting
- Project web site comments forms
- Written comments
- Comments submitted on the 2002 and 2005 Environmental Assessments (EA's)

Public Scoping Meeting Comments: Three public scoping meetings were held in January 2006, to solicit comments from interested individuals, Alaska Native organizations, and public interest organizations. Section 1.3 presents a list of the public meeting dates and locations, and informal meeting dates and locations. The sign-in sheets and public meeting transcripts are included in Appendix E, as well as other public comments received by e-mail, fax, or U.S. mail. Comments received included a broad range of issues similar to those compiled in Section 2.2 of this report. A more detailed summary of comments is presented in Section 2.2 of this report and the complete comments are included in Appendix E.

Agency Scoping Meeting Comments: The agency scoping meeting was held via conference call on February 7, 2006. Representatives from NMML, NMFS Alaska Region, the U.S. Marine Mammal Commission (MMC), U.S. Environmental Protection Agency (EPA) Region 10, and Aleutians East Borough (AEB) participated in the agency scoping teleconference Agency scoping comments focused primarily on role of the National Marine Mammal Laboratory (NMML) in the EIS, status of grants, permits and modifications to permits and whether the EIS analysis of permits and grants would be retroactive, the Humane Society of the U.S. (HSUS) lawsuit, permit amendments and modifications, project schedule, project workshop, and NOAA General Counsel's involvement in the EIS. The meeting minutes, agency comment letters, and all agency issues raised are included in Appendix F.

Tribal Government Scoping Meeting Comments: The project team conducted a conference call on February 7, 2006 with interested tribes. No formal comments were made during the teleconference. However, comments and questions were raised during the informal comment period, which included subsistence, research permits, status of stocks and species biology and NFS surveys. These informal comments will be considered by NMFS during development of the EIS. Representatives from the Native Village of Akutan, Native Village of Nikolski, and the Sitka Tribe of Alaska participated in the teleconference. The list of participants is included in Appendix G.

Comments Received on the 2002 and 2005 Permit Environmental Assessments: Comments received on the 2002 and 2005 Environmental Assessments (EAs) of the Effects of Permit Issuance for Research and Recovery Activities on SSL (Permit EAs) are incorporated into this scoping report given their relevance to the issues considered in this EIS. These comments have been coded just as those comments received for this EIS and are also summarized in this report.

E-mail and Written Comments: The majority of public comments received on this EIS during the formal scoping period have been in the form of written comments or e-mails sent to the agency's designated address for this project (ssleis.comments@noaa.gov). For example, comments submitted on the previous EAs, as described above, were written letters sent to the agency. Letters and e-mails submitted to the agency and included in this scoping period covered a broad range of issues which are summarized in the following section.

2.2 Issues Identified During Scoping

A number of issues were identified by NMFS prior to the start of the scoping process for this EIS. This preliminary list was provided to the public in an effort to encourage the public to participate in scoping and focus their concerns on issues within the scope of the project but the list was not intended to constrain the analysis. These issues identified by NMFS at the start of scoping included types of research methods and protocols permitted, level of research effort, coordination of research, effects of research, qualification of researchers, criteria for allowing modifications or amendments to existing grants and permits; for denying permit amendments; and for suspending or revoking permits.

The issues identified during scoping (as listed in Table 1 below) have been developed based on all formal comments made for public record and do not include any informal comments or questions asked during the public, agency, or government-to-government meetings. The issue codes presented in Table 1 include the preliminary issues and concerns that help to organize the comments and present them in a manner that facilitates the preparation of alternatives and evaluation of environmental consequences. The scoping comments received on the SSL and NFS Research EIS have been categorized under issue topics that are based on 1) the factors of analysis that NMFS is required to address in preparing an EIS, and 2) additional issues raised by the public. The issues are presented by general topic and may include sub-categories that further describe comments received related to that issue. For example, comments received on the adequacy of the previous SSL Permit EAs are included in the NEPA category as well as comments related to issues that should be addressed in this EIS analysis.

Scoping comments received during scoping are briefly summarized below (for more detailed comments see Appendices E and F). Some comments have been coded under multiple issue categories due to content. Therefore, there may be similarities among some of the summary comments presented under the issue codes below.

Alaska Native Issues

- Environmental justice issues should be addressed in the EIS.
- Questions asking about the role of Tribal governments in the EIS and the decision-making process.
- Effects of the proposed action on subsistence users.

Alternatives

- Comments related to the inadequacy of alternatives analyzed in the 2002 and 2005 SSL Permit EAs.
- Comments in support of, or against, alternatives analyzed in the 2002 and 2005 SSL Permit EAs.
- Suggestions for alternative components that should be analyzed in the EIS.
- Discussions related to a reasonable range of alternatives.

Branding/ Hot Branding

- Hot branding is an inhumane, intrusive method for marking animals and should not be used. The risks associated with hot branding outweigh the benefits.
- Branding causes too much disturbance on rookeries and should not be used.
- Effects of hot branding should be studied further before additional hot branding is authorized.
- Post branding monitoring is needed to understand its effects and ensure its effectiveness and utility.
- Too many animals are branded each year.

Conservation of the Species/ Conservation Goals

- Permitted research should be focused on contributing to the conservation of the species.
- The permitted research activities are not contributing to the conservation of the species.
- Concerns that proposed research does not appear to be conducted in a manner that promotes conservation of the species.
- Research objectives should be coordinated with the overall goal of recovering and conserving the species.

Coordination

- There is a lack of coordination among permitted research and it needs to be coordinated.
- NMFS has authorized permits without regard to how they all fit together to answer questions related to recovery and conservation of the species. Without such an approach, populations and areas are being over-sampled.
- Research must be coordinated to ensure that methodologies being used are comparable.
- Research needs to be coordinated with the goals in the species recovery plan.

Credentials of Researchers

- Comments related to the qualifications/credentials of researchers conducting certain types of research, particularly invasive research.
- Only veterinarians should administer anesthesia or dart animals.

Cumulative Effects

- The EIS should include discussion of the cumulative or synergistic effects of research on the animals.
- Cumulative effects were not addressed in the 2002 or 2005 Steller Sea Lion Permit EAs.
- Research is causing significant adverse cumulative effects on the species.
- Comments related to specific issues that should be included in the cumulative effects analysis.
- The cumulative effects of research exceed the sustainability of the population.
- All permits should be suspended until cumulative effects of research are analyzed.

Duplication of Research Effort

- Due to the lack of coordination of research activities permitted, there is duplication of effort that is harmful to the species.
- Some of the methodologies being used appear duplicative.

Editorial

- Editorial comments regarding text, tables or figures in the 2002 or 2005 SSL Permit EAs.

Effects of Research

- The effects of the invasive research taking place on these animals needs to be addressed. This should be addressed before any additional permits are approved.
- NMFS has not demonstrated that the effects of research will be insignificant.
- Specific comments on the effects of particular methods being used during research.
- Any given research method can have a wide range of disturbing effects.
- The cruelty of certain types of research is disturbing and lacks justification.
- The effects of administering multiple research methods on the same animal are not well documented and should be analyzed.

Endangered Species Act

- NMFS cannot meet its burden of proof under the ESA and MMPA to show that this research will clearly benefit the species.
- This research is in violation of the ESA.
- The quality and level of analysis required is lacking and does not meet the requirements of the ESA.

Inadequate Information

- There is inadequate information to fully understand the effects of research.

- Comments related to inadequate information provided in specific research permit applications (e.g. sampling locations, justification for specific protocols, mortality rates, etc.)

Methodology

- Research methods are inhumane; other methods that are less invasive should be used.
- Research methods are not justified.
- Effects of research methods are not well documented; not enough is known about the effects of certain research methods.
- Research methods should address questions or hypotheses related to the primary research goals listed in the SSL Recovery Plan and the NFS Conservation Plan.
- When there are conflicting methodologies, NMFS should clarify whether or how each fits within overall recovery goals.
- Suggestions on specific methodologies and how they should be administered (e.g., only veterinarians should administer anesthesia or that researchers working on rookeries should be briefed by biologists on how to minimize impacts).
- A power analysis for research methodologies should be done before any more invasive research is permitted.
- NMFS should create an independent research panel of outside experts to help identify the best methodologies to be used; a workshop that includes outside experts should be organized by NMFS to determine the best methodologies.
- When possible, new invasive methodologies should be tested on non-listed species first to determine their effects on subject species and effectiveness in attaining research objectives.

Mitigation

- Mitigation measures are not discussed in all permit applications.
- The EIS should discuss appropriate mitigation measures that should be implemented as part of the proposed action.

Marine Mammal Protection Act

- NMFS cannot meet its burden of proof under the MMPA to show that this research will clearly benefit the species and that the level of incidental mortality is acceptable.
- NMFS has not conducted the required level of analysis on the effects of research as required under the MMPA.
- Issuing permits for research violates the MMPA; approval of invasive research should be suspended until a comprehensive evaluation of effects and the contribution to recovery and compliance with MMPA are demonstrated.

Monitoring

- NMFS must suspend permits until an adequate monitoring program to evaluate effects of research is in place.
- Monitoring the long-term effects of research (e.g. hot branding) should be done.
- A monitoring program administered by NMFS should include ways to assess cumulative effects.

Mortality

- Comments expressing concern over the level of mortality described in specific permit applications; the rate of mortality described in some permit applications does not appear insignificant as NMFS concludes.
- Comments regarding research techniques that should not be used because they result in an increased level of mortality.
- The level of mortality (take) approved by NMFS is unacceptable, particularly for an endangered population.

National Environmental Policy Act

- The 2002 and 2005 SSL Permit EAs are inadequate and violate the requirements of NEPA; NMFS' Finding of No Significant Impact (FONSI) should be re-examined.
- The quality of analysis of the effects of research as required under NEPA are lacking at this time.
- Specific comments on what should be included in the SSL and NFS Research EIS; direct, indirect and cumulative effects should be analyzed in a single NEPA document.
- Questions related to why the EIS is not called a programmatic EIS since it is analyzing the effects of the grant and permit programs.
- Preparation of an EIS should be undertaken prior to issuance of permits rather than after the fact.
- Permits and permit modifications or amendments should be suspended until the EIS is complete.

Potential Biological Removal

- Concern that the level of take exceeds the Potential Biological Removal (PBR) for the species.
- The cumulative effects of research activities, when added to other factors such as Native harvest, could exceed the PBR and is clearly a significant impact.
- NMFS should require researchers to consult on how to reduce incidental mortality to ensure PBR is not exceeded.

Permits

- Comments expressing concern over the lack of sufficient information in specific permit applications to adequately assess impacts of research.
- Comments highlighting discrepancies in numbers or information presented in specific permit applications.
- NMFS must consider suspending all permits until a thorough EIS evaluating the effects of research is complete.
- Concerns related to invasive techniques described in specific permit applications.
- Research permits should be carried out under the respective co-management agreements.
- An overall assessment or description of all permit modifications should be developed by the agency so the effects of these permit changes can be understood.
- Permit applicants should be required to address how their activities address a critical need and justify why certain methodologies must be used, particularly if they are invasive.

Reporting Requirements

- Comments regarding discrepancies in permit applicant reports.
- Researchers are not doing an adequate job of reporting effects of their research activities to NMFS.

Sample Sizes; Techniques

- Specific suggestions for quality control of sample sizes, locations and techniques used to minimize impacts to SSL and NFS; sampling techniques should be coordinated so results are comparable.
- Concerns related to sample sizes, locations and techniques used for specific types of research; there is an apparent lack of integration and coordination of research for determining appropriate sample sizes, locations and techniques.
- A power analysis should be undertaken to determine appropriate sample sizes, locations and techniques.

Take

- Concerns that the level of take is too high for the population to sustain itself.
- Concern that researchers increase the level of take each year and the overall effects of this increase are significant.

Welfare

- NMFS must consider the welfare of individual animals when reviewing permit applications.

- Justification or sufficient information that the techniques used, or the level of take requested, meet the tests of the Animal Welfare Act is lacking. Each permit application should be able to pass scrutiny of an independent animal welfare/care committee.

Table 1 presents the scoping comments received organized by issue, number of comments per issue, number of submissions per affiliation, and the total number of comments received. A more complete summary of issues raised are located in the Appendices: Appendix E - issues raised by the public, Appendix F -issues raised by federal, state, and local government, and Appendix G – list of Native tribes that participated in the government-to-government meeting. See Key for table on the following page for identification of commenter affiliation.

Table 1. Scoping Comments by Issue and Entity

Issue Code	Issue Code Description	Public	Native	Agency	Total
AKN	Alaska Native Issues		AKU-1; NIK-2	EPA-4	7
ALT	Alternatives	HSUS-10;		EPA-1; MMC-1	12
BRD	Branding; Hot Branding	API-1; GS-1; GRN-2; HSUS-11		MMC-4	19
CON	Conservation of the Species; Conservation Goals	OMI-1; DOW-1; GRN-6; HSUS-6		MMC-4	20
COR	Coordination of Research	DOW-1; WWF-2; GRN-3; HSUS-7;		MMC-7	20
CRE	Credentials of Researchers	API-1; GS-1; HSUS-4		MMC-9	15
CUM	Cumulative Effects	API-1; DOW-2; BS-1; GRN-4; DB-2; HSUS-18		MMC-6	34
DUP	Duplication of Effort	API-1; AWI-1; DOW-1; HSUS-7		MMC-1	11
EDI	Editorial	HSUS-3			3
EFF	Effects	AWI-1; OMI-2; GS-2; GRN-7; HSUS-9		MMC-10; EPA-1	32
ESA	Endangered Species Act	DOW-2; HSUS-13			15
INA	Inadequate Information	DOW-2; HSUS-25		MMC-23	50
LIT	Litigation		AEB-1		1
MET	Methodology	API-1; AWI-2; OMI-2; GS-7; WWF-1; GRN-1; DB-3; HSUS-45		MMC-16;	78
MIT	Mitigation Measures	HSUS-2		MMC-1; EPA-1;	4
MMP	Marine Mammal Protection Act	DOW-2; HSUS-11			13
MON	Monitoring	AWI-1; GRN-3; HSUS-10		MMC-7;	21

Issue Code	Issue Code Description	Public	Native	Agency	Total
MOR	Mortality	DOW-2; GRN-3; HSUS-9		MMC-7;	21
NEP	National Environmental Policy Act	API-5; AWI-3; OMI-3; DOW-2; WWF-3; GRN-11; HSUS-55		MMC-5; EPA-10; NMML-3; AKR-1	101
NMM	National Marine Mammal Laboratory			NMML-1	1
PBR	Potential Biological Removal	HSUS-4		MMC-2	6
PER	Permits; Permit Applications	WWF-1; BS-1; GRN-1; HSUS-31	AEB-1;	MMC-23; NMML-1;	59
REP	Reporting	HSUS-3			3
SAM	Sample Size; Sample Location	GRN-6; HSUS-7		MMC-7	20
TAK	Take; Incidental Take	HSUS-1		MMC-2;	3
WEL	Welfare of the Species; Animal Welfare Act	API-1; HSUS-3			4

KEY:

AKU – Native Village of Akutan
AKR – NMFS Alaska Region
API - Animal Protection Institute
AWI - Animal Welfare Institute
BS – B. Sachau (citizen)
DB – David Bain (citizen)
DOW – Defenders of Wildlife
EPA – U.S. Environmental Protection Agency
GRN - Greenpeace
GS – Gary Snyder (citizen)
HSUS – Humane Society of the U.S.
MMC – U.S. Marine Mammal Commission
NIK- Native Village of Nikolski
OMI - Ocean Mammal Institute
WWF - World Wildlife Fund

2.3 Issues Raised That Will Not be Addressed in the EIS

Some issues raised during scoping will not be addressed in the EIS. Editorial comments related to specific content in the 2002 and 2005 SSL Permit EAs will not be addressed in this EIS, such as discrepancies in table numbers, figures or narrative text. However, comments related to the inadequacy of the EAs in addressing issues related to NEPA will be addressed.

3.0 SUMMARY OF FUTURE STEPS IN THE EIS PROCESS

Scoping is the first step in the EIS preparation process. Several more steps are necessary to complete the Steller Sea Lion and Northern Fur Seal Research EIS. The following chart depicts the requirements of the EIS process that falls within the framework of NEPA.

Figure 2 EIS NEPA Level Planning Process Steps

3.1 Development of Project Purpose and Need

An EIS must explain the underlying purpose and need to which NMFS is responding in proposing the research alternatives, including the proposed action. A preliminary purpose and need has been developed and was included in the project newsletter, as well as earlier in this report.

3.2 Description of the Affected Environment

Preparation of a focused description of the affected environment is needed to analyze the potential effects of the proposed action and its alternatives. The description of the affected environment will include a summary of the most recent scientific data available on all affected resources. This step has begun, and the analysis will provide the baseline reference for the development and evaluation of alternatives.

3.3 Formulation of Alternatives

A reasonable range of alternatives offering distinct choices of various research activities, combined with various types of research techniques, which meet the purpose and need for the project will be identified. All pertinent input from the public scoping process will be used to examine the range of potential alternatives to ensure that the full spectrum of positions expressed by participants in the scoping process have been considered. Alternatives eliminated from further consideration and not brought forward for formal analysis in the EIS will be identified, along with justifications for elimination. This step began in March 2006 and will continue through fall 2006.

3.4 Analyzing the Effects of the Alternatives

Once the alternatives are developed, the next step involves analyzing the effects of each alternative on the environment. This will include analysis of potential cumulative effects of each of the alternatives. NMFS expects to begin this process in September 2006 and will likely end in December 2006.

3.5 Write and Publish the Draft EIS

The results of the previous steps will be compiled in a preliminary Draft EIS that will be reviewed and approved by NMFS. The approved Draft EIS will be printed for distribution to the public for a 60-day review period. NMFS will provide a Notice of Availability (NOA) published in the *Federal Register*, which identifies the timing of the review period, time and location of public hearings on the Draft EIS, and any deadlines for submitting comments on the Draft EIS. NMFS will also distribute newsletters and provide information on the project website that contains this information. NMFS will likely begin the public comment period around January 2007 and may continue through March 2007.

3.6 Issuing the Proposed Final EIS

Based on the information contained in the Draft EIS and public comments received, NMFS will analyze and respond to the substantive comments received on the Draft EIS. Changes may be made to the information and analyses contained in the Draft EIS, and NMFS will select a preferred alternative and present it to the public in the Final EIS. This step will include public notices of the document's availability, the distribution of the document, and a 30-day protest period on the final document. NMFS will begin this step in November 2007 and expects to complete the project in December 2007.

4.0 CONTACTS

For further information regarding this scoping report, or other aspects of preparing the Steller Sea Lion and Northern Fur Seal Research EIS, please use the following contact information:

Tammy Adams, Project Manager, Permits, Conservation, and Education Division
Office of Protected Resources (F/PR1)
National Marine Fisheries Service
1315 East-West Highway, Room 13705
Silver Spring, MD 20910-3226
Phone: (301) 713-2289
Fax: (301) 427-2582

Web Site: http://www.nmfs.noaa.gov/pr/permits/eis/steller.htm
E-Mail: ssleis.comments@noaa.gov

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APPENDIX A
Federal Register Notice

rehabilitation activities; response to live animals would be limited to euthanasia or release; no disentanglement or health assessment activities;); (3) an alternative that allows for response and rehabilitation for cetaceans only; and (4) an alternative that allows for response and rehabilitation for ESA-listed marine mammals only. The elimination of any of these activities would impede data collection regarding strandings and the health of marine mammals that is necessary for NMFS conservation and recovery efforts for many species.

In addition to the alternatives listed above, NMFS will also utilize the scoping process to identify other alternatives for consideration. It should be noted that although several of the listed alternatives would not allow for the mandated activities listed in the MMPA, under 40 CFR 1506.2(d), reasonable alternatives cannot be excluded strictly because they are inconsistent with Federal or state laws, but must still be evaluated in the EIS.

For additional information about the MMHSRP, the national stranding network, and related information, please visit our website at *http://www.nmfs.noaa.gov/pr/health/*.

Public Involvement and Scoping Meetings Agenda

Public scoping meetings will be held at the following dates, times, and locations:

1. Tuesday, January 24, 2006, 7 – 10 p.m., Santa Barbara Natural History Museum, 2559 Puesta del Sol, Santa Barbara, CA;
2. Wednesday, January 25, 2006, 2 – 5 p.m.; Bay Conservation and Development Commission, 50 California Street, Suite 2600, San Francisco, CA;
3. Friday, January 27, 2006, 3 – 6 p.m., Hawaiian Islands Humpback Whale National Marine Sanctuary O'ahu Office, 6600 Kalaniana'ole Highway, Honolulu, HI;
4. Monday, January 30, 2006, 2 – 5 p.m., NMFS Northwest Regional Office, Building 9, 7600 Sand Point Way NE, Seattle, WA;
5. Wednesday, February 1, 2006, 2 – 5 p.m., U.S. Fish and Wildlife Service, 1011 East Tudor Road, Anchorage, AK;
6. Tuesday, February 7, 2006, 5 – 8 p.m., NMFS Southeast Regional Office, 263 13th Avenue, South, St. Petersburg, FL;
7. Monday, February 13, 2006, 5 – 8 p.m., New England Aquarium, Conference Center, Central Wharf, Boston, MA;
8. Friday, February 17, 2006, 2 – 5 p.m., Silver Spring Metro Center, Building 4, Science Center, 1301 East-West Highway, Silver Spring, MD.

Comments will be accepted at these meetings as well as during the scoping period, and can be mailed to NMFS by February 28, 2006 (see FOR FURTHER INFORMATION CONTACT).

We will consider all comments received during the comment period. All hardcopy submissions must be unbound, on paper no larger than 8 1/2 by 11 inches (216 by 279 mm), and suitable for copying and electronic scanning. We request that you include in your comments:

(1) Your name and address;

(2) Whether or not you would like to receive a copy of the Draft EIS (please specify electronic or paper format of the Draft EIS); and

(3) Any background documents to support your comments as you feel necessary.

All comments and material received, including names and addresses, will become part of the administrative record and may be released to the public.

Special Accommodations

These meetings are accessible to people with disabilities. Requests for sign language interpretation or other auxiliary aids should be directed to Sarah Howlett or Sarah Wilkin, 301–713–2322 (voice) or 301–427–2522 (fax), at least 5 days before the scheduled meeting date.

P. Michael Payne,

Chief, Marine Mammal and Sea Turtle Division, Office of Protected Resources, National Marine Fisheries Service.

[FR Doc. E5–7990 Filed 12–27–05; 8:45 am]

BILLING CODE 3510–22–S

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

[I.D. 122005C]

Notice of Intent to Prepare an Environmental Impact Statement on Impacts of Research on Steller Sea Lions and Northern Fur Seals Throughout Their Range in the United States

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice of Intent to prepare environmental impact statement.

SUMMARY: The National Marine Fisheries Service (NMFS) announces its intent to prepare an Environmental Impact Statement (EIS) to analyze the environmental impacts of administering grants and issuing permits associated with research on endangered and threatened Steller sea lions (*Eumetopias jubatus*) and depleted northern fur seals (*Callorhinus ursinus*). Publication of this notice begins the official scoping process that will help identify alternatives and determine the scope of environmental issues to be addressed in the EIS. This notice requests public participation in the scoping process and provides information on how to participate.

The purpose of conducting research on threatened and endangered Steller sea lions is to promote the recovery of the species' populations such that the protections of the Endangered Species Act (ESA; 16 U.S.C. 1531 *et seq.*) are no longer needed. Consistent with the purpose of the Marine Mammal Protection Act (MMPA; 16 U.S.C. 1361 *et seq.*), the purpose of conducting research on northern fur seals is to contribute to the basic knowledge of marine mammal biology or ecology and to identify, evaluate, or resolve conservation problems for this depleted species.

Research on Steller sea lions and northern fur seals considered in this EIS is funded and permitted by NMFS, which are both federal actions requiring National Environmental Policy Act (NEPA; 42 U.S.C. 4321 *et seq.*) compliance. The need for these actions is to facilitate research to: (1) Prevent harm and avoid jeopardy or disadvantage to the species; (2) promote recovery; (3) identify factors limiting the population; (4) identify reasonable actions to minimize impacts of human-induced activities; (5) implement conservation and management measures; and (6) make data and results available in a timely manner for management of the species. As part of this action, NMFS is developing measures that will improve efficiency and avoid unnecessary redundancy in Steller sea lion and northern fur seal research, utilize best management practices, facilitate adaptive management, and standardize research protocols.

ADDRESSES: See SUPPLEMENTARY INFORMATION for specific dates, times, and locations of public scoping meetings for this issue.

FOR FURTHER INFORMATION CONTACT: Written statements and questions regarding the scoping process must be postmarked by February 13, 2006, and should be mailed to: Steve Leathery, Chief, Permits, Conservation and Education Division, Office of Protected Resources, National Marine Fisheries Service, 1315 East-West Highway, Room 13705, Silver Spring, MD 20910–3226, Fax: 301–427–2583 or e-mail at *ssleis.comments@noaa.gov*.

SUPPLEMENTARY INFORMATION: NMFS is the Federal agency responsible for management of Steller sea lions and northern fur seals under the ESA and the MMPA. NMFS currently administers grants and issues permits to various individuals and institutions to conduct research on Steller sea lions and northern fur seals in lands and waters under U.S. jurisdiction.

The grant monies administered by NMFS have been designated by Congress and allocated within NMFS annual budgets for the purpose of facilitating research on Steller sea lions and northern fur seals. The agency has determined that the act of awarding grants is a federal action requiring NEPA compliance. Similarly, issuance of permits for research activities on marine mammals is a federal action requiring NEPA compliance. These permits are issued pursuant to the provisions of the ESA, the MMPA, and NMFS regulations implementing these statutes. This EIS would satisfy the NEPA compliance requirements for awarding grants and issuing permits for research on Steller sea lions and northern fur seals.

The statutory requirements for permits to allow research on marine mammals and on threatened and endangered species are described in Section 104 of the MMPA and Section 10 of the ESA, respectively. Specifically, Section 104(c)(3)(A) of the MMPA states that NMFS may issue a permit for scientific research purposes to an applicant, which submits with its permit application information indicating that the taking is required to further a bona fide scientific purpose. The MMPA defines bona fide scientific research as scientific research on marine mammals, the results of which: (1) likely would be accepted for publication in a refereed scientific journal; (2) are likely to contribute to the basic knowledge or marine mammal biology or ecology; or (3) are likely to identify, evaluate, or resolve conservation problems. Section 104 of the MMPA specifies additional conditions and requirements for permits including requiring permit applicants to demonstrate that the permit will be consistent with the purposes of the MMPA, which are specified in Section 2 of the statute.

For marine mammals listed as threatened or endangered, the provisions of Section 10 of the ESA apply to permit issuance in addition to the provisions of the MMPA. Section 10(a)(1)(A) of the ESA states that NMFS may issue permits for otherwise prohibited acts for scientific purposes or to enhance the propagation or survival of the affected species. Section 10(d) of the ESA further states that NMFS may grant exceptions under subsection 10(a)(1)(A) only if the agency finds that: (1) Such exceptions were applied for in good faith, (2) if granted and exercised will not operate to the disadvantage of such endangered species, and (3) will be consistent with the purposes and policies set forth in Section 2 of the Act. The purposes of the ESA, which are stated in Section 2 of the statute, are to provide a means whereby the ecosystems upon which endangered and threatened species depend may be conserved, to provide a program for the conservation of such endangered and threatened species, and to take such steps as may be appropriate to achieve the purposes of the treaties and conventions set forth in section 2(a) of the ESA.

In addition to the requirements of section 10 of the ESA, NMFS must comply with section 7 of the ESA in issuing permits. According to Section 7 of the ESA, NMFS must insure that any action it authorizes (such as by permit), funds (such as by grants), or carries out, is not likely to jeopardize the continued existence of listed species or result in destruction or adverse modification of critical habitat.

The purpose of issuing permits is to allow an exemption to the prohibitions on "takes" established under the ESA and MMPA. The ESA and the MMPA prohibit "takes" of threatened and endangered species, and of marine mammals, respectively. The ESA defines "take" as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Under the MMPA, "take" is defined as to "harass, hunt, capture, collect or kill, or attempt to harass, hunt, capture, collect or kill any marine mammal." Many research activities, including aerial and vessel-based surveys, tagging and marking procedures, attachment of scientific instruments, and collection of tissue samples require approaching or capturing animals and may result in harassment or other acts prohibited under the ESA and MMPA except where allowed by permit.

Because some of the proposed research may result in adverse effects on threatened and endangered Steller sea lions and depleted northern fur seals, NMFS has decided to prepare an EIS to evaluate the cumulative impacts of continuing to fund and permit research activities on these species. This EIS will assess the likely environmental and socioeconomic effects of funding and permitting research under a range of alternatives and will address compliance of the alternatives with the ESA, MMPA, and other applicable laws.

This notice initiates a public scoping period that will help determine the structure of each alternative considered in the EIS. The final scope and structure of the alternatives will reflect the combined input from the public, research institutions, affected state and federal agencies, and NMFS administrative and research offices. Based on comments received on Environmental Assessments prepared in 2002 and 2005 for permitting research on Steller sea lions, the following issues that NMFS is seeking public comments on have been identified and may be incorporated into the analysis of alternatives in the EIS:

(1) *Types of research methods and protocols permitted*. For example, are there critical research needs for these species other than those identified in the Recovery or Conservation Plans? If so, what are they and how are they likely to benefit the species? Of the research, information, and monitoring needs identified in the Recovery and Conservation Plans, what are the most appropriate methods to conduct the study or obtain the information? What criteria for developing and incorporating new research techniques should be used?

(2) *Level of research effort*. For example, how much of a specific research activity (e.g., aerial survey, tagging, biopsy sampling, etc.) is enough for management and conservation needs? Can there be too much? If so, how should NMFS set limits? Are the current methods to assess and document numbers of different "takes" that occur as a result of permitted research appropriate? Should there be different standards or more restrictions placed on research conducted on certain age, sex, or life-history stages or on the geographic or temporal distribution of research effort? If so, what should those limitations be?

(3) *Coordination of research*. For example, assuming permits are issued to multiple individuals, what are the most appropriate mechanisms for ensuring research is coordinated to maximize information and reduce adverse impacts? Alternatively, should NMFS consider limiting the number of permits to increase coordination and cooperation? If so, how should this be accomplished? Should researchers operating under different permits (but studying the same or related questions such as aerial survey for population census or biopsy for population

genetics) be required to use the same or similar methods to ensure the information collected is comparable and useful for NMFS conservation of the species? If so, what methods are most appropriate (e.g., for aerial surveys; capture and restraint; tissue sampling; marking; etc.)? If not, how should NMFS compare or use the data from various permit holders in its management decisions?

(4) *Effects of research*. NMFS will be assessing possible effects of the various research methods using all appropriate available information. Anyone having relevant information they believe NMFS should consider in its analysis should provide a complete citation or reference for retrieving the information. In addition, NMFS is seeking recommendations for study designs that could detect or predict the effects of research on Steller sea lions and northern fur seals.

(5) *Qualification of researchers*. For example, to ensure the study is conducted successfully and with the minimum of adverse impacts, how much prior experience should a permit applicant, principal investigator, or anyone else operating under a permit have with the specific methods for which they seek a permit?

(6) *Criteria for allowing modifications or amendments to existing grants and permits; for denying permit amendments; and for suspending or revoking permits*. In addition to the existing statutory and regulatory criteria for permit issuance and denial, should there be restrictions on the number or type of permit modifications or amendments issued over the life of a permit? With respect to environmental impacts, under what conditions should a permit be modified, revoked or suspended by NMFS?

The exact number and structure of the alternatives that are analyzed in the EIS will be determined based on information gathered during scoping. To provide a framework for public comments, the range of potential alternatives currently includes the Proposed Action and several other action alternatives, as well as a No Action alternative. The Proposed Action alternative would result in issuance of permits to qualified individuals and institutions to conduct those research activities determined critical or essential to NMFS' conservation and recovery of Steller sea lions and northern fur seals. To minimize the cumulative impacts of research on these species, no permits would be issued for lower priority research activities until the highest priority tasks identified for species conservation and recovery were completed or unless there was sufficient information to determine that the cumulative impacts of allowing additional takes for research would not adversely impact, disadvantage, or jeopardize the continued existence of the species. The Proposed Action could thus be viewed as a minimum take alternative, allowing the least amount of research practicable to meet NMFS' needs for recovery and conservation of the species.

In addition to the Proposed Action, NMFS will consider other alternatives for issuing permits for research on Steller sea lions and northern fur seals. One alternative to the Proposed Action is to issue all permits requested regardless of their relative potential contribution to conservation and recovery of the species, provided they meet all permit issuance criteria and would not jeopardize the continued existence of threatened or endangered species or result in significant adverse effects on depleted species. In contrast to the Proposed Action, this could be viewed as the maximum allowable take alternative.

Another alternative to the Proposed Action is the No Action alternative, which CEQ regulations require be included for consideration. The No Action alternative would only allow conduct of that research on Steller sea lions and northern fur seals already allowed under existing permits, which are valid through 2010. No new permits would be issued to replace the expiring permits, nor would existing permits be amended to allow modifications in research activities, sample sizes, or objectives.

A fourth alternative considered is the Status Quo. As with the No Action alternative, the Status Quo alternative would allow conduct of research on Steller sea lions and northern fur seals already identified under existing permits, and no permits would be amended to change research activities, sample sizes, or objectives. However, under the Status Quo Alternative, new permits would be issued to replace existing permits as they expire such that the current level of research and types of research activities would continue. Since the Status Quo would not allow issuance of permits for any research activities, objectives, or sample sizes not currently permitted, it would preclude adaptive changes in the research program that may be responsive to changes in the population status or threats to the recovery of the species.

The Status Quo and two other alternatives considered by NMFS may be eliminated from detailed study because they would not allow conduct of research identified by NMFS as necessary for conservation of the species. The other two alternatives that may be eliminated from further study are: (1) imposing a research permit moratorium (i.e., suspending or revoking existing permits and not issuing new ones) and (2) suspending all intrusive research activities (i.e., stopping biopsy sampling, instrument attachment, and other activities that could result in physical injury). In addition to preventing collection of information about Steller sea lions and northern fur seals needed for NMFS conservation and recovery efforts for these species, a research permit moratorium would hinder NMFS ability to monitor the status of these populations, which is important in making informed management decisions. Suspending permits for intrusive research would impede collection of information on Steller sea lion and northern fur seal habitat use and population structure which is needed for NMFS' conservation and recovery efforts for these species.

The EIS will assess the direct and indirect effects of the alternative approaches to funding and permitting Steller sea lion and northern fur seal research. The EIS will assess the effects on these species as well as other components of the marine ecosystem and human environment. The EIS will assess the contribution of research activities to the cumulative effects on these resources, including effects from past, present, and reasonably foreseeable future events and activities that are external to the research activities. The EIS will also assess the potential beneficial impacts of the research as it relates to conservation of Steller sea lions and northern fur seals. Anyone having relevant information they believe NMFS should consider in its analysis should provide a description of that information along with complete citations for supporting documents.

For additional information about Steller seal lions, northern fur seals, the permit process, and related information for these species, please visit our website at: *http://www.nmfs.noaa.gov/pr/permits/eis/steller.htm*.

Scoping Meetings Agenda

Public scoping meetings will be held at the following dates, times, and locations:

1. January 18, 2006, 1 – 4 p.m., Silver Spring Metro Center, Building 4, Science Center, 1301 East-West Highway, Silver Spring, MD;
2. January 20, 2006, 4 – 7 p.m., Alaska Fisheries Science Center, 7600 Sand

Point Way NE, Building 9, Seattle, WA; and

3. January 23, 2006, 5 – 8 p.m., Hilton Anchorage, 501 West 3rd Avenue, Anchorage, AK.

Comments will be accepted at these meetings as well as during the scoping period, and can be mailed to NMFS by February 13, 2006 (see FOR FURTHER INFORMATION CONTACT).

NMFS will consider all comments received during the comment period. All hardcopy submissions must be unbound, on paper no larger than 8 1/2 by 11 inches (216 by 279 mm), and suitable for copying and electronic scanning. NMFS requests that you include in your comments:

(1) Your name and address;

(2) Whether or not you would like to receive a copy of the Draft EIS; and

(3) Any background documents to support your comments as you feel necessary.

Special Accommodations

These meetings are accessible to people with disabilities. Requests for sign language interpretation or other auxiliary aids should be directed to Tammy Adams or Andrew Wright, 301–713–2289 (voice) or 301–427–2583 (fax), at least 5 days before the scheduled meeting date.

Dated: December 20, 2005.

Stephen L. Leathery,

Chief, Permits, Conservation and Education Division, Office of Protected Resources, National Marine Fisheries Service.

[FR Doc. E5–7989 Filed 12–27–05; 8:45 am]

BILLING CODE 3510–22–S

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

[I.D. 121905E]

Pacific Fishery Management Council; Public Meetings/Workshop

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice of public meeting.

SUMMARY: The Pacific Fishery Management Council (Council) will hold a public workshop to review and critique its groundfish stock assessment process in 2005.

DATES: The Groundfish Stock Assessment Process Review Workshop will commence at 8 a.m., Friday, January 13, 2006, and continue until business for the day is completed.

ADDRESSES: The Groundfish Stock Assessment Process Review Workshop meeting will be held at the Sheraton Portland Airport Hotel, Columbian A Room, 8235 NE Airport Way, Portland, OR 97220; telephone: (503) 281–2500.

Council address: Pacific Fishery Management Council, 7700 N.E. Ambassador Place, Suite 200, Portland, OR 97220–1384; telephone: (503) 820–2280.

FOR FURTHER INFORMATION CONTACT: Mr. John DeVore, Pacific Fishery Management Council; telephone: (503) 820–2280.

SUPPLEMENTARY INFORMATION: The purpose of the Groundfish Stock Assessment Process Review Workshop is for participants in the Council's 2005 stock assessment process to consider the procedures used in 2005 to assess and update groundfish stock abundance and develop recommendations for improving the process for future assessments. No management actions will be decided in this workshop. Any recommendations developed at the workshop will be submitted for consideration by the Council at its March meeting in Seattle, WA.

Although non-emergency issues not identified in the workshop agenda may come before the workshop participants for discussion, those issues may not be the subject of formal action during this workshop. Formal action at the workshop will be restricted to those issues specifically listed in this notice and any issues arising after publication of this notice that require emergency action under Section 305(c) of the Magnuson-Stevens Fishery Conservation and Management Act, provided the public has been notified of the workshop participants' intent to take final action to address the emergency.

Special Accommodations

This workshop is physically accessible to people with disabilities. Requests for sign language interpretation or other auxiliary aids should be directed to Ms. Carolyn Porter at (503) 820–2280 at least 5 days prior to the workshop date.

Dated: December 21, 2005.

Emily Menashes,

Acting Director, Office of Sustainable Fisheries, National Marine Fisheries Service.

[FR Doc. E5–7851 Filed 12–27–05; 8:45 am]

BILLING CODE 3510–22–S

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

[I.D. 122005A]

50 CFR Part 660

Pacific Fishery Management Council; Public Meetings and Hearings

AGENCY: National Marine Fisheries Service (NMFS), NationalOceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice of availability of reports; public meetings, and hearings.

SUMMARY: The Pacific Fishery Management Council (Council) has begun its annual preseason management process for the 2006 ocean salmon fisheries. This document announces the availability of Council documents as well as the dates and locations of Council meetings and public hearings comprising the Council's complete schedule of events for determining the annual proposed and final modifications to ocean salmon fishery management measures. The agendas for the March and April Council meetings will be published in subsequent **Federal Register** documents prior to the actual meetings.

DATES: Written comments on the salmon management options must be received by March 28, 2006, at 4:30 p.m. Pacific Time.

ADDRESSES: Documents will be available from and written comments should be sent to Mr. Donald Hansen, Chairman, Pacific Fishery Management Council, 7700 NE Ambassador Place, Suite 200, Portland, OR 97220–1384, telephone: 503–820–2280 (voice) or 503–820–2299 (fax). Comments can also be submitted via e-mail at *PFMC.comments@noaa.gov* address, or through the internet at the Federal eRulemaking Portal: *http://www.regulations.gov*. Follow the instructions for submitting comments, and include the I.D. number in the subject line of the message. For specific meeting and hearing locations, see supplementary information.

Council Address: Pacific Fishery Management Council, 7700 NE Ambassador Place, Suite 200, Portland, OR 97220.

FOR FURTHER INFORMATION CONTACT: Mr. Chuck Tracy, telephone: 503–820–2280.

SUPPLEMENTARY INFORMATION:

Schedule for Document Completion and Availability

February 28, 2005: "Review of 2005 Ocean Salmon Fisheries" and specified by the Department. Parties who submit argument in this proceeding are requested to submit with the argument: (1) A statement of the issue, and (2) a brief summary of the argument. Parties submitting case and/or rebuttal briefs are requested to provide the Department copies of the public version on disk. Case and rebuttal briefs must be served on interested parties in accordance with 19 CFR 351.303(f). Also, pursuant to 19 CFR 351.310, within 30 days of the date of publication of this notice, interested parties may request a public hearing on arguments to be raised in the case and rebuttal briefs. Unless the Secretary specifies otherwise, the hearing, if requested, will be held two days after the date for submission of rebuttal briefs, that is, 37 days after the date of publication of these preliminary results.

Representatives of parties to the proceeding may request disclosure of proprietary information under administrative protective order no later than 10 days after the representative's client or employer becomes a party to the proceeding, but in no event later than the date the case briefs, under 19 CFR 351.309(c)(ii), are due. The Department will publish the final results of this administrative review, including the results of its analysis of arguments made in any case or rebuttal briefs.

This administrative review is issued and published in accordance with section 751(a)(1) and 777(i)(1) of the Act.

Dated: February 8, 2006.

David M. Spooner,

Assistant Secretary for Import Administration.

[FR Doc. E6–2166 Filed 2–14–06; 8:45 am]

BILLING CODE 3510–DS–P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

[I.D. 122005C]

Notice of Intent to Prepare an Environmental Impact Statement on Impacts of Research on Steller Sea Lions and Northern Fur Seals Throughout Their Range in the United States

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice of intent to prepare environmental impact statement; extension of comment period.

SUMMARY: On December 28, 2005, the NMFS announced its intent to prepare an Environmental Impact Statement (EIS) to analyze the environmental impacts of administering grants and issuing permits to facilitate research on endangered and threatened Steller sea lions (*Eumetopias jubatus*) and depleted northern fur seals (*Callorhinus ursinus*). Written comments were due by February 13, 2006. NMFS has decided to allow additional time for submission of public comments on this action.

DATES: The public comment period for this action has been extended from February 13 to February 25, 2006. Written comments must be postmarked by February 25, 2006.

ADDRESSES: Written comments should be mailed to: Steve Leathery, Chief, Permits, Conservation and Education Division, Office of Protected Resources, National Marine Fisheries Service, 1315 East-West Highway, Room 13705, Silver Spring, MD 20910–3226. Written comments may also be submitted by facsimile to 301–427–2583, or by e-mail at *ssleis.comments@noaa.gov*.

FOR FURTHER INFORMATION CONTACT: Tammy Adams or Andrew Wright at 301–713–2289.

SUPPLEMENTARY INFORMATION: On December 28, 2005 (70 FR 76780) NMFS announced its intent to prepare an EIS regarding Steller sea lion and northern fur seal research. Background information concerning the EIS can be found in the December 28, 2005, **Federal Register** notice and is not repeated here. For additional information about Steller sea lions, northern fur seals, the permit process, and this EIS, please visit the project website at: *http://www.nmfs.noaa.gov/pr/permits/eis/steller.htm*.

Dated: February 9, 2006.

Stephen L. Leathery,

Chief, Permits, Conservation and Education Division, Office of Protected Resources, National Marine Fisheries Service.

[FR Doc. 06–1432 Filed 2–10–06; 3:29 pm]

BILLING CODE 3510–22–S

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

[I.D. 020806E]

Gulf of Mexico Fishery Management Council; Public Meeting

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice of a public meeting.

SUMMARY: The Gulf of Mexico Fishery Management Council (Council) will convene its Socioeconomic Panel (SEP).

DATES: The meeting will convene at 9 a.m. on Thursday, March 2, 2006, and conclude no later than 12 noon on Friday, March 3, 2006.

ADDRESSES: The meeting will be held at the Quorum Hotel Tampa, 700 North Westshore Boulevard, Tampa, FL 33609.

Council address: Gulf of Mexico Fishery Management Council, 2203 North Lois Avenue, Suite 1100, Tampa, FL 33607.

FOR FURTHER INFORMATION CONTACT: Dr. Assane Diagne, Economist, Gulf of Mexico Fishery Management Council; telephone: (813) 348–1630.

SUPPLEMENTARY INFORMATION: The Gulf of Mexico Fishery Management Council (Council) will convene its Socioeconomic Panel (SEP) to discuss total allowable catch (TAC) allocation issues. The SEP will prepare a report containing their conclusions and recommendations. This report will be presented to the Council at its meeting March 20–23, 2006 at the Radisson Admiral Semmes Hotel in Mobile, AL.

A copy of the agenda and related materials can be obtained by calling the Council office at (813) 348–1630.

Although other non-emergency issues not on the agendas may come before the SEP for discussion, in accordance with the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), those issues may not be the subject of formal action during this meeting. Actions of the SEP will be restricted to those issues specifically identified in the agendas and any issues arising after publication of this notice that require emergency action under Section 305(c) of the Magnuson-Stevens Act, provided the public has been notified of the Council's intent to take action to address the emergency.

Special Accommodations

This meeting is physically accessible to people with disabilities. Requests for sign language interpretation or other auxiliary aids should be directed to Dawn Aring at the Council (see **ADDRESSES**) at least 5 working days prior to the meeting.

Dated: February 10, 2006.

Tracey L. Thompson,

Acting Director, Office of Sustainable Fisheries Service, National Marine Fisheries Service.

[FR Doc. E6–2159 Filed 2–14–06; 8:45 am]

BILLING CODE 3510–22–S

APPENDIX B
Project Mailing List
May 2006

First Name	Last Name	Organization	Address 1	City	State	Zip
		Aleutian Pribilof Island Community Development Assoc.	234 Gold Street	Juneau	AK	99801
		Bering Sea Fishermen's Association	725 Christensen Drive	Anchorage	AK	99501
		National Marine Fisheries Service - WF Thompson Memorial Library	301 Research Court	Kodiak	AK	99615
		National Marine Fisheries Service AFSC, Auke Bay Laboratory Fisheries	11305 Glacier Highway	Juneau	AK	99801
		Sierra Club - Alaska Chapter	333 W. 4th Ave., Ste. 307	Anchorage	AK	99501-2341
		The Ocean Conservancy	1725 DeSales Street NW, Suite 600	Washington	DC	20036
Kelsey	Abbott	NOAA-NMFS				
Dave	Ackley	National Marine Fisheries Service	P.O. Box 21668	Juneau	AK	99801
Tammy	Adams	National Marine Fisheries Service, Office of Protected Resources	1315 East-West Highway	Silver Spring	MD	20910
Vera	Alexander	Marine Mammal Commission	P.O. Box 757500 Office 235 IRVII	Fairbanks	Alaska	99775
Matthew	Alford	University of Washington, Applied Sciences Laboratory	1013 NE 40th Street	Seattle	WA	98105-6698
Laurie	Allen	NOAA Fisheries/PR	1315 East-West Highway: SSMC III	Silver Springs	MD	20910
Bob	Alverson	Fishing Vessel Owners Association	4055 20th Avenue West	Seattle	WA	98119
Ralph	Andersen	Bristol Bay Native Association	PO Box 310	Dillingham	AK	99576
Patrick M.	Anderson	Chugachmiut	1840 South Bragaw Suite 110	Anchorage	AK	99508
Stosh	Anderson	F/V Kestrel	P.O. Box 310	Kodiak	AK	99615
Will	Anderson	Humane Society/U.S.	2122 8th Avenue #201	Seattle	WA	98109
Russel	Andrews	Alaska SeaLife Center	P.O. Box 1329	Seward	AK	99664
Harvey	Anelon	Village of Iliamna	P.O. Box 286	Iliamna	AK	99606
Robyn	Angliss	National Marine Mammal Laboratory	7600 Sand Point Way N.E. F/AKC3	Seattle	WA	98115
Bud	Antonelis	Pacific Islands Fisheries Science Center, Marine Mammal Research Program, Protected Species Division	2570 Dole Street	Honolulu	HI	96822-2396
Ellen	Athas	Council on Environmental Quality	722 Jackson Place NW	Washington	DC	20006
Shannon	Atkinson	Alaska SeaLife Center	P.O. Box 1329	Seward	AK	99664
Ben	Atoruk	Native Village of Kiana	P.O. Box 69	Kiana	AK	99749
A. Dennis	Austin	Washington Dept. of Fish & Wildlife	600 Capitol Way N.	Olympia	WA	98501-1091
Jim	Ayers	Oceana	175 S. Franklin, Ste. 418	Juneau	AK	99801

First Name	Last Name	Organization	Address 1	City	State	Zip
Bob	Bailey	Oregon Coastal Conservation & Development Commission (OCC&DC)	635 Capitol St. NE, Suite 150	Salem	OR	97301-2540
David	Bain	University of Washington				
Kris	Balliet	The Ocean Conservancy	425 G Street, Suite 400	Anchorage	AK	99501
Andrea	Balla-Holden	URS Corporation				
Greg	Balogh	U.S. Fish & Wildlife Service	1011 E. Tudor Road	Anchorage	AK	99503
Jim	Balsiger	National Marine Fisheries Service	P.O. Box 21668	Juneau	AK	99802
Greg	Bargmann	Washington Dept. of Fish & Wildlife	600 Capitol Way N.	Olympia	WA	98501
Randy	Bates	Alaska DNR OPMP - ACMP	302 Gold Street, Suite 202	Juneau	AK	99801-0030
Kimberlee	Beckmen	Alaska Department of Fish & Game	1300 College Road	Fairbanks	AK	99701-1599
Linda	Behnken	Alaska Longliner Fisherman's Association	403 Lincoln Street, Suite 237	Sitka	AK	99835
John	Bengtson	National Marine Mammal Laboratory	7600 Sand Point Way, NE BIN C15700, Bldg. 1	Seattle	WA	98115-0070
Dave	Benson	Fur Seal Committee	5303 Shilshole Ave., NW	Seattle	WA	98107-4000
Ron	Berg	National Marine Fisheries Service	P.O. Box 21668	Juneau	AK	99801
Steven	Berkeley	Hatfield Marine Science Center	Oregon State University	Newport	OR	97365
Sally	Bibb	National Marine Fisheries Service Sustainable Fisheries Division	P.O. Box 21668	Juneau	AK	99802-1668
Jerry	Bongen	Fairweather Fisheries	P.O. Box 3523	Kodiak	AK	99615
Corrie	Bosman	Center for Biological Diversity	201 Lincoln Street	Sitka	AK	99835
Corey	Bradshaw	Charles Darwin University		Darwin	Northern Territiry	909
Kaja	Brix	National Marine Fisheries Service	P.O. Box 21668	Juneau	AK	99801
Ryan	Broddrick	California Department of Fish and Game	1416 Ninth St	Sacramento	CA	95814
Margaret	Brown	Cook Inlet Region, Inc.	2525 C Street, Suite 500	Anchorage	AK	99509-3330
Robin	Brown	Oregon Department of Fish and Wildlife	7118 NE Vandenberg Avenue	Corvallis	OR	97330-9446
John	Bruce	Jubilee Fisheries	1516 NW 51st Street	Seattle	WA	98107
Jason	Brune	Resource Development Council	121 West Fireweed, Suite 250	Anchorage	Ak	99503
John	Bundy	Glacier Fish Company, LTD.	1200 Westlake Ave. N, Suite 900	Seattle	WA	98109
Alvin	Burch	Alaska Draggers Association	P.O. Box 991 (or 668 Anderson Way)	Kodiak	AK	99615
Kurt	Byers	UAF Sea Grant College Program	P.O. Box 755040	Fairbanks	AK	99775-5040

First Name	Last Name	Organization	Address 1	City	State	Zip
Vernon	Byrd	U.S. Fish and Wildlife Service, Alaska Maritime Wildlife Refuge	95 Sterling Highway, Suite 1	Homer	AK	99603
John	Calambokidis	Cascadia Research Collective	Waterstreet Bldg. Suite 201	Olympia	WA	89501
Meg	Caldwell	California Coastal Commission	Stanford Law School, 559 Nathan Abbott Way, Owen House Room 6,	Stanford	CA	94305-8610
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McKie	Campbell	Alaska Department of Fish and Game	P.O. Box 25526	Juneau	AK	99802
Shane	Capron	National Marine Fisheries Service	P.O. Box 21668	Juneau	AK	99801
Charlie	Challstrom	NOAA, National Ocean Services	1305 East-West Hwy, SSMC4, Rm 13632	Silver Spring	MD	20910
Mary	Charles	Native Village of White Mountain	P.O. Box 84082	White Mountain	AK	99784
Joseph M.	Chaszar	North Pacific Observer Training Ctr	7717 Regal Mountain Drive	Anchorage	AK	99504
Pat	Check	Nooksack Tribe	5017 Deming Road	Deming	WA	98244
Dorothy	Childers	Alaska Marine Conservation Council	P.O. Box 101145	Anchorage	AK	99510
Miranda	Christiansen	Gulf of Alaska Coastal Communities Coalition	P.O. Box 201236	Anchorage	AK	99520
Gary	Christofferson	Pacific States Marine Fisheries Commission	612 W. Willoughby Ave, Suite B	Juneau	AK	99801
Ronald	Clarke	Marine Conservation Alliance	P.O. Box 20676	Juneau	AK	99802
David	Clausen	National Marine Fisheries Service - Auke Bay Lab	11305 Glacier Highway	Juneau	AK	99801
Jim	Coe	Alaska Fisheries Science Center	7600 Sand Point Way N.E., Bldg. 4	Seattle	WA	98115
Adrian	Colewycz	National Marine Fisheries Service - Auke Bay Lab	11305 Glacier Highway	Juneau	AK	99801
Catherine	Coon	North Pacific Fishery Management Council	605 W. 4th Ave., Suite 306	Anchorage	AK	99501-2252
Larry	Cotter	Aleutian Pribilof Islands Community Development Association	234 Gold Street	Juneau	AK	99801
David	Cottingham	Marine Mammal Commission	4340 East West Highway, Suite 905	Bethesda	Maryland	20814
Keith	Criddle	Department of Economics	Utah State University	Logan	UT	84322
Craig	Cross	Aleutian Spray Fisheries	11021 1st Ave NW	Seattle	WA	98177

First Name	Last Name	Organization	Address 1	City	State	Zip
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Christopher	Dahl	Pacific Fishery Management Council	7700 Ambassador Pl., Suite 200	Seattle	OR	97220
Paul	Dalzell	Western Pacific FMC	1164 Bishop Street, Suite 1400	Honolulu	HI	96813
Costa	Daniel	University of California, Long Marine Lab	100 Shaffer Rd	Santa Cruz	CA	95060
Steven	Davis	National Marine Fisheries Service-Alaska Region	222 W. 7th Avenue, Room 517	Anchorage	AK	99513
Randall	Davis	Texas A&M University, Department of Marine Biology	5007 Avenue U	Galveston	TX	77551
Paul	Dayton	Marine Mammal Commission	9500 Gilman Drive, 0210	La Jolla	California	92093-0210
LT. Peter	DeCola	USCG - NPRFTC	P.O. Box 10092	Kodiak	AK	99619
Anthony	DeGange	U.S. Fish & Wildlife Service	1011 E. Tudor Road, Suite 219	Anchorage	AK	99503
Robert	DeLong	National Marine Mammal Laboratory	7600 Sand Point Way, NE BIN C15700, Bldg. 1	Seattle	WA	98115-0070
Doug	DeMaster	Alaska Fisheries Science Center	7600 Sand Point Way N.E., Bldg. 4	Seattle	WA	98115
Jane	DiCosimo	North Pacific Fisheries Management Council	605 W. 4th Ave., Suite 306	Anchorage	AK	99501-2252
Kimberly	Dietrich	Assoc. for Professional Observers	5026 9th Avenue, NE	Seattle	WA	98105
Lisa	Dolchok	Cook Inlet Tribal Council, Inc.	3600 San Jeronimo Drive	Anchorage	AK	99508
Martin	Dorn	Alaska Fisheries Science Center	7600 Sand Point Way N.E., Bldg. 4	Seattle	WA	98115
Kevin	Duffy	Alaska Department of Fish and Game	P.O. Box 25526	Juneau	AK	99802
Gary	Duker	Alaska Fisheries Science Center	7600 Sand Point Way N.E., Bldg. 4	Seattle	WA	98115
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Matthew	Eagleton	National Marine Fisheries Service/HCD	222 W. 7th Avenue, Room 517	Anchorage	AK	99513
Tom	Enlow	The Grand Aleutian	P.O. Box 921169	Dutch Harbor	AK	99692
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Leonte	Ermeloff	Village of Nikolski	General Delivery	Nikolski	AK	99638
Michael	Etnier	University of Washington, Department of Anthropology	Box 353100	Seattle	WA	98198-3100
Larry	Evanoff	Native Village of Chanega	P.O. Box 8079	Chenega Bay	AK	99574
Diana	Evans	North Pacific Fisheries Management Council	605 W. 4th Ave., Suite 306	Anchorage	Ak	99501-2252
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Mollie	Farrell	Lathum & Watkins	555 Eleventh Street, NW	Washington	D.C.	20004
Jennifer	Ferdinand	Alaska Fisheries Science Center	7600 Sand Point Way N.E., Bldg. 4	Seattle	WA	98115

First Name	Last Name	Organization	Address 1	City	State	Zip
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Dave	Fraser	High Seas Catchers' Co-op	P.O. Box 771	Port Townsend	WA	98368
Lowell	Fritz	National Marine Fisheries Service, Alaska Fisheries Science Center	7600 Sand Point Way N.E., Bldg. 4	Seattle	WA	99815
Jeff	Fujioka	National Marine Fisheries Service - Auke Bay Lab	11305 Glacier Highway	Juneau	AK	99801
Fritz	Funk	Alaska Department of Fish & Game	P.O. Box 25526	Juneau	AK	99802
Sarah	Gaichas	Alaska Fisheries Science Center	7600 Sand Point Way N.E., Bldg. 4, Bin C15700	Seattle	WA	98115
Nicholas	Gales	Australian Antarctic Division	Channel Highway	Kingston Tasmania 7050	AUSTRALIA	
Michael	Galginaitis	Applied Sociocultural Research	608 W 4th Ave., Suite 314	Anchorage	AK	99501
Russell	Galipeau	Channel Islands National Park	1901 Spinnaker Drive	Ventura	CA	93001
Steve	Ganey	Pew Oceans Commission	2101 Wilson Boulevard, Suite 550	Arlington	VA	22201
Jennifer	Gannett	Humane Society/U.S.				
Glen	Gardner	City of Sand Point	P.O. Box 249	Sand Point	AK	99661
John	Garner	NorQuest Seafoods, Inc.	5245 Shilshole Ave., NW	Seattle	WA	98107-4833
Chris	Gebhardt	EPA Region 10	1200 6th Avenue ECO-088	Seattle	WA	98101
Tom	Gelatt	National Marine Mammals Laboratory, National Marine Fisheries Service, NOAA	7600 Sand Point Way N.E., Bldg. 4	Seattle	WA	98115
Eric	Gilman	National Audobon Society	2718 Napuaa Place	Honolulu	HI	96822
Robert	Gilzinger	C/O Gorton's Inc.	128 Rogers Street	Gloucester	MA	1930
Jay	Ginter	National Marine Fisheries Service Sustainable Fisheries Div.	P.O. Box 21668	Juneau	AK	99802-1668
Jim	Glock	National Marine Fisheries Service - Northwest Region	525 NE Oregon Street, Suite 510	Portland	OR	97232
Raymond	Goldoff	Village of Atka	P.O. 47030	Atka	AK	99574
Jon	Goltz	State of Alaska - Department of Law	1031 West 4th Ave, Suite 200	Anchorage	AK	99501-1994
Rowan	Gould	U.S. Fish & Wildlife Service, Alaska Region	1011 East Tudor Road	Anchorage	AK	99503
Shane	Guan	NOAA-NMFS	1315 East-West Hwy. 13 Floor	Silver Spring	MD	20910

First Name	Last Name	Organization	Address 1	City	State	Zip
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Jeannie	Hagne	EPA Region 10	1200 6th Avenue ECO-088	Seattle	WA	98101
Jim	Hale	National Marine Fisheries Service	P.O. Box 21668	Juneau	AK	99802-1668
Kathy	Hansen	SEAK Fishermen's Alliance	9369 North Douglas Highway	Juneau	AK	99801
David	Hanson	Pacific States Marine Fisheries Commission	405 Durham	Lake Oswego	OR	97034
Amy	Hapeman	NOAA-NMFS				
Rob	Harcourt	Macquarie University, Graduate School of the Environment		Sydney	NSW	2109
Steven	Hare	International Pacific Halibut Commission	P.O. Box 95009	Seattle	WA	98145-2009
Brian	Harper	U.S. Army Corps of Engineers	P.O. Box 6898	Elmendorf AFB	AK	99506-6898
John	Harrington	US EPA	1200 Pennsylvania Avenue M/C 2252A	Washington	DC	20460
Jeff	Hartman	National Marine Fisheries Service Sustainable Fisheries	P.O. Box 21668	Juneau	AK	99802
Tom	Hawkins	Bristol Bay Native Corporation	111 West 16th Avenue, Suite 400	Anchorage	AK	99501
Jon	Heifetz	National Marine Fisheries Service - Auke Bay Lab	11305 Glacier Highway	Juneau	AK	99801
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Mark	Hindell	University of Tasmania, Antarctic Wildlife Research Unit	P.O. Box 05	Hobart	TAS	7001
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First Name	Last Name	Organization	Address 1	City	State	Zip
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Anne	Hollowed	Alaska Fisheries Science Center	7600 Sand Point Way N.E., Bldg. 4, Bin C15700	Seattle	WA	98115
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Sarah	Howlett	NOAA-NMFS				
Carrie	Hubard	NOAA-NMFS				
Jim	Ianelli	Alaska Fisheries Science Center	7600 Sand Point Way N.E., Bldg. 4	Seattle	WA	98115
Stephen	Insley	Hubbs-SeaWorld Research Institute	2595 Ingraham St.	San Diego	CA	92109
Dave	Irons	U.S. Fish & Wildlife Service	1011 E. Tudor Road	Anchorage	AK	99503
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Lianna	Jack	The Alaska Sea Otter and Stellar Sea Lion Commission	6239 B Street, Suite 204	Anchorage	AK	99518
Mark	Jen	EPA Region 10	222 W. 7th Avenue, Suite 19	Anchorage	AK	99513
Gary	Johnson	Peter Pan Seafoods, Inc.	2200 6th Avenue, Suite 1000	Seattle	WA	98121
Pete	Jones	National Marine Fisheries Service	P.O. Box 21668	Juneau	AK	99802
Allen	Joseph	AVCP, Inc.	P.O. Box 219	Bethel	AK	99559
Bob	Juettner	Aleutians East Borough	3380 "C" St., Suite 205	Anchorage	AK	99503
Archie	Kalmakoff	Ivanoff Bay Village	P.O. Box K1B	Ivanoff Bay	AK	99502
Gilbert	Kashervarof	Aleut Community of Saint George	P.O. Box 940	St. George Island	AK	99591
Gilberty G.	Kashevarof	St. George Traditional Council; St. George Co-Management Council	PO Box 940	St. George Island	AK	99591
Frank	Kelty	City of Unalaska	PO Box 610	Unalaska	AK	99685
Mitch	Kilborn	Western Alaska Fisheries, Inc.	P.O. Box 2367	Kodiak	AK	99615
Nicole	Kimball	North Pacific Fishery Management Council	605 W. 4th Ave., Suite 306	Anchorage	AK	99501-2252
Eric	Kingma	WesPac Fishery Management Council	1164 Bishop Street, Suite 1400	Honolulu	HI	96813
Alan	Kinsolving	National Marine Fisheries Service Sustainable Fisheries Division	P.O. Box 21668	Juneau	AK	99802-1668
Julie	Kitka	Alaska Federation of Natives	1577 C St., Suite 300	Anchorage	AK	99501
Jeffrey	Koenings	Washington Dept. of Fish & Wildlife	600 Capitol Way N.	Olympia	WA	98501-1091
Gary	Kompkoff	Village of Tatitlek	P.O. Box 171	Tatitlek	AK	99677
Iris	Korhonen-Penn	Earthjustice Legal Defense Fund	325 4th Street	Juneau	AK	99802

First Name	Last Name	Organization	Address 1	City	State	Zip
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Earl	Krygier	Alaska Department of Fish & Game - Commercial Fisheries	333 Raspberry Road	Anchorage	AK	99518
Rena J.	Kudrin	Tribal Government of St. Paul; St. Paul Co-Management Council	P.O. Box 86	St. Paul Island	AK	99660
Kathy	Kuletz	U.S. Fish & Wildlife Service	1011 E. Tudor Road	Anchorage	AK	99503
Jon	Kurland	National Marine Fisheries Service	P.O. Box 21668	Juneau	AK	99802-1668
Vincent	Kvasnikoff	Village of Nanwalek	PO Box 8026	Nanwalek	AK	99603
Andrew	Larsen	Consulate General of Japan	3601 C Street, Suite 1300	Anchorage	AK	99503
Mike	LaTourneau	EPA Region 10	1200 Sixth Avenue; Mailstop ECO-088	Seattle	WA	98101
Bruce	Leaman	International Pacific Halibut Commission	P.O. Box 95009	Seattle	WA	98145-2009
Gerald	Leape	National Environmental Trust	1200 18th Street NW, 5th Floor	Washington	D.C.	20016
Steve	Leathery	National Marine Fisheries Service, Office of Protected Resources, Permits, Conservation and Education Division, F/PR1	1315 East-West Highway, Room 13705	Silver Spring	MD	20910-3226
Claire	LeClair	Alaska Marine Conservation Council	P.O. Box 101146	Anchorage	AK	99502
Jim	Lee	Alaska Fisheries Science Center	7600 Sand Point Way N.E., Bldg. 4	Seattle	WA	98115
Anne	Lee	URS Corporation	2700 Gambell St., Suite 200	Anchorage	AK	99503
Terry	Leitzell	Icicle Seafoods, Inc.	4019 21st Avenue, W.	Seattle	WA	98199
Margaret	Lekanoff	Qawalangin Tribe of Unalaska	PO Box 334	Unalaska	AK	99685
Phillip	Lestenkof	Cent. Bering Sea Fishermen's Assoc.	P.O. Box 288	Saint Paul	AK	99660-0288
Aquilina	Lestenkof	Pribilof Islands Collaborative	P.O. Box 86	St. Paul Island	AK	99660
Joe	Lianos	Village of Ouzinkie	P.O. Box 130	Ouzinkie	AK	99644
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Lisa	Lindeman	NOAA General Counsel	PO Box 21109	Juneau	AK	99802
Beate	Litz	Alaska SeaLife Center	P.O. Box 1329	Seward	AK	99664
Pat	Livingston	Alaska Fisheries Science Center	7600 Sand Point Way N.E., Bldg. 4, Bin C15700	Seattle	WA	98115
Denby	Lloyd	Alaska Department of Fish and Game	211 Mission Road	Kodiak	AK	99615

First Name	Last Name	Organization	Address 1	City	State	Zip
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Sandra	Lowe	Alaska Fisheries Science Center	7600 Sand Point Way N.E., Bldg. 4	Seattle	WA	98115
Seth	Macinko	Department of Marine Affairs	University of Rhode Island, Washburn Hall	Kingston	RI	02881
Debra	Mack	Aleut Corporation	4000 Old Seward Hwy, Suite 300	Anchorage	AK	99503
Stephanie	Madsen	North Pacific Fisheries Management Council - Pacific Seafood Processors Assn	605 W. 4th Avenue, Suite 306	Anchorage	AK	99501-2253
Max	Malavansky, Jr.	St. George Traditional Council; St. George Co-Management Council	PO Box 940	St. George Island	AK	99591
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Bruce	Mate	Oregon State University	2030 SE Marine Science Dr.	Newport	OR	97365
Craig	Matkin	Noerh Gulf Oceanic Society	60920 Mary Allen Ave.	Homer	AK	99603
Lisa	Mazzaro	Mystic Aquarium	55 Coogan Blvd.	Mystic	CT	6355
Steve	MacLean	The Nature Conservancy				
Sheela	McLean	NOAA-NMFS				
Barbara	McBride	Alaska Sablefish Inc.	P.O. Box 319	Homer	AK	99603
Trevor	McCabe	At-Sea Processors Association	431 West 7th Ave., Suite 201	Anchorage	AK	99501
Joe	McCabe	NOAA General Counsel	PO Box 21109	Juneau	AK	99802
Chuck	McCallum	Chignik Seiners	614 Irving Street	Bellingham	WA	98225
Peter	McCarthy	F/V Laura	P.O. Box 4311	Kodiak	AK	99615
Heather	McCarty	At-Sea Processors Association	319 Seward Street, #3	Juneau	AK	99801
Bob	McConnaughey	Alaska Fisheries Science Center	7600 Sand Point Way N.E., Bldg. 4	Seattle	WA	98115-6349
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Chris	McNeil	Sealaska Corporation	One Sealaska Plaza, Suite 400	Juneau	AK	99801

First Name	Last Name	Organization	Address 1	City	State	Zip
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Gerry	Merrigan	Prowler Fisheries	P.O. Box 1364	Petersburg	AK	99833
Dennis	Metrokin	Koniag, Inc.	104 Center Avenue, Suite 205	Kodiak	AK	99615
Jeremy	Miller	The Ocean Conservancy	425 G Street, Suite 400	Anchorage	AK	99501
Mel	Moon, Jr.	Quileute Tribe	P.O. Box 187	LaPush	WA	98350
Joe	Moore	TOC	425 G Street, Suite 400	Anchorage	AK	99501
Phillip	Mundy	EVOS Trustee Council	441 W. 5th Avenue, Suite 500	Anchorage	AK	99501-2340
Peggy	Murphy	Alaska Fisheries Information Network	612 W. Willoughby Ave., Suite B	Juneau	AK	99801
Benjamin	Muse	National Marine Fisheries Service - Alaska Region	709 West 9th, Room 420	Juneau	AK	99802
Kevin	Myers	Sierra Club	1030 Wee Burn Drive	Juneau	AK	99801
Ahmad	Nassar	Latham & Watkins	555 Eleventh Street, NW	Washington	D.C.	20004
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Kris	Norosz	Icicle Seafoods, Inc.	P.O. Box 1147	Petersburg	AK	99833
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Sebastian	O'Kley	Robertson, Monagle & Eastaugh				
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Dorothy	Owen	Douglas Indian Association	P.O. Box 240541	Douglas	AK	99824
George	Owletuck	Alaska Oceans Network	308 G Street, Suite 219	Anchorage	AK	99501
Brent	Paine	United Catcher Boats	4005 20th Avenue W, Suite 110	Seattle	WA	98199-1290
David	Palmer	Latham & Watkins	555 Eleventh Street, NW	Washington	D.C.	20004

First Name	Last Name	Organization	Address 1	City	State	Zip
Donna	Parker	Arctic Storm - Marine Conservation Alliance	81 Big Bear Pl. NW	Issaquah	WA	98027
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Tom	Pearson	National Marine Fisheries Service	301 Research Court, Room 212	Kodiak	AK	99615
Wally	Pereyra	Profish International Inc.	400 N 34th, Suite 306	Seattle	WA	98103
Paul	Peyton	C/O BBEDC	815 E. 82nd Ave 50c 104	Anchorage	AK	99518
Dimitri	Philemonof	Aleutian / Pribilof Islands Association	201 East 3rd Avenue	Anchorage	AK	99501
Patrick	Phillip	Village of Alakanuk	P.O. Box 149	Alakanuk	AK	99554
Ken	Pitcher	Alaska Department of Fish and Game	P.O. Box 25526	Juneau	AK	99802
Joe	Plesha	Trident Seafoods Corporation	5303 Shilshole Avenue, NW	Seattle	WA	98107
Karen	Pletnikoff	Aleutian/Pribilof Islands Association	201 E 3rd Avenue	Anchorage	AK	99501
Ed	Poulsen	F/V Arctic Sea	1143 NW 45th St.	Seattle	WA	98107
Jimmie	Powell	Pew Oceans Commission	2101 Wilson Blvd, Suite 550	Arlington	VA	22201
Rich	Preston	17th U.S. Coast Guard District	P.O. Box 25517	Juneau	AK	99802
Lawrence	Prokopiof	St. George Fisherman's Association	P.O. Box 947	St. George Island	AK	99591
Lewis	Queirolo	Alaska Fisheries Science Center	440 Eagle Crest Road	Camano Island	WA	98282
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First Name	Last Name	Organization	Address 1	City	State	Zip
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Greg	Siekaniec	Alaska Maritime Wildlife Refuge	95 Sterling Highway, Suite 1	Homer	AK	99603
Michael	Sigler	National Marine Fisheries Service - Auke Bay Lab	11305 Glacier Highway	Juneau	AK	99801
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Jennifer	Skidmore	NOAA-NMFS				
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Lauren	Smoker	NOAA General Counsel	PO Box 21109	Juneau	AK	99802
David	Soma	Deep Sea Fishermen's Union	5215 Ballard Avenue NW	Seattle	WA	98107
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Trveor	Spradlin	NOAA-NMFS				
Alan	Springer	University of Fairbanks, Institute of Marine Science	Rm 262 AHRB	Fairbanks	AK	99775
Jacob	Stepetin	Village of Akutan	P.O. Box 89	Akutan	AK	99553
Jeff	Stephan	United Fishermen's Mktg Assc	P.O. Box 2917	Kodiak	AK	99615

First Name	Last Name	Organization	Address 1	City	State	Zip
Carol	Stephens	Alaska SeaLife Center	P.O. Box 1329	Seward	AK	99664
Jack	Stern	Trustees for Alaska	1026 W. 4th Avenue, Ste. 201	Anchorage	AK	99501
Rita	Stevens	Kodiak Area Native Association	3449 East Rezanof Drive	Kodiak	AK	99615
Beth	Stewart	Aleutians East Borough	2767 John Street	Juneau	AK	99801
Brent S.	Stewart	Hubbs-SeaWorld Research Institute	2595 Ingraham St.	San Diego	CA	92109
Jay E.	Stinson	Alaska Draggers Association	P.O. Box 3845	Kodiak	AK	99615
Janice	Straley	University of Alaska Southeast	1332 Seward Ave.	Sitka	AK	99835
Diana	Stram	North Pacific Fisheries Management Council	605 W. 4th Ave., Suite 306	Anchorage	AK	99501-2252

APPENDIX C
Public Notices

NOAA National Marine Fisheries Service

Public Scoping Meeting Announcement

January 23, 2006, 5-8 PM

Hilton Hotel 501 West 3rd Avenue, Anchorage, AK

The National Marine Fisheries Service (NOAA Fisheries) and URS Corporation invite the public to an open house and scoping meeting regarding the preparation of a Steller Sea Lion and Northern Fur Seal Research Environmental Impact Statement (EIS). The EIS will analyze the environmental impacts of administering grants and issuing permits associated with research on endangered and threatened Steller sea lions and depleted northern fur seals throughout their range in U.S. waters. The scoping meeting will combine an informational open house, which will last from 5:00 pm to 8:00 pm, with a brief presentation around 6:30pm that provides an overview of the EIS purpose, objectives, and schedule. Please contact Mr. Stephen Leathery, Project Manager, at (301) 713-2289 for further information.

Anchorage Daily News

TIME SENSITIVE – DISPLAY AD PROOF

Ad Number: 111766
Sales Rep: .... Shawn Lyons
Phone: .... (907) 257-4250
Fax: .... (907) 257-4246
Ad Size: .... 2 col. x 4 in.
Run Date: 01/16/06

Deliver proof to: .... Kim Busse
Fax/email: .... Kim_Busse@URSCorp.com

Please be sure to look over ad proof carefully and check box below

Ad OK.... ☐
Changes.. ☐

Ad approved by:________________

Please mark changes and fax back, or call your Sales Representative for further assistance.

7 search results for:
All ads in *Public Notices*;
Return to search.

Public Notices - 381

MEETING NOTICE The King County Rural Forest Commission will meet on Wednesday, Januar at the Preston Community Center, 8625 310th Ave SE, Preston, from 9:30am - 12:30pm. For mo information please contact Linda Vane at 206-296-8042. *(This ad last ran on 01/07/2006.)*

MEETING NOTICE The King County Agriculture Commission meeting will be held on Thursday, January 12, at the Mercerview Community Center, Mercer Island, 8236 SE 24th Street, Mercer Island WA 98040, from 4:00 -7:00pm. For more information please contact Claire Dyckman at 20 296-1926. *(This ad last ran on 01/07/2006.)*

PUBLIC NOTICE Name of Operator/ Permitee: B. Douglas Williams-King County Permitting & Ri of-Way Agent Address of Owner: 201 S. Jackson St., KSC-NR-0503, Seattle, WA 98104 is seeki coverage under the Washington Department of Ecology's NPDES General Permit for Stormwater Discharges Associated with Construction Activities. The proposed 2 acre project, known as Carnation Wastewater Treatment Facility is located at 31500 W. Entwistle, in Carnation, WA. Approximately 8.5 acres will be disturbed for construction of a wastewater treatment facility, 1.6 m of conveyance pipeline and outfall. Stormwater will be handled on-site with biofiltration swale (20 feet in length, bed width- 3 feet, slope-0.01) and an infiltration trench (16 feet by 105 feet), sized f inches/hour prior to discharging into the grass field. The conveyance 12 inch pipeline, will follow existing right-of-way and existing private roadways and covered immediately for the 1.6 miles to t Snoqualmie River. This project, when completed by the end of 2007, will allow for all of the residences of the City of Carnation to convert from septic (a number which have failed) to treated sewerage and improve public health. Any persons desiring to present their views to the Departme of Ecology concerning this application may notify Ecology in writing within 30 days from the last d of publication of this notice. Comments may be submitted to: Washington Department of Ecology Water Quality Program Stormwater Unit - Construction PO Box 47696 Olympia, WA 98504-7696 *ad is from 12/29/2005 to 01/05/2006.)*

CITY OF DES MOINES WASHINGTON PUBLIC NOTICE OF LAND USE APPLICATION NOTIC HEREBY GIVEN THAT A SHORELINE SUBSTANTIAL DEVELOPMENT PERMIT APPLICATIO AND AN ENVIRONMENTAL REVIEW APPLICATION (SEPA) HAS BEEN FILED WITH THE CIT OF DES MOINES PLANNING, BUILDING AND PUBLIC WORKS DEPARTMENT.FOR THE FOLLOWING REQUESTED LAND USE DEVELOPMENT PROPOSAL APPLICATION SUBMITT August 30, 2005 APPLICATION COMPLETE: November 7, 2005 NOTICE OFAPPLICATION: January 1, 2006 COMMENT DUE DATE: January 31, 2006 PROPOSAL: Removal of 10' to 15' o existing Redondo Waster Water Treatment Plant Outfall Pipe and installation of 2000' of a replacement outfall pipe to relocate the outfall from -30 Mean Lower Low Water to -400 Mean Lo Low Water. APPLICANT: Lakehaven Utility District LOCATION/ LEGAL DESCRIPTION: Adjacen the intersection of Redondo Beach Drive South and Redondo Shores Drive South:. Tax Parcel 0521046666 No Further Legal Description Available FILE NUMBER: LUA05-039 PERMITS REQUIRED: Department of Fish and Wildlife HPA approval, Army Corps of Engineers Section 10 Permit approval, Department of Ecology 401 permit approval, Department of Natural Resources Aquatic Land Lease, City of Des Moines Shoreline Substantial Development Permit, Environmen Review Application (SEPA), and Grading Permit EXISTING ENVIRONMENTAL DOCUMENTATI

Biological Evaluation The public is invited to review contents of the official file for the proposal. Written comments are also encouraged and will be accepted for consideration if filed with the Planning, Building, and Public Works Department on or before 4:30 PM January 31, 2006. Furthe information about the proposal may be obtained by contacting Jason Sullivan by phone at 206-87 6551 or by email at jsullivan@desmoineswa.gov during regular working hours. The Planning, Building, and Public Works Department is located at 21630 11th Avenue South, Suite D, Des Moines, Washington 98198 (This ad is from 01/01/2006 to 01/08/2006.)

NOAA National Marine Fisheries Service Public Scoping Meeting Announcement The National Marine Fisheries Service (NOAA Fisheries) and URS Corporation invite the public to an open hou and scoping meeting regarding the preparation of a Steller Sea Lion and Northern Fur Seal Rese Environmental Impact Statement (EIS). The EIS will analyze the environmental impacts of administering grants and issuing permits associated with research on endangered and threatene Steller sea lions and depleted northern fur seals throughout their range in U.S. waters. The scopi meeting will combine an informational open house, which will last from 4:00 pm to 7:00 pm, with a brief presentation around 5:30pm that provides an overview of the EIS purpose, objectives, and schedule. Please contact Mr. Stephen Leathery, Project Manager, at (301) 713-2289 for further information. January 20, 2006, 4-7 PM Alaska Fisheries Science Center, Building 9 7600 Sand Pc Way Seattle, WA

NOTICE: ANNOUNCEMENT OF A WASTEWATER PERMIT APPLICATION AND AVAILABILITY DRAFT PERMIT ****************************** PERMIT NO.: WA-003209-3 APPLICATION: Northwe Pipeline Corporation 2800 Post Oak Blvd Houston, TX 77056 SITE LOCATION: Western Washington Linear project from Sumas in Whatcom County through Skagit, Snohomish, King, Pierce, Thurston, Cowlitz Counties to Washougal in Clark County Northwest Pipeline Corporation has applied for a National Pollutant Discharge Elimination System (NPDES) permit in accordance with the provisions of Chapter 90.48 Revised Code of Washington (RCW), Chapter 173-220 Washington Administrative Code (WAC), and the Federal Clean Water Act. Following evaluation o the application and other available information, a draft permit has been developed to allow the discharge of stormwater, uncontaminated dewatering water associated with construction activities and hydrostatic test water from the Northwest Natural Gas Pipeline System construction project. tentative determination has been made on the effluent limitations and special permit conditions th will prevent and control pollution. A final determination will not be made until all timely comments received in response to this notice have been evaluated. PUBLIC COMMENT AND INFORMATIC The draft permit and fact sheet may be viewed at the Department of Ecology (Department) websi http://www.ecy.wa.gov/programs/wq/permits/northwest_permits.html. The application, fact sheet, proposed permit, and other related documents are also available at the Department's Northwest Regional Office. To obtain a copy, please call Sally Perkins at (425) 649-7190, email at sper@ecy.wa.gov Interested persons are invited to submit written comments regarding the propo permit. All comments must be submitted within 30 days after publication of this notice to be considered for the final determination. Comments should be sent to: Water Quality Permit Coordinator Department of Ecology Northwest Regional Office 3190 - 160th Avenue SE Bellevue WA 98008-5452 Email comments should be sent to tmil461@ecy.wa.gov. Any interested party m request a public hearing on the proposed permit within 30 days of the publication date of this notic The request for a hearing shall state the interest of the party and the reasons why a hearing is necessary. The request should be sent to the above address. The Department will hold a hearing determines that there is significant public interest. If a hearing is to be held, public notice will be published at least 30 days in advance of the hearing date. Any party responding to this notice witt comments will be mailed a copy of a hearing public notice. The Department is an equal opportunit agency. If you have a special accommodation needs, please contact Tricia Miller at (425) 649-72 or TTY (for the speech and hearing impaired) at 711 or 1-800-833-6388. (This ad is from 12/28/2005 to 01/04/2006.)

Public Notice Notice is hereby given that Umpqua Bank, 445 SE Main Street, Roseburg, Oregon 97470, has filed with the Federal Deposit Insurance Corporation an application to establish a limit service bank branch at 19625 62nd Ave. South, Building C, Suite 101, Kent, WA 98032 Any pers wishing to comment on this application may file his or her comments in writing with the regional director of the Federal Deposit Insurance Corporation at its region office, 25 Ecker Street, Suite 2300, San Francisco, California 94105 before processing of the application has been completed. Processing will be completed no earlier than the 15th day following the last required publication o the date of receipt of the application by the FDIC, whichever is later. The period may be extended the regional director for good cause. The non-confidential portion of the application is available fo inspection within one day following the request for such file. It may be inspected in the Corporatio

APPENDIX D

Newsletter and Comment Form

Steller Sea Lion and Northern Fur Seal Research

Environmental Impact Statement

NOAA-National Marine Fisheries Service

January 2006

This newsletter is the first in a series of newsletters regarding the Steller Sea Lion and Northern Fur Seal Research Environmental Impact Statement (EIS). It is being mailed to federal, state, and local agencies; elected and appointed officials; Alaska Native groups; other interested organizations; and individual citizens within or adjacent to the project study area to inform people about the study process and to solicit comments. This and subsequent newsletters can be found on the project website http://www.nmfs.noaa.gov/pr/permits/eis/steller.htm.

Scoping Notice

The National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA Fisheries Service) is preparing an EIS to analyze the potential environmental impacts of administering its grant and permit programs for Steller sea lions (*Eumetopias jubatus*) and northern fur seals (*Callorhinus ursinus*). The purpose of this newsletter is to invite you to participate in the planning process and provide some background information on both the project area and the process of preparing an EIS.

The scoping process provides persons affected by the project an opportunity to express their views and concerns. The Council on Environmental Quality (CEQ) under the National Environmental Policy Act of 1969 (NEPA; 42 U.S.C. 4321 *et seq.*) defines scoping as an "early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action" (40 CFR 1501.7). The objectives of the scoping process are to:

- identify potentially interested parties
- identify public and agency concerns regarding research
- define the range of alternatives that will be examined in the EIS
- ensure that relevant issues are identified early and drive the analyses
- establish a public record

Project Description

NOAA Fisheries Service is the federal agency responsible for the management, conservation and protection of living marine resources within the United States' (U.S.) Exclusive Economic Zone (marine water from 3-200 miles offshore).

NOAA Fisheries Service currently administers grant monies that have been designated by Congress and allocated within NOAA Fisheries Service's annual budget for the purpose of facilitating research on Steller sea lions and northern fur seals. The act of awarding grants is a federal action requiring NEPA compliance. Similarly, issuance of permits for research activities on marine mammals is a federal action requiring NEPA compliance. These permits are issued pursuant to the provisions of the Endangered Species Act (ESA; 16 U.S.C. 1531 *et seq.*), the Marine Mammal Protection Act (MMPA; 16 U.S.C. 1361 *et seq.*), and regulations implementing these statutes. This EIS would satisfy the NEPA compliance requirements for awarding grants and issuing permits for research on Steller sea lions and northern fur seals. NOAA Fisheries Service awards grants and issues permits to qualified individuals and institutions so they can conduct research activities likely to result in collection of information needed by NOAA Fisheries Service to conserve and recover the populations of Steller sea lions and northern fur seals.

The need for this action is to facilitate research to: 1) prevent harm and avoid jeopardy or disadvantage to the species; 2) promote recovery; 3) identify factors limiting the population; 4) identify reasonable actions to minimize impacts of human-induced activities; 5) implement conservation and management measures; and 6) make data and results available in a timely manner for management of the species. As part of this action, NOAA Fisheries Service will evaluate measures that will improve efficiency and avoid unnecessary redundancy in Steller sea lion and northern fur seal research, utilize best management practices, facilitate adaptive management, and standardize research protocols.

The project area includes the entire range of Steller sea lions and northern fur seals in U.S. waters and on the high seas, which includes parts of Alaska, Washington, Oregon, and California (See Figures 1 and 2).

Why is an EIS needed?

Issuance of permits for scientific research on marine mammals is generally categorically excluded from NEPA requirements to prepare an environmental assessment (EA) or EIS (NOAA Administrative Order [NAO] 216-6). However, when the activities that would be authorized in a scientific research permit would involve a geographic area with unique characteristics, are the subject of public controversy based on potential environmental impacts, have uncertain environmental impacts or unique or unknown risks, would establish a precedent or decision in principle about future proposals, may result in cumulatively significant impacts, or may have any adverse effects upon endangered or threatened species or their habitats, the preparation of an EA or EIS is required. This EIS will assess the likely environmental and socioeconomic effects of funding and permitting research under a range of alternatives and will address compliance of the alternatives with the ESA, MMPA, and other applicable laws. An EIS serves several purposes. The process of preparing an EIS:

- identifies planning issues and concerns
- identifies the purpose and need for the proposed action
- develops and evaluates reasonable alternatives for the proposed action
- describes the affected environment
- assesses potential environmental consequences of alternatives

The Steller Sea Lion and Northern Fur Seal Research EIS will satisfy the requirements of CEQ regulations and NAO 216-6 for those federal permits allowing research or federal grants funding research that may have impacts on Steller sea lions and northern fur seals throughout their range in U.S. waters. The EIS will consist of a programmatic analysis, covering expected and projected federally granted and permitted research projects for future years, until such time that a revision of the programmatic document is deemed necessary.

Preparation of the Steller Sea Lion and Northern Fur Seal Research EIS will provide the public an opportunity to:

- understand the requirements for planning and NEPA compliance
- make recommendations on how research should be conducted
- review decision-making options for research grant funding by NMFS

Steps in the Planning Process

The EIS process, currently scheduled for completion in two years (2007), has nine basic steps:

1. Federal Notice of Intent to prepare an EIS
2. public scoping period
3. develop and analyze alternatives
4. prepare and distribute Draft EIS
5. public comment review and synthesis
6. response to comments and revisions to EIS
7. select the preferred alternative
8. prepare and distribute Final EIS
9. issue Record of Decision

The range, or scope, of public and agency issues and concerns are being identified through comments received in response to this notice and during upcoming public scoping meetings listed in this newsletter. NOAA Fisheries Service welcomes your thoughts and ideas on the grant and permit process and the development of alternatives to be addressed in the EIS process.

A range of reasonable alternatives, including an alternative considering no action, as required by NEPA, will be developed and analyzed in the EIS. The alternatives must address the requirements of NEPA as well as the legal, regulatory, and budgetary parameters that govern the research. Through scoping and subsequent discussions, the public will assist in developing the alternatives to be addressed in the EIS process.

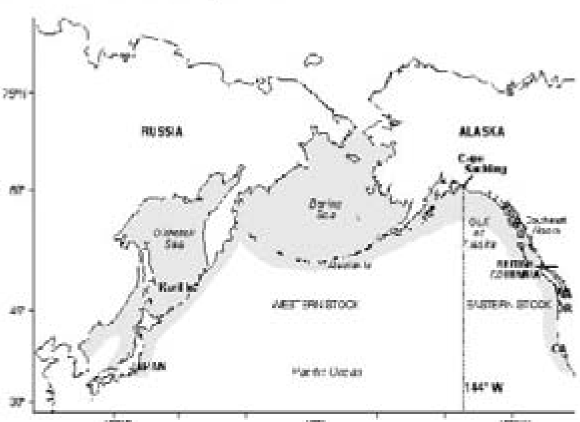

Figure 1. Steller Sea Lion Distribution

The potential impacts of the alternatives will be assessed and the results of the analyses will be documented in the Draft EIS, which the public will have an opportunity to review. Comments on the Draft EIS received from agencies and the public will be considered and incorporated, as applicable, into the Final EIS.

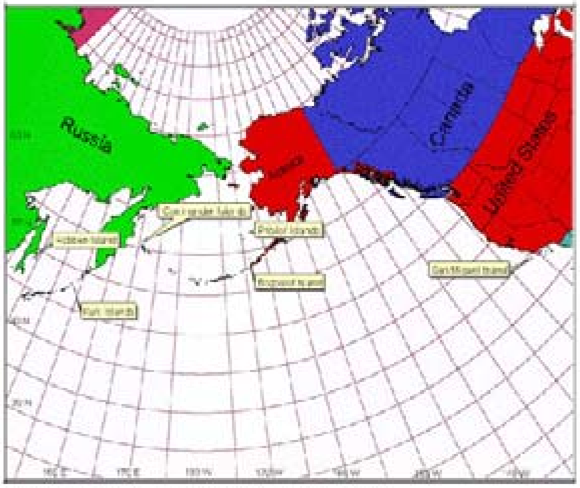

Figure 2. Northern Fur Seal Breeding Sites

What preliminary factors will be evaluated in the EIS?

The following factors were identified for evaluation in the EIS. Additional issues identified through the scoping process will be analyzed and considered in the EIS.

- Types of Research Needed
- Level and Effectiveness of Research Effort
- Coordination and Monitoring of Research
- Qualifications of Researchers
- Effects of Research on Marine Mammals
- Alternative Methods for Research

How can you participate in the project?

Public Scoping Meetings: Listening to the Public

There are several opportunities to participate in the Steller Sea Lion and Northern Fur Seal Research EIS process. Three public scoping meetings will be held to present information to the public and obtain input. The scoping meetings will combine an informational open house with a brief presentation that provides an overview of the plan purpose, objectives, and schedule. A question, answer, and comment session will take place after the formal presentation towards the end of the meeting.

The public scoping comment period will be open until February 25, 2006. Comments may be submitted by e-mail fax, or by letter to the address provided at the end of this newsletter. Details for the public scoping meetings are provided below, and will be announced through media releases and the project web page at http://www.nmfs.noaa.gov/pr/permits/eis/steller.htm.

Your comments are important to us, particularly at this early stage of the process.


Northern Fur Seals

Other Avenues for Public Involvement

The preaddressed comment form accompanying this newsletter can be used to submit written comments at any time during the scoping period, until February 25, 2006. Comments received from the public during scoping will be reviewed and incorporated, as applicable, into developing the EIS.


Steller Sea Lion

Once the Draft EIS is complete, the document will be released to the public to review for a period of 90 days. During the review period, NOAA Fisheries Service will conduct public hearings to accept comments on the Draft EIS document. Public testimony, written or faxed comments, and e-mailed comments will be accepted during this period. NOAA Fisheries Service will maintain a mailing list throughout the process. Informational materials will be distributed to those on the mailing list. A project website will be maintained and updated at http://www.nmfs.noaa.gov/pr/permits/eis/steller.htm throughout the course of the project.

PUBLIC SCOPING MEETINGS Please Attend!		
Silver Spring, Maryland	**Seattle, Washington**	**Anchorage, Alaska**
January 18, 2006	January 20, 2006	January 23, 2006

We encourage you to take an active part in the Steller Sea Lion and Northern Fur Seal Research EIS project. The purpose of this newsletter is to keep you informed and to allow you every opportunity to voice your opinion regarding this important project. If you require more information about the project, have any questions, or are interested in being added to (or removed from) the mailing list please contact the NOAA Fisheries Service Project Manager for the EIS at the fax or email address below. Please submit your written comments regarding the scope of the EIS to Steve Leathery, Chief, Permits, Conservation and Education Division at:

Contact information:

Permits, Conservation and Education Division
Office of Protected Resources (F/PR1)
National Marine Fisheries Service
1315 East-West Highway, Room 13705,
Silver Spring, MD 20910–3226,
Fax: 301–427–2582 or e-mail at: ssleis.comments@noaa.gov.

URS Corporation
2700 Gambell Street, Suite 200
Anchorage, Alaska 99503

Written Comment Form

Environmental Impact Statement (EIS) on Steller Sea Lion and Northern Fur Seal Research Throughout Their Range in U.S. Waters

Your input is important to us. Please use this form to tell us about the environmental issues and alternatives that you think should be analyzed in the Draft EIS. Please feel free to use additional comment sheets if more space is needed. To ensure that your comments are considered in the Draft EIS, we must receive them by February 26, 2006.

Your Name & Email Address:

Mailing Address:

City, State, Zip Code:

This form can be submitted to:	For Office Use Only
Stephen L. Leathery Chief of the Permits, Conservation, and Education Division Office of Protected Resources NMFS 1315 East-West Highway, Room 13705 Silver Spring, MD 20910 Email: sslei s.comments@noaa.gov Fax: 301-427-2583	

Stephen L. Leathery
Chief of the Permits, Conservation, and Education Division
Office of Protected Resources
NMFS 1315 East-West Highway, Room 13705
Silver Spring, MD 20910

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APPENDIX E

Public Scoping Meetings, Issues Raised, Public Scoping Comments

URS

Minutes

Meeting Type: SSL/NFS Research EIS Scoping Meeting
Date: 01/18/2006
Time: 1:00 pm – 4:00 pm
Location: National Oceanic and Atmospheric Administration Building 4
Attendees: See sign-in sheet attached.

On January 18, 2006, representatives of National Marine Fisheries Service (NOAA Fisheries) and their contractor, URS, conducted a Public Scoping Meeting at NOAA Building 4 in Silver Springs, MD to provide a briefing on the Steller sea lion and northern fur seal research environmental impact statement, and to identify issues that should be addressed in the planning and permitting process. Twenty people attended the public meeting. For a full transcript of this meeting, please see the attachment.

- **Jennifer Gannett (Human Society of the United States [HSUS]) – *Formal Comment***

An environmental impact statement (EIS) should have been completed prior to issuing permits. NOAA Fisheries is limiting what will be analyzed in the EIS. NOAA Fisheries should identify and prioritize research needs in the EIS and coordinate research.The approporiate level of research (i.e., demographics, population) and the power of analysis/criteria should be developed before granting permits. The most common methodologies for marine mammal research should be used so there are minimal adverse effects on the species. Only vets should administer anesthesia to animals subjected to research. NOAA Fisheries should neither issue nor modify permits approved or disapproved by other agencies.

D

NMFS – URS
STELLER SEA LION AND NORTHERN FUR SEAL RESEARCH EIS
PROJECT SCOPING MEETING
January 2006
SIGN-IN SHEET

URS

PLEASE PRINT NAME AND ADDRESS	AGENCY and DISCIPLINE	PHONE NUMBER	EMAIL ADDRESS	MAKE ORAL COMMENT ?
Karl Ohls NSG 1463 Kirby Road McLean, VA 22101	North Star Group	703-442-0355	kohls@northstargrp.com	No
John Harrington 1200 Pennsylvania Ave Wash DC 20460	EPA	202 564 7148	Harrington.Matt@epa.gov	no
Jennifer Gannett	HSUS	202 676 2526	jgannett@hsus.org	yes
[illegible]	Latham & Watkins	202 637 2364	sara.orr@lw.com	no

Silver Spring 1/16/06

(2)

NMFS – URS

STELLER SEA LION AND NORTHERN FUR SEAL RESEARCH EIS

PROJECT SCOPING MEETING

January 2006

SIGN-IN SHEET

PLEASE PRINT NAME AND ADDRESS	AGENCY and DISCIPLINE	PHONE NUMBER	EMAIL ADDRESS	MAKE ORAL COMMENT ?
Millie Farrell	Latham + Watkins	[illegible]6372153	millie.farrell@lw.com	no
Sebastian O'Kelly	Robertson, Monagle & Eastaugh	703-527-4414	[illegible]@ [illegible]-dc.com	no
PETER JONES	NOAA/AKR	907 586-7280	peter.d.jones@noaa.gov	NO
David Palmer	Latham and Watkins	202-[illegible]-1073	david.palmer@lw.com	No

Silver Spring 1/18/06

(6)

NMFS – URS
STELLER SEA LION AND NORTHERN FUR SEAL RESEARCH EIS
PROJECT SCOPING MEETING
January 2006
SIGN-IN SHEET

PLEASE PRINT NAME AND ADDRESS	AGENCY and DISCIPLINE	PHONE NUMBER	EMAIL ADDRESS	MAKE ORAL COMMENT ?
Ahmad Nassar	Latham & Watkins	(202)637-1071	ahmad.nassar@lw.com	No
Kate Swails	NOAA-NMFS PRI		Kate.Swails@noaa.gov	NO
Sarah Hallett	NOAA-NMFS PR2		Sarah.hallett@noaa.gov	NO
Kelsey Abbott	NOAA-NMFS PR1		Kelsey.abbott@noaa.gov	NO

Silver Spring 1/08/06

(4)

NMFS – URS

STELLER SEA LION AND NORTHERN FUR SEAL RESEARCH EIS

PROJECT SCOPING MEETING

January 2006

SIGN-IN SHEET

PLEASE PRINT NAME AND ADDRESS	AGENCY and DISCIPLINE	PHONE NUMBER	EMAIL ADDRESS	MAKE ORAL COMMENT ?
Janet Whaley	NOAA-NMFS PR		Janet.Whaley@noaa.gov	NO
Sarah Wilkin	NOAA-NMFS PR		sarah.wilkin@noaa.gov	NO
TREVOR SPRADLIN	NOAA-NMFS PR		Trevor.Spradlin@noaa.gov	NO
Amy HAPEMAN	NOAA NMFS PR		Amy.Hapeman@noaa.gov	NO

Silver Spring 1/10/06

(5)

NMFS – URS

STELLER SEA LION AND NORTHERN FUR SEAL RESEARCH EIS

PROJECT SCOPING MEETING
January 2006
SIGN-IN SHEET

URS

PLEASE PRINT NAME AND ADDRESS	AGENCY and DISCIPLINE	PHONE NUMBER	EMAIL ADDRESS	MAKE ORAL COMMENT ?
Carrie Hubard	NMFS/OPR	301-713 2289	carrie.w.hubard@noaa.gov	NO
Jennifer Skidmore	NMFS-/OPR	301-713-2289	jennifer.skidmore@noaa.gov	NO
Shane Guan	NMFS/OPR	301-713 2289	shane.guan@noaa.gov	No
Ken Hollingshead	NMFS/OPR	713-2289	ken.hollingshead@noaa.gov	No

Silver Spring 1/18/06

OFFICE OF PROTECTED RESOURCES

NOAA FISHERIES

NATIONAL MARINE FISHERIES SERVICE

\+ + + + +

PUBLIC SCOPING MEETING

\+ + + + +

ENVIRONMENTAL IMPACT STATEMENT ON

STELLER SEA LION AND

NORTHERN FUR SEAL RESEARCH

SILVER SPRING, MARYLAND

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The question-and-answer period of the public scoping meeting commenced on January 18, 2006, at 3:00 p.m., in the auditorium of the National Oceanic and Atmospheric Administration, 1301 East West Highway, Silver Spring, Maryland, Jon Isaacs, URS, presiding.

Moderator:

Jon Isaacs, URS

Presenters:

Stephen Leathery, National Marine Fisheries Service

Tammy Adams, National Marine Fisheries Service

P-R-O-C-E-E-D-I-N-G-S

3:00 p.m.

MODERATOR ISAACS: Please give us your name for the record and who you represent, and that will help our court reporter.

MS. BENNETT: Hi. My name is Jennifer Bennett, and I represent the agency, the Humane Society of the United States.

Thanks for providing the opportunity so that we can briefly comment on the scope of the upcoming EIS. We'll be providing more extensive written comments at a later date, by the end of the comment period.

I'd like to start off by saying that the agency believes that this process should have been undertaken prior to issuing permits to conduct intrusive research on Steller Sea Lions.

Because of the large number of animals that are affected, and the number of procedures to which they will be subjected, and are being subjected, NMFS must evaluate a number of areas to assure that the research does not harm the very animals that you are required to protect.

We believe that answer is erred, in limiting the options under analysis, and our written comments will suggest other considerations.

The proposed action would grant permits to conduct research determined to be critical to the conservation of Steller Sea Lions and Fur Seals, and permit lower priority only if there is no adverse impact.

While on its face this appears to be a reasonable alternative, this alternative is only reasonable if specific questions are addressed in the EIS that were not asked in the scoping questions. For example, the EIS should address how NMFS will identify which questions are, indeed, the most critical. As it stands, this nebulous alternative could allow permit applicants themselves to identify for themselves the critical needs in the recovery of conservation plans. NMFS should identify and prioritize the most critical needs prior to granting the permits.

Applicants should have to specify how their research will address the critical need and why their chosen methodology is more appropriate if there are other less intrusive approaches to addressing the question. This will also aid in efforts to coordinate research and ensuring minimal effect.

In addition, the EIS should identify the level of research that is appropriate and the appropriate demographic classes and temporal and spatial bounds for research to address those questions.

A power analysis for particular research questions and/or methodologies should be done before granting permits for invasive research and sampling.

NMFS cannot continue to do this on an ad hoc basis. We support convening a research panel with outside experts who can assist in clarifying the most appropriate research design and ensure it is not marred by self interest.

In terms of coordination of research, permits should not be issued for Alaska-wide research until and unless there is a written plan indicating how multiple permittees will coordinate their studies and ensure that that research will cover appropriate times, area, and demographic classes, and is not duplicative.

The EIS should evaluate all of the most common methods of providing insight into important food habits. Research and methodology should be evaluated as to how effective they are in providing key information with minimal adverse effects, and how they can be used in combination with each other.

We believe that only veterinarians should administer anesthesia. This will ensure that distressed animals receive appropriate care and to prevent serious injury or mortality.

As you know, some permittees have requested half a dozen or more modifications to a single permit in less than a year. Changing protocol makes it difficult to standardize results. No permit should be modified until and unless the permittee demonstrates that the modification will not invalidate results from previous or ongoing studies.

NMFS should neither issue nor modify permits that other agencies, such as APHIS, the Animal Plant Health Inspection Service, has recommended for denial.

MODERATOR ISAACS: About 13 seconds.

MS. BENNETT: Thank you.

Permittees who do not comply with permit conditions, such as timely submission of reports, should have permits suspended. If there are declines in the number of species in Alaska, the EIS should discuss the need for appropriate ecosystem research that may not depend on synoptic and intrusive research directed at a single species or two species. The problems are much broader than Steller Sea Lions and Fur Seals, and appropriate management action cannot be taken without a more holistic approach to research.

I appreciate the opportunity to comment and will be submitting more involved written comments before the end of the comment period.

Thank you.

MODERATOR ISAACS: Thank you very much.

Is there anybody else in the audience who would like to testify at this point in time?

Okay, seeing none, then what we'll do right now is, we will suspend the public hearing, and the process is that we will be here for another hour. So, if you think about this, you are listening, you want to testify, just let us know, we will reopen the public hearing and take down the comments.

At this point in time, we'd like to maybe see if there is any questions that Steve might be able to answer, or at least take note of on an informal basis.

Do we have any questions that you might want to ask of Steve, about the NEPA process or anything else that we are going to be doing? Now is a good time to capture his attention.

MR. LEATHERY: So again, this is an informal question and answer session that's not in the formal record of scoping, but in other scoping meetings we've opened up an informal question and answer period just to help inform the interested public.

There's no bad questions, be glad to take questions on permit process, or the research at hand, or anything at all.

Well, I guess seeing none then what we'll do is, we'll be around here, if you have informal questions, we can either go back to the board and discuss something informally, and again, if someone wants to testify just let us know and we'll reopen the public hearing to take it down for the record.

But, otherwise, thank you very much for coming today. Hopefully, we've given you some of the information you need to participate in the scoping process, and we appreciate all your attendance.

Okay, thank you.

MR. LEATHERY: Thank you.

(Whereupon, the above-entitled matter was concluded at 3:05 p.m.)

URS

Minutes

Meeting Type:	SSL/NFS Research EIS Scoping Meeting
Date:	01/20/2006
Time:	4:00 pm – 7:00 pm
Location:	Alaska Fisheries Science Center Building 9
Attendees:	See sign-in sheet

On January 20, 2006, representatives of National Marine Fisheries Service (NOAA Fisheries) and their contractor, URS, conducted a Public Scoping Meeting at the Alaska Fisheries Science Center Building 9 in Seattle, WA to provide a briefing on the Steller Sea Lion (SSL) and Northern Fur Seal (NFS) Research Environmental Impact Statement (EIS), and to identify issues that should be addressed in the EIS process. For a full transcript of this meeting, please see the attachment.

- **Will Anderson (self)** – ***Formal Comment***

Comments were submitted in the lawsuit filed with the Humane Society of the United States.

- **Dr. David Bain (University of Washington, Marine Mammal Research)** – ***Formal Comment***

Endangered species/potential biological removal (PBR) to allow human activities. Should expand PBR dev. to include cumulative effects. Research on Steller sea lions and northern fur seals needs to be coordinated to eliminate the duplication of effort. PBR is equivalent to the total budget of impact. There are certainly tradeoffs when doing research that is invasive. One such tradeoff may be to limit invasive research, which may affect the certainty of results but be less harmful to the species. In other words, research on a threatened population rather than the endangered population may make it more difficult to determine major factors affecting the endangered population but may help reduce the impact to that endangered population. There would be less likelihood of overstressing the threatened stock than an endangered stock if research was conducted only on the threatened stock.

NMFS – URS

STELLER SEA LION AND NORTHERN FUR SEAL RESEARCH EIS

PROJECT SCOPING MEETING

January 2006

SIGN-IN SHEET

PLEASE PRINT NAME AND ADDRESS	AGENCY and DISCIPLINE	PHONE NUMBER	EMAIL ADDRESS	MAKE ORAL COMMENT ?
DAVID BAIN	UNIV. WA. MARINE MAMMAL RESEARCH	(425) 402-4378	dbain@u.washington.edu	YES
Andrea Balla-Holden	URS Corporation	(360) 769-0444	Andrea_Balla-Holden@urscorp.com (← hyphen; ↑ underscore)	NO
Steven K. Davis	NOAA-Fisheries AK-Region	907-271-3523	steven.k.davis@noaa.gov	no
WILL ANDERSON	SELF	206 715-6414	WILLOWSEATTLE@COMCAST.NET	NO

AFSC Seattle Jan. 20th

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION,

(NOAA) FISHERIES

OFFICE OF PROTECTED RESOURCES

NATIONAL MARINE FISHERIES SERVICE

*****

Environment Impact Statement

on Steller Sea Lion and

Northern Fur Seal Research

Public Scoping Meeting

7600 Sandpoint Way, NE, Seattle, WA

Friday, January 20, 2006

*****

Appearances:

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Jon Isaacs

Steven Leathery

Andrew Wright

Rich Kleinleder

Stan Edo

Anne Lee

Steve Davis

TABLE OF CONTENTS

SEATTLE, WASHINGTON; FRIDAY, JANUARY 20, 2006
5:30 P.M.

MR. ISAACS: My name is Jon Isaacs. I'm from URS in Anchorage and I'm the project manager for the contractor team. I'll also be the moderator for this evening's meeting particularly for the public testimony period.

What I'd like to do is introduce our team that's here tonight. We have Steve Leathery who's chief with the Office of Protective Resources, the Education, Conservation and Permits Division. And with Steve, we have Andrew Wright who is also in the back here. From the URS side of the project team, we have Rich Kleinleder who is one of our marine mammal wildlife specialists. We have Anne Lee who is our deputy project manager. A couple other folks in the audience, Stan Edo who's a NEPA coordinator with the Alaska Sealife Center --

MR. EDO: Science Center.

MR. ISAACS: Science Center, excuse me. There's a foreordain slip. Alaska Fisheries Science Center. We have Steve Davis who's with the Alaska Region and the NEPA coordinator there, who's also a key member of the team.

So, again, welcome. We're going to do a

couple things in tonight's meeting. We're going to go through the general NEPA process and sort of what is in the scoping period, what are some of the expectations of scoping. We'll have a presentation by Rich on some of the status of the stocks and the research in terms of the Steller sea lions and the northern fur seals and then I will talk a bit about the purpose and need and some of the specifics of this EIS effort.

So this sort of summarizes what we're going to be doing tonight in our agenda. The thing to point out is this is really an important part of the public comment period. NEPA is a very serious process on public involvement and we are really looking forward to inviting comment as part of the scoping period to get identification of issues, concerns, topics that should be addressed in the NEPA process and so we're looking forward to various forms of comment, whether it's here in tonight in public testimony, whether it's using the e-mail site, whether it's sending in written comment. We're looking for a wide range of suggestions on what this NEPA document should consider.

This is the second of three scoping meetings. Our first scoping meeting was in Washington, DC on

Wednesday afternoon and then our third scoping meeting is going to be in Achorage on Monday evening in conjunction with the marine symposium that's going to be going on there.

As far as our scoping meeting procedures go, we ask you to sign in at the registration table for a couple reasons. One is to put you on our mailing list and so you'll receive newsletters, you'll receive updates when we send out a form asking for what format you might want the draft EIS in. We'll send those cards to folks. We'll also use it as our basis for the record for the public comment period and if you want to testify, I'll be using that to call people up in the order they've signed up. Written comments, if you have them with you, they can be turned in today but, again, our written comment deadline will be the 25th of February, and I'll talk about that a little bit later.

You might notice that we have a court reporter with us today and we're going to be recording transcripts of today's meeting. We're also going to audio tape it so we have it for the public record and we'll be using that to evaluate the scoping comments and include the results in the scoping report.

So, with that, I'd like to turn it over to

Steve Leathery to talk about the NEPA process.

MR. LEATHERY: Hi. Thank you all for coming tonight. Thanks for the introduction. I -- I'm Steve Leathery and I'm in charge of the Permitting Division and Protected Resources and Headquarters and we issue permits nationally for endangered species and marine mammals that are under the jurisdiction of the National Marine Fisheries Service, and my division also issues incidental take authorizations under the Marine Mammal Protection Act for activities in the coastal marine environment that may adversely affect marine mammals.

The purpose of the National Environmental Policy Act, you can read the text there, it's was enacted to ensure that the federal government disclose the activities that it's -- it's preparing to -- to do that would have environmental impacts and requires a consideration of a reasonable range of alternatives and the -- in analysis, the impact of those alternatives and then a selection of an alternative. It's really a sunshine law that requires the federal government to disclose the activities that it's going to conduct that may affect the environment, and that's both adverse effects and beneficial effects.

Requirements of NEPA, as I -- I mentioned, are to assess the environmental impacts of proposed agency actions, consider environmental consequences early in the process, and to -- and to reduce, prevent or minimize environmental damage and to seek out public comment and involvement throughout this process.

It does not dictate what the decision should be. It -- it requires a full disclosure. It's basically a Sunshine Act.

The federal action in this case is the National Marine Fisheries Service is responsible under several statutes for the management of Steller sea lions and northern fur seals. It would be under the Endangered Species Act and the Marine Mammal Protection Act. And our administration of grants to fund this research and issuing permits to regulate the research is the activity under -- under consideration and that's for both Steller sea lion research and northern fur seal research.

NOAA policy is to prepare EIS for agency actions that are subject to significant public controversy based on the potential environmental consequences, have an uncertain impact or risks to the environment, establish a precedent or decision in principle about future proposals, may result in cumulatively significant impacts, and that may have adverse effects upon endangered or threatened species in their habitats.

In -- generically, within an environmental impact statement, there's -- there's four primary sections, purpose and need for the proposed action, the reasonable range of -- of alternatives that meet the proposed need -- the -- the purpose and need and description of the effected environment and then analysis of the environmental consequences of the alternatives.

In this case, the CIS will look at the entire research program for these species covering current and projected granting and -- and permit activities.

This is the full range of factors that are in a typical EIS. In -- in this case, all these will be considered, but the most important that we would focus on is under wildlife, the first two sub-bullets, threatened and endangered species as well as marine mammals, and then the last sub-bullet, the -- the cumulative impacts -- the last bullet. NEPA requires an cumulative impact analysis and that will be a very important part of -- of this environmental impact statement.

The next steps after the public scoping is that we will review and analyze the scoping comments. We plan to conduct a workshop on -- on research needs and methods, and that will have some invited participants and will be open to the public. After -- and -- and the results of that workshop will help inform, along with the public scoping comments, will inform the draft EIS that we'll prepare that. It will identify a range of alternatives to be considered that meet our purpose and need, describe the -- the environment and evaluate the environmental consequences of the proposed action and the alternatives.

There will be a public comment period on the -- the draft EIS and then we'll prepare a final EIS. And in the final EIS, there will be a formal response to comments that were raised by the public on the draft EIS.

My staffer Tammy Adams couldn't make it on this trip so at this point I'm turning it over to Rich to -- to give you some more information.

MR. KLEINLEDER: I'm Rich Kleinleder. I work with URS, so I'm going to just give a briefly overview of Steller sea lion and northern fur seal, their status -- management status and the type of research that's been going on with these species. And, like I said, it will be a brief overview so if I leave out anybody's favorite factoid, you'll have to forgive me.

Steller sea lions were listed as -- as threatened in 1990 under the Endangered Species Act and there was a recovery plan initially published for that species in 1993. In 1997, the -- there was two stocks that were recognized. So essentially the -- for management purposes, there was two stocks, western stock and a eastern stock divided about the 144th parallel longitude. So west of the 144th is the western stock and east of that, going from just east of Prince William Sound down south along the Pacific coast to California is the eastern stock. The western stock also includes animals that are over in Russia and down into Japan. This -- this action will be considering just research that's going on in this U.S.

The western stock, the reason that they were split was a major difference in -- or demonstrable difference in genetics and so forth but another factor was -- was that the western stock was declining and the eastern stock was increasing. So it was a very different population dynamic.

The western stock population, major decline starting in the -- in the late '70s. This graph shows later part of the decline -- decline -- declined in --

in all different sections from the Gulf of Alaska out to the western Aleutians at different -- at slightly different rates but throughout it's range. So it was a major decline and that's -- that's why -- the reason it was put on the endangered species list. In the last few years, the last two surveys in 2002, 2004 has shown reversal of that trend showing about a five percent increase throughout -- throughout the -- in -- in almost all areas that have been surveyed.

The eastern population has been a very different story starting at a lower level, but over the past 20 years or so, it's been generally increasing throughout it's range, except for sort of central southern California where -- where the population has -- has declined in some cases -- or for some years but its stock, as a whole, has been -- has been generally increasing.

The research and the recovery plan for the sea lions has identified a number of potential contributing factors to the population decline and has identified types of research that would be important for helping the -- the stock recover. Among those -- and these are not listed in any particular order, but among those predation by killer whales, nutrition -- nutritional stress either brought about by combination of fishing factors, ocean -- oceanographic shifts, changing conditions in the -- in the ocean, parasitism and disease have been looked at, and also mortality in fishing in various fisheries, both U.S. fisheries and foreign fisheries, including entanglement in lost fishing gear.

So these are some of the things that the research has been oriented towards trying to discover the reasons for the decline.

Grants to do Stellar Seal Lion research in the past five or six years have -- have a major increase in -- in granting money related to sea lion research. Some of it has been -- come through -- its earmarks from congressional appropriations. Some has been distributed in competitive fashion through the Stellar Sea Lion Initiative. Other -- other monies coming through NMFS for sea lion research has come from within the -- the budget of -- of NMFS to fund the research here, National Marine Mammal Laboratory. Recipients are both a combination of federal and state agencies as well as independent groups, especially university -- university groups.

The permitting process is -- is a formal process requiring application and justification of a whole list of criteria and it goes through a complicated process involving a lot of different steps. I -- I won't go over all that right here but there is some more information on -- on the web site, NMFS web site as well as on one of the boards out here. But it is a public -- they are public documents. And the permitting for Steller sea lions is -- applies under both the Marine Mammal Protection Act permits as well as the Endangered Species Act permits.

So these are the institutions that have received permits to do work on Steller sea lions that are -- they're current -- currently valid permits.

Type of -- the permits are very specific as far as the type of activities that are allowed under the given permit, and -- so for different types of research functions, the permits specify a given number of animals that can be affected.

The types of research through surveys on population, essentially censusing, through use of planes, marine vessels and ground surveys, scat collection. Some animals are captured, temporary restrained for morphometric measurements. Some animals go through tissue sampling that are permitted from various tissues. Body composition, a number of other -- physiological measurements. Temporary and permanent marking ranging from hot branding to flipper tags and things of that nature. External and scientific instruments -- internal scientific instruments, telemetry gear, stomach intubation, enemas. Removal from the wild in captivity and associated studies at the Sealife Center in Steward.

The -- the permits, like I said, they are specified for the -- a number of animals, the type of procedure, the sex, age, and -- and year of the -- the work and the season of the work, and it -- it varies. These research programs sometimes -- some years are more active than others, so this is just sort of a sample of an average number of animals that may be affected or that are permitted in a given year from all these different research programs.

So, all the animals may -- in the population may be disturbed through various censusing activities but then a subset are -- are permitted for work doing requiring capture and so forth.

Fur seals, there are two separate stocks recognized in U.S. waters, the Easter Pacific stock and the San Miguel Island stock. So the San Miguel Island stock in California relatively small component but the Eastern Pacific stock ranging all the way to the North Pacific and into the Bering Sea. Eastern

Pacific stock was listed as depleted under the Marine Mammal Protection Act in 1988. The San Miguel Island stock is not listed as depleted. That stock has -- has been increasing. That's why it's not as depleted.

Eastern Pacific stock has undergone substantial decline in -- in -- as a little -- in contrast to Steller sea lions, the fur seals, they're very few rookeries so most of the -- most of the breeding population -- most of the breeding occurs on the Pribilof Islands, St. Paul, St. George. There has been a increase on Bogoslof Island, that population has been increasing substantially at the same time that the Pribilof Island population has been decreasing.

Some very -- some -- some similar factors to the sea lion case as far as potential causes for decline, but with fur seals, there was also a substantial commercial harvest back in the '60s and the '50s. Same source of things incidental mortality in fisheries, nutritional stress, parasitism and disease, predation, and then habitat degradation. And it also is a -- a hunted population so the subsistence harvests as well as vessel traffic.

These are all compon -- or potential components in -- in the decline and so they have been subject of research activities.

And so the -- the fur seals are listed as depleted on the Marine Mammal Protection Act but the Endangered Species Act so permits issued for them for research are just under the MMPA, and these are the recipients of a -- they're current permit holders for doing research on wild animals.

So there are other -- other permits for laboratory work but from tissue samples that are -- are collected from subsistence harvests and other -- other incidental mortality.

And they're really very similar types of research on -- on northern fur seals, different methodologies, but same types of things that are going on with these species but on a much smaller scale than the sea lions.

Okay.

MR. ISAACS: Thanks, Bruce.

What I'd like to do now is finish up this with information on the specific need to action before us in talking about the proposed action. What is the preliminary purpose and need. What are some of the issues we've identified preliminarily and what sort of information we're looking for feedback from the public.

I think as Steve indicated that proposed action before us is to facilitate conduct of research activities related to conservation and recovery of Steller sea lions and northern fur seals by awarding grants and issuing permits to qualified individuals and institutions.

And, again, there's some key words in here in terms of looking at research related to conversation and recovery and looking at awarding grants and issuing permits to qualified -- qualified individuals and institutions.

We put together a preliminary purpose and needs statement to start with scoping and what we'll be doing is we will be revisiting that purpose and need statement after we get the scoping comments in. But for the purpose of helping the public understand the purpose and need of the proposed action, this is where we're starting from.

The purpose is to award grants and assist in funding of activities identified by Congress or NMFS as important for management of protected species and to issue permits to provide an exemption from Marine Mammal Protection Act and Endangered Species Act prohibitions on take for conduct from bona fide scientific search and enhancement activities.

The preliminary need is to facilitate research needed to identify, evaluate or resolve conservation problems for the species and that information from this authorized research is needed by NMFS to identify natural and anthropogenic factors in limiting populations of stocks, in identifying reasonable actions to minimize impacts of human activities and to promote recovery of those stocks.

So why are permits needed for research? What the permits do is they allow researchers specific exemptions from the prohibitions of takes as defined under the Endangered Species Act and the Marine Mammal Protection Act.

And the way they define takes, there are some silimit -- some similarities and slight differences. Both of them prohibit takes of threatened and endangered species and the marine mammals respectively. ESA defines take as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect or attempt to engage in any such conduct, whereas the Marine Mammal Protection Act defines take as to harass, hunt, capture, collect or kill or attempt to harass, hunt, capture or collect or kill under any marine mammal. So, again, the permits that are issued by NMFS provide an exception to these prohibitions.

We've come up with some preliminary environmental issues that we see need to be addressed in the EIS. And, again, the purpose of scoping is we are looking from the public what should be the issues and the concerns that the EIS should address both in terms of the alternatives considered and in terms of the potential environmental consequences that we're going to analyze.

Among the issues are what are the information needs of NMFS for the conservation of the species, what type of information do they need for management, or do the types and the amounts of research activities that should be permitted, what mitigation measures should be identified and used as conditions on issuing permits, and then what are the cumulative impacts of research activities taken in conjunction with things like subsistence, commercial fishing and natural environmental factors on northern fur seals, on Steller sea lions and on the environment.

There's a number of specific questions that NMFS is asking the public to help answer and this is something that's being used not only for this project but for other research activities that NMFS is permitting and doing NEPA compliance on.

The first is the types of research. Things we would like to hear from people on are, are there critical research needs that are not already identified in the species' Recovery and Concervation Plans? If so, what are those research needs and how will they benefit the species?

What are the most appropriate methods to obtain the information required by the Recovery and Conservation Plans? Are there alternative methods we should -- should be considering? What should be the level of research effort? How much of a specific activity, such as hot branding, is enough for management and conservation needs? Can there be too much? Should NMFS set limits in some of these activities? Should there be different standards or more restrictions for research on certain age/sex/reproductive classes or life history stages? If so, for what classes, what stages, what should those limitations be?

Coordination of research. What are the most appropriate mechanisms to ensure that research is coordinated and there's not duplicative research? Should NMFS limit the number of permits to increase coordination? If so, how should this be accomplished? Should researchers operating under different permits be required to use the same or similar methods? If so, what methods are the most appropriate for different research categories? How should NMFS compare data from different permit holders when making management decisions?

Qualifications of researchers. How much expertise and prior experience should a permit applicant, principal investigator or anybody else have with the specific methods for which they seek a permit?

And what are the effects of research? NMFS will be assessing the possible effects of the various research methods in this EIS. Anyone who has relevant information they believe NMFS should consider should provide a complete reference or citation. NMFS is also seeking recommendations for study designs that could detect or predict the effects of research activities on Steller sea lions and northern fur seals.

So we're going to get ready for the public hearing portion of this and I want to go over the process for oral comments and a few other administrative procedures.

NMFS is in the process of issuing a supplemental notice of intent. The original notice of intent had a public comment deadline of February 13th and we've decided to extend that comment deadline to February 25th so that the supplemental notice of intent I think is going to be in the Federal Register relatively shortly.

The same procedure that we're using for all these scoping hearings is o people sign in at the registration table. Again, that gives us a list of people who have signed up and we'll call people in the order that they've signed up for testimony.

Everyone has four minutes to offer the oral comments. Typically what I do is, as you're approaching your four minutes, maybe 15 seconds left, I'll let you know you have about 15 seconds left and ask you to please wrap up. If you go a little bit over, no big deal but we'd like you to try to respect the four-minute limit.

And we have a court reporter here so we'll be recording the meeting both with a transcript and with an audiotape to make sure that we have accurate and complete record. We've used those for analyzing the scoping comments and those will be part of the scoping report which will be available on the web site for public review.

In addition to oral comments, you could also submit written comments and you're not limited to one form of comment. In many cases, the best thing to do with oral comments is to summarize your main points and then submit more detailed written comments.

If you have written comments, your options are, if you have them today, we'll be glad to take them. You can hand them in to us. We have comment sheets here at the meeting and I think we also have comment sheets on the web site, if I'm not mistaken, and those can be filled out and turned in. You can send them in by e-mail and the e-mail address is ssleis.comments@noaa.gov. Anything that's submitted by e-mail, anything that's turned in in written comments needs to be in by the 25th of February.

We also have a NOAA web page. The address is up here and you can take a look at that for additional information. We will be posting the scoping report to that web site. We will be putting newsletters on the web site. Other project information will go on it. The draft EIS will be on it and will be downloaded by PDF, so that will be a very good source to check and keep up on the status of the project.

If you're interested in the copy of the EIS, you can register here and you can check the avail -- availability on the web site and I think for people who are on the mailing list, we'll also be sending a card close to the period in time that the EIS is out to see if you want a hard copy or you want it in a CD format.

Probably don't think we need a five-minute break. But I've got a feeling is we have maybe one person who signed up to testify, is that a good guess?

MS. LEE: Uh-huh. Yes, we do.

MR. ISAACS: Okay. So let me go ahead and get the -- the sign-in sheet. And what I will do, even though we have one person set up to testify, I'm going to ask if anybody else in the audience who would like to testify, have you sign in.

When the testimony is finished, what we'll do is temporarily suspend the public hearing and then we will probably have an informal question and answer period, if you have some questions for Steve and other folks here.

We will certainly be here through the end of the published notice of 7:00 o'clock so if you change your mind or somebody else comes in, we'll reopen the public hearing to take testimony.

When I ask you to testify, if I could have you state your name and if you're representing an organization for the record to help out the court reporter.

So the only person signed up on the list is David Bain. David, if you could come to the microphone here and, again, just state your -- your name for the record and you have four minutes, so thank you.

MR. BAIN: Okay. I'm Dr. David Bain and I'm not representing any organization.

Populations end up on the endangered species list when their potential for long-term survival has become impaired. NMFS has developed the concept of potential biological removal to try to strike a balance between allowing human activities to continue and the population to recover without further impairment and cumu -- or PBR was originally developed to deal with fishery situations when the removals were from immediate injuries or death, however, I think we should expand that concept to include cumulative effects.

And in that light, when we're looking at issuing research permits, factors like the level of effort will determine and what the contribution to the cumulative effect is. Also, how well researchers coordinate their efforts and avoid duplication of effort will impact the cumulative effect.

When -- well, we can think of potential biological removal as a total budget for all human impacts on a species attempting to recover. And when we're weighing the value of research projects, there are a number of things we should consider.

One, what is the probability that the factor addressed in the research influences the probability that the population will recover? Given the competence of the researchers, what is their probability of success in determining whether that factor is relevant? Even if the research is successful, what is the probability that it will result in the management action that will have an impact on the probability that the population will recover? And in making such decisions, we need to consider tradeoffs of sample size versus certainty in the results, invasiveness versus certainty -- or versus the certainty in the results.

When we're weighing the costs of a research project, we need to consider what the costs are, and there are a couple of different ways of looking at this. One is if you do your research on animals that are permanently in captivity anyway, there won't be any cost to the wild population. If you do the work with the threatened population, that's less likely that the results will be as costly as if you did the work on an endangered population.

MR. ISAACS: About 15 seconds.

MR. BAIN: Okay. Two other points.

And we need to consider the relationship between the type of research and its effect on the survival and reproduction of the species. And, finally, we need to consider the reproductive value of the individuals influenced.

For example, a stranded animal or a young pup is likely to die before contributing to future reproduction of the population. Older individuals are less likely to contribute to the future reproductive -- reproductive value of the population and we may find females are more important to future reproduction than males are.

Thank you.

MR. ISAACS: Thank you, David.

Is there anyone else here who hasn't signed up who would like to testify tonight?

Okay. Seeing and hearing none, then what we'll do is we'll suspend the public hearing portion of it. Again, if someone here who would like to testimony and you change -- testify and you change your mind, please let us know and we'll open it back up to take your testimony.

(Whereupon the Public Scoping Meeting concluded at 6:05 p.m.)

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CERTIFICATE

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I, Cynthia A. Kennedy, do hereby certify that pursuant to the Rules of Civil Procedure, the witness named herein appeared before me at the time and place set forth in the caption herein; that at the said time and place, I reported in stenotype all testimony adduced and other oral proceedings had in the foregoing matter; and that the foregoing transcript pages constitute a full, true and correct record of such testimony adduced and oral proceeding had and of the whole thereof.

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IN WITNESS HEREOF, I have hereunto set my hand this 3rd day of February, 2006.

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Signature Expiration Date

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Minutes

Meeting Type: SSL/NFS Research EIS Scoping Meeting

Date: 01/23/2006

Time: 5:00 pm – 8:00 pm

Location: Anchorage, AK

Attendees: See sign-in sheet

On January 23, 2006, representatives of National Marine Fisheries Service (NOAA Fisheries) and their contractor, URS, conducted a Public Scoping Meeting at the Hilton Hotel in Anchorage, AK to provide a briefing on the Steller Sea Lion (SSL) and Northern Fur Seal (NFS) Research Environmental Impact Statement (EIS), and to identify issues that should be addressed in the planning and permitting process.

- **Larry Merculieff (Alaska Native Science Commission, Deputy Director) –** ***Formal Comment***

  Bering Sea Forum has been instrumental. Papers calling for cooperation and coordination in Bering Sea research. Bering Sea Summit of Indigenous Peoples. The Aleuts were the first to flag ecosystem problems in the Bering Sea in 1977. The Aleuts are never given attribution for their contribution. Two websites of interest include: www.nativeknowledge.org and www.nativescience.org. Not sure about implications of doing an EIS rather than an EA, or combining SSLs and NFSs. This approach may unnecessarily delay research. He was the first to report that a third decline of NFSs would occur. An EA should be adequate for both species. Alaska Natives must be involved in the development of the document because they are the only stakeholders with a nutritional stake since they consumers of both species. Do not ignore their knowledge of the species. The state of Alaska must be partners in research efforts and provide some financial assistance. The research on SSL and NFS should be kept separate. Research questions and management should include Russia – this half of the population cannot be ignored.

(1)

NMFS – URS
STELLER SEA LION AND NORTHERN FUR SEAL RESEARCH EIS
PROJECT SCOPING MEETING
January 2006
SIGN-IN SHEET

URS

ANCHORAGE 1-23

PLEASE PRINT NAME AND ADDRESS	AGENCY and DISCIPLINE	PHONE NUMBER	EMAIL ADDRESS	MAKE ORAL COMMENT ?
Denna Willoya	The AK Sea Otter & Steller Sea Lion Comm. (TASSC)	907 274-9799	dwilloya@seaotter-sealion.org	
Beate Litz	Alaska Sealife Center (ASLC)		beate_litz@alaskasealife.org	
Shannon Atkinson	ASLC		shannon_atkinson@alaskasealife.org	
Doug DeMaster	AFSC		douglas.demaster@noaa.gov	

NMFS – URS

STELLER SEA LION AND NORTHERN FUR SEAL RESEARCH EIS

PROJECT SCOPING MEETING

January 2006

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(2)

ANCHORAGE 1-23

PLEASE PRINT NAME AND ADDRESS	AGENCY and DISCIPLINE	PHONE NUMBER	EMAIL ADDRESS	MAKE ORAL COMMENT ?
Larry Merculieff 429 L Sr. Anchorage, AK 99501	Alaska Native Science Commission	907-258-2672	lmerculieff@aknsc.org	
Bill Wilson NPFMC 605 W. 4th Ave. Suite 306 Anchorage 99501	North Pacific Fishery Mgt. Council	907.271.2809	bill.wilson@noaa.gov	yes
JO-ANN MELLISH ASLC/UAF PO BOX 1329 SEWARD AK 99664	ASLC/UAF Biologist			
Jamie Thomton ASLC PoB 1329 Seward, AK 99664	ASLC Researcher			
Marine Lindsey NOAA Fisheries PO Box 21668 JNU 99802	NMFS	586-7203	marine.lindsey@noaa.gov	

(3)

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STELLER SEA LION AND NORTHERN FUR SEAL RESEARCH EIS
PROJECT SCOPING MEETING
January 2006
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ANCHORAGE 1-23

PLEASE PRINT NAME AND ADDRESS	AGENCY and DISCIPLINE	PHONE NUMBER	EMAIL ADDRESS	MAKE ORAL COMMENT
Sheela McLean	NOAA Fisheries	586 7032	sheela.mclean@noaa.gov	NO ?
Steve MacLean	The Nature Conservancy	276-3133	smaclean@tnc.org	No
Margaret Williams	World Wildlife Fund	277-5504	margaret.williams@wwfus.org	
MIKE WILLIAMS	NOAA FISHERIES	271-5006	michael.williams@noaa.gov	No
Tylan Schrock	ALASKA SEA LIFE CENTER	907 224.6349	tylan_schrock@alaskasealife.org	

NMFS – URS

STELLER SEA LION AND NORTHERN FUR SEAL RESEARCH EIS

PROJECT SCOPING MEETING

January 2006

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ANCHORAGE 1-23

PLEASE PRINT NAME AND ADDRESS	AGENCY and DISCIPLINE	PHONE NUMBER	EMAIL ADDRESS	MAKE ORAL COMMENT ?
Don Calkins Alaska SeaLife Center Seward AK	ASLC Steller Sea Lion and Northern Fur Seal Program Manager	907-224 6325	don_calkins@alaskasealife.org	
Kate Wynne Univ Alaska Fbx 118 Trident Way Kodiak AK 99615	UAF	907- 486-1517	ffkmw@uaf.edu	
Clark Lee Merriam 710 Settlers Ldg Rd Hampton VA 23669	Cousteau Society	757-722- 9300	cmerriam@cousteausociety.org	
Lowell Fritz	NMFS NMML	206-526 4246	lowell.fritz@noaa.gov	

NMFS – URS

STELLER SEA LION AND NORTHERN FUR SEAL RESEARCH EIS

PROJECT SCOPING MEETING

January 2006

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(5)

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ANCHORAGE 1-23

PLEASE PRINT NAME AND ADDRESS	AGENCY and DISCIPLINE	PHONE NUMBER	EMAIL ADDRESS	MAKE ORAL COMMENT ?
Lianna Jack 6239 B St Ste 204 Anch AK 99504	TASSC	907-274-9799	ljack@seaotter-sealion.org	N

(6)

NMFS – URS

STELLER SEA LION AND NORTHERN FUR SEAL RESEARCH EIS

PROJECT SCOPING MEETING

January 2006

SIGN-IN SHEET

ANCHORAGE 1-23

PLEASE PRINT NAME AND ADDRESS	AGENCY and DISCIPLINE	PHONE NUMBER	EMAIL ADDRESS	MAKE ORAL COMMENT
JOHN BENGTSON 7600 SAND POINT WAY SEATTLE, WA 98115	NMFS	206, 526, 4016	JOHN.BENGTSON@NOAA.GOV	? NO

NOAA
PUBLIC SCOPING MEETING
Anchorage, Alaska

In Re:)
)
Environmental Impact Statement)
on Steller Sea Lion and)
Northern Fur Seal Research)
)

TRANSCRIPT OF FORMAL TESTIMONY
Hilton Anchorage
January 23, 2006
5:00 p.m.

APPEARANCES: MR. JON ISAACS,
Moderator: URS
MR. STEVEN LEATHERY: National Marine Fisheries Service, Silver Spring, Maryland
MR. ANDREW WRIGHT: National Marine Fisheries Service, Silver Spring, Maryland

ALSO PRESENT: MS. KELLEY HARTLIEB,
Court Reporter: Metro Court Reporting, Anchorage, Alaska

* * * *

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(On record - 7:05 p.m.)

MR. ISAACS: I don't think we really need a five-minute break with the number of comments we have, but let me go through the comment list here and see who has signed up. Now, when I call you up, if you could come up to the microphone up here, it will help the court reporter out. And if you could state your name for the record and who you're affiliated with, and it also might help in some cases to spell your name if necessary so the court reporter can take that down. So it looks like first on the list is Bill Wilson. Bill, you have no comments at this time?

MR. WILSON: No comments.

MR. ISAACS: Okay, Larry Merculieff.

MR. MERCULIEFF: Is this the reporter?

MR. ISAACS: Yes.

STATEMENT BY LARRY MERCULIEFF

(Speaks in Aleut) In Aleut, that means the evening tastes good. My name is Larry Merculieff. I've given the court reporter the testimony so she's got the spelling of my name. I'm the deputy director of the Alaska Native Science Commission. And I'm going to make some general comments and then turn in written comments that are far more specific. But by way of introduction, I was involved in Bering Sea ecosystem issues for almost 30 years now and mostly as an indigenous leader. I was instrumental, for example, in the formation of

Page 3

the International Bering Sea Forum which is composed of organizations and individuals focused on conservation in the Bering Sea and pursuing an international treaty. And I was also instrumental in securing Call to Action papers by the Departments of Interior and Commerce calling for cooperation and collaboration between those two departments and focussing in on research in the Bering Sea. And that was a result of a meeting that we had at the White House. Then I secured funding from the US State Department to mobilize a committee on the Bering Sea ecosystem under the auspices of the National Research Council, which was to take the best and the brightest of scientists nationally to take a look at the gaps and issues that need to be addressed in the Bering Sea, particular dealing with Bering Sea ecosystem approaches and the problems with the current science. And also I conducted the first ever Bering Sea Summit of Indigenous Leaders to outline what Alaska Native communities want to see in terms of research and Native participation in dealing with the Bering Sea issues. And I was the only indigenous representative who presented in the plenary in the White House Conference on the Oceans in Monterey, California in 1999. So I have some experience with these issues.

But without equivocation, I can say that Aleuts were the first ones to flag ecosystem problems in the Bering Sea in numerous scientific and general policy forums, governmental

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forums, after Aleut people observed anomalous behavior of seals, sea lions and birds, sea birds, beginning in 1977. I can also say without equivocation that Aleuts were never given any attribution for our observations in any scientific forum, white paper or research document to this day. And that -- I'm hoping that whatever research is conducted that comes out of this, that attribution does take place because it hampers Native people's abilities to have some credibility in these scientific forums. I could say now, we pointed this out in 1977, that there were ecosystem problems. And we knew there were problems with sea lions, we knew there were problems with fur seals, we knew there were problems with sea birds, and it wasn't just isolated to the Pribilof Islands. That would have given us a little bit more credibility when we testify at any public forum.

Right now I serve as the deputy director for the Alaska Native Science Commission. Our primary purpose is to bring together western science and traditional ways of knowing, and to try to bring more participant involvement of Native peoples in terms of how science is conducted. We've got two websites: www.nativeknowledge.org and www.nativescience.org. And we have a database on there that points out all the Native resources we have through the state. We are a statewide organization.

I've got six points. One, I'm not sure about the

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rationale or implications for conducting a full EIS rather than an EA and combining fur seals with sea lions. I understand that there are a lot of commonalities research-wise between sea lions and fur seals but I think that we need to examine what happens when these two are combined and we're doing a full EIS. By going this route, it seems to me that it may take an inordinate amount of time, in my opinion, to conduct an assessment on both species before a final report is out. And I maintain that this is time we do not have. I was, by the way, the first one that flagged that we were going to have a third decline of the fur seals and predicted that very accurately based on information given to me by our people, that we are going to encounter a third decline. This third decline has now begun and it's going to be far more precipitous than anything that's seen before, at least since the 1950's. So that given this, if combining the two species in an EIS will delay recommendations at research efforts, then in my opinion, this is a bad idea. Likewise, when it comes to eventual hearings on the draft EIS, combining these two species in this draft report will make the hearings cumbersome, if not just for the sheer number of people and organizations that will no doubt testify on one or the other species or both, and further delaying final action. We may be looking out to three years before a final action report is -- a final EIS actually developed, or maybe five years, and

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that's time that we absolutely do not have.

Number two, unless the agency is contemplating taking research action that requires an EIS because of potential significant impacts we are not told about, or is being contemplated that has not been discussed, an EA should be adequate for both species. It seems odd to me that it was considered adequate to do an EA for fishery management actions in the Bering Sea while an EIS would be required just for research. So it would be good to address that in some way.

Number three, Alaska Natives must be involved in designing research questions as they are not like any other stakeholder. First, Alaska Natives are the only consumer of the fur seals and sea lions for subsistence. Secondly, they are the only stakeholders that have major cultural and nutritional stake in the well being of the two species. As such, they are the only stakeholders that have more than economic consequences and public interest. Given this, if the plight of sea lions and fur seals worsen, which it is likely to do particularly for fur seals, it's the Alaska Native who will not only suffer the most in the current generation, but for many generations to come.

Number four, Alaska Natives must be partners in research efforts where Alaska Natives are given the financial wherewithal to deal with the collection and interpretation of traditional knowledge and wisdom about fur seals and sea

Page 7

lions. This has been totally and completely and sadly inadequate from what has been done particularly with sea lions, although there is now efforts to try to develop co-management measures working with the Sea Lion Commission and that's good. And we need more and more support. Let's see, now, Alaska Natives, in terms of traditional knowledge and wisdom, are unique in this regard in that they're the only stakeholders who have an intergenerational knowledge and understanding of these two species. To ignore this fact is to ignore a potentially significant source of information and understanding. And we can document where scientists have missed things that were absolutely critical to understanding what was going on. Although we cannot scientifically document it, we can anecdotally document it. And it can be corroborated by many Native peoples.

Number five, research funds for fur seals and sea lions must be kept separate and distinct, with requirements for coordination, cooperation and sharing of information and data between fur seal and sea lion scientists, utilizing ecosystem approaches unless there is a strong rationale as to why the science is going to be any better when you put them together. We're concerned about the implication of bringing these two together where they're going to end up with one species getting more effort and research and the other not. And we feel that both of them are absolutely critical.

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Number six and final point, research questions must address the western Bering Sea ecosystem and human activities on the Russian side of the Bering Sea. Neither of these species can be managed as if they live in only one half of the ecosystem; it's absolutely insane. We are discounting an entire half of their habitat. It's a significant flaw in all prior research in my opinion. And efforts must be made immediately to accelerate research cooperation and coordination with the Russians.

Thank you. I'll be glad to answer any questions.

MR. ISAACS: Thank you, Larry. At this point in time, no one else has signed up on the list. Are there other folks in the audience who would like to testify tonight? Again, it's a good opportunity but you also have the opportunity to submit written comments. Anyone else at this time? Okay, seeing none, what we're going to do is we're going to close the public hearing portion of it, but we're going to certainly be here through eight o'clock. If you change your mind and you want to put something on the record, I will open up the public comment period again and we'll go ahead and take the notes.

STATEMENT BY LARRY MERCULIEFF (cont.)

So I guess one comment, only because I'm trying to decide, you know, whether or not we should push for trying to separate the two had have them different between seals and sea

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lions. But, you know, in terms of the comment about the permits showing that the research is starting to parallel each other, I think that's more a reflection of either the lack of imagination, creativity or critical thinking on the part of the scientists. Because from the Native viewpoint, there are vast differences between seals and sea lions. And you know, my people on St. Paul Island are called (Aleut word), people of the sea lion. We eat more sea lion per capita than any other Native group. I myself have been a sea lion hunter for about 40 years. And we also live on an Island where the fur seals are, the majority of the fur seals. Between St. Paul and St. George, St. Paul's got the most. And we know there are major differences between the two. So that's for the record.

* * * END OF FORMAL TESTIMONY * * *

CERTIFICATE

UNITED STATES OF AMERICA)
) s.
STATE OF ALASKA)

I, Jerri Young, Notary Public in and for the State of Alaska and Reporter with Metro Court Reporting, do hereby certify:

THAT the foregoing pages numbered 01 through 09 contain a full, true and correct transcript of the Environmental Impact Statement on Steller Sea Lion and Northern Fur Seal Research Public Scoping Meeting Formal Testimony before NOAA, was taken and transcribed by Kelley Hartlieb of this office.

THAT the Transcript has been prepared at the request of National Marine Fisheries Service, Office of Protected Resources, 1315 East-West Highway, Room 3525, Silver Spring, Maryland.

DATED at Anchorage, Alaska this 27th day of January, 2006.

SIGNED AND CERTIFIED BY:

Jerri Young
Notary Public in and for Alaska
My Commission Expires: 11-03-07

METRO COURT REPORTING
907.276.3876 745 West 4th Avenue, Suite 425, Anchorage, Alaska 99501 metro@gci.net

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APPENDIX F
Agency Scoping Meeting, Issues Raised, and Agency Scoping Comments

URS

Minutes

Meeting Type: Agency Scoping Meeting SSL/NFS Research EIS

Date: February 7, 2006

Time: 9:00am

Location: Conference Call

Attendees: Sharon Melin NMML; Tom Gellatt, NMML; Brian Fadely, NMML; Beth Stewart AEB-Juneau; Mike LeTurno, EPA Region 10; Mike Seigler, NMML; Rich Kleinleder, URS; Mike Williams, NOAA Fisheries-AK; David Cottingham, MMC; Mike Gosliner, MMC; Jeannie Drevenak, MMC; Steve Davis; Steve Leathery, NOAA Fisheries; Tammy Adams, NOAA Fisheries; Andrew Wright, NOAA Fisheries; Anne Lee, URS; Jon Isaacs, URS

On February 7, 2006, representatives of National Marine Fisheries Service (NOAA Fisheries) and their contractor, URS, conducted an Agency Scoping Meeting via teleconference to provide a briefing on the Steller Sea Lion (SSL) and Northern Fur Seal (NFS) Research Environmental Impact Statement (EIS), and to identify issues that should be addressed in the planning and permitting process.

- **Steller Leathery (National Marine Fisheries Service) –** ***Opens***

The purpose of the call is to continue the scoping process and specifically reach out to agencies that may wish to comment or ask questions regarding the EIS. The Powerpoint presentation that I am going to review here over the phone will be posted on the project website shortly after this teleconference. NEPA requires that the EIS consider the environmental impacts of research as well as the cumulative effects. NOAA Fisheries is responsible for the management of SSLs and NFSs. The action requiring NEPA compliance is the issuance of federal grants and permits. There is no implication or judgment by NOAA Fisheries that there are adverse impacts, but NOAA Fisheries is required to address these issues.

(Review of Powerpoint presentation – See attached copy of presentation).

- **Brian Fadely (National Marine Mammal Laboratory)**

What is the role of the National Marine Mammal Laboratory (NMML) – are they considered the public or an agency? How should NMML be involved in this project?

Answer (Steve Leathery): AFSC and NMML should have another conference call to flush out their roles.

- **David Cottingham (Marine Mammal Commission)**

How much is dealing with grants and permits already issued? Are there grants and permits that are affected by this EIS?

Answer (Steve Davis) – The EIS does not have an affect on grants that are already issued. Right now, NEPA compliance is needed for all grants. This is a new requirement by NOAA Grants Management Council. NAO-216-6 states that any decision that affects ESA/MMPA species cannot be categorically excluded, so either full NEPA compliance is conducted on ALL grants or we do what is trying to be done now. In the past, the Grants Office relied on the Permit Division for NEPA compliance, but now given the Humane Society (HSUS) lawsuit, this is problematic.

Is this a retrospective EIS for grants?

Answer (Steve Leathery): It is both, in that in the EIS we must analyze historical grants as well as existing and potential future grants for both species.

- **Beth Stewart (Aleutians East Borough-Juneau)**

What is going on with the litigation?

Answer (Steve Leathery):Why don't we talk offline sometime soon and I will fill you in on the HSUS lawsuit.

- **Brian Fadely (National Marine Mammal Laboratory)**

What is going on with pending permits or modifications for SSLs?

Answer (Steve Leathery): No decision has been made yet. The Permit Division recently approved 5-year permits, and 8 applicants were given 2-year lead-time. We are also waiting to see what happens in front of the judge for the HSUS lawsuit in March. That ruling may influence whether we will be able to process permits.

- **Tom Gellatt (National Marine Mammal Laboratory)**

What is the status of northern fur seal permits?

Answer (Steve Leathery?): The decision at hand for NMFS now is whether to prepare an interim EA, wait for the EIS to be complete, or wait to hear what the judge in the HSUS lawsuit tells us we have to do. We are working to try to move forward on northern fur seal permits before the EIS is complete. Until litigation is determined, we are waiting to decide on whether to process Steller sea lion permit modifications.

- **Beth Stewart (Aleutians East Borough-Juneau)**

How big of an amendment to a permit is okay and could be processed?

Answer (Steve Leathery): Minor amendments are considered okay.

- **Beth Stewart (Aleutians East Borough-Juneau)**

Is the information you are reviewing during this call on the website?

Answer (Steve Leathery?): Yes, this Powerpoint presentation will be posted soon after this teleconference is finished.

Also, have you already met with Kate Wynn of the Sea Grant Office?

Answer (Steve Leathery?): No, but she was at the public meeting held in Anchorage on January 23, 2006 and she made comments at the meeting.

Peggy Osterback of Dutch Harbor should also be contacted.

- **Tom Gellatt (National Marine Mammal Laboratory)**

Who has been contacted regarding this project? What is the schedule for scoping?

Answer (Steve Leathery):Our project mailing list is very broad with over 300 people, including all permit holders. Three scoping meetings were held in Silver Spring, MD, Seattle, WA, and Anchorage, AK, on January 18, 20 and 23, 2006. The public scoping comment deadline is February 25, 2006. There may be a workshop in March or July this year to help inform the alternative development process. There will also be a comment period after the release of the draft EIS.

- **Sharon Melin (National Marine Mammal Laboratory)**

Is the workshop more for comments on the process?

Answer (Steve Leathery): The workshop is to bring parties together to help develop a reasonable range of alternatives. It is an attempt to be more inclusive by inviting people to participate in addition to the researchers such as conservation biologists and members of HSUS and other NGOs. This is not an exercise to reach consensus.

(Jon Isaacs): If this EIS is to be more programmatic, then we also need help from the workshop about information regarding reasonably foreseeable future actions as far as potential new research methods, techniques and programs.

- **Tom Gellatt (National Marine Mammal Laboratory)**

It will be important to involve NOAA GC in this project, especially for review of project alternatives. Is there a conflict of interest because NMML would help with this process but are also researchers seeking permits?

Answer (David Cottingham): This is an agency document.

URS

Answer (Tammy Adams): In order to properly characterize past, current and future research, NMML must be involved.

Answer (Steve Leathery): The agency is conducting research, funding research, and permitting research. Therefore, there is an inherent conflict, which is why it is so important to do an EIS and involve the public.

Spring would be a better time to have the workshop – March or April – because of the field season.

- **Steve Davis**

Is the intent to develop strawman alternatives for the workshop to help focus the group?

Answer (Steve Leathery): Yes.

There is a challenge in predicting the future, so we need to base it on the present. Presume in the near term that research is continued, so future range should be discussed during.

- **David Cottingham (Marine Mammal Commission)**

The SSL Recovery Plan Team meeting is scheduled for March 15-17. This would be valuable information to have for the workshop.

- **Tom Gellatt (National Marine Mammal Laboratory)**

The SSL Recovery Plan is supposed to be externally reviewed before team meeting, then after March 17 the SSL Plan should be final and published.

- **David Cottingham (Marine Mammal Commission)**

The MMC does not plan to draft separate comments for this comment period. Please consider our comments submitted on the Permits EA and other recent comments regarding this topic our formal submittal for the pubic scoping period of this EIS.

APPENDIX G
Native Scoping Meeting, Issues Raised and Native Scoping Comments

Minutes

Meeting Type: Government-to-Government Scoping Meeting SSL/NFS Research EIS

Date: February 7, 2006

Time: 2:00 pm

Location: Teleconference

Attendees: Mike Miller, Sitka Tribe of Alaska; Nikolski-Agrafina-Per, Tribal Secretary; Woody Widmark, Sitka Tribe of Alaska; Peggy Osterback, Executive Director of Aleut MMC; Akutan-Jacob Admin; Steve Leathery, NOAA Fisheries; Tammy Adams, NOAA Fisheries; Andrew Wright, NOAA Fisherise; Anne Lee, URS; Jon Issacs, URS

On February 7, 2006, representatives of National Marine Fisheries Service (NOAA Fisheries) and their contractor, URS, conducted an Agency Scoping Meeting via teleconference to provide a briefing on the Steller Sea Lion (SSL) and Northern Fur Seal (NFS) Research Environmental Impact Statement (EIS), and to identify issues that should be addressed in the EIS process. No formal comments were made during the teleconference. However, comments and questions were raised during the informal comment period, which included subsistence, research permits, status of stocks and species biology and NFS surveys. These informal comments will be considered by NMFS during development of the EIS.

S:\Projects\Federal\26219742 - Steller and Fur Seal EIS\Public Involvement\Scoping Report\Native Scoping Mtg Notes 2006.doc

APPENDIX H
Comment Report By Issue Code

SUBMISSION INDEX REPORT
SSL and NFS Research EIS Scoping Report
March 2006

Date	Number	Name	Format:	Organization:
2/7/2006		, Agrafina	Public Hearing	Native Village of Nikolski
1/20/2006		Bain, David	Public Hearing	Citizen
1/18/2006		Bennett, Jennifer	Public Hearing	Humane Society of the United States
2/7/2006		Cottingham, David	Public Hearing	Marine Mammal Commission
5/3/2005		Curland, Jim	Fax	Defenders of Wildlife
2/7/2006		Davis, Steve	Public Hearing	National Marine Fisheries Service-Alaska Region
7/26/2002		De Fontaubert, Charoltte	Fax	Greenpeace
2/16/2006		Engebretson, Monica	Fax	Animal Protection Institute
2/7/2006		Fadely, Brian	Public Hearing	National Marine Mammal Laboratory
2/7/2006		Gellatt, Tom	Public Hearing	National Marine Mammal Laboratory
2/23/2006		Green, Marsha L.	Fax	Ocean Mammal Institute
1/18/2006		Harrington, John	Comment Form	U.S. Environmental Protection Agency
2/21/2006		Liss, Cathy	Fax	Animal Welfare Institute
8/12/2002		Mattlin, Robert H.	Letter	Marine Mammal Commission
2/7/2006		Melin, Sharon	Public Hearing	National Marine Mammal Laboratory
2/15/2006		Sachau, B.	Email	Citizen
3/8/2006		Snyder, Gary	Email	Citizen
2/7/2006		Stepetin, Jacob	Public Hearing	Native Village of Akutan
2/7/2006		Stewart, Beth	Public Hearing	Aleutians East Borough-Juneau
2/25/2006		Williams, Margaret	Email	World Wildlife Fund
7/29/2002		Young, Sharon B.	Fax	Humane Society of the United States
5/4/2005		Young, Sharon B.	Fax	Humane Society of the United States
5/4/2005		Young, Sharon B.	Fax	Humane Society of the United States
2/24/2006		Young, Sharon B.	Fax	Humane Society of the United States

DRAFT COMMENT ISSUE REPORT
SSL and NFS Research EIS
MARCH 2006

Alaska Native Issues

Submission No.	CommentNumber		Database Reference ID		ISSUES
	CommentNumber	2	Database Reference ID	380	ISSUES
Does anyone know what's going on with the Bogoslof northern fur seal population?					AKN
Submission No.	CommentNumber	1	Database Reference ID	379	ISSUES
Where does the survey information gathered from these communities go?					AKN
Submission No.	CommentNumber	1	Database Reference ID	378	ISSUES
Does the MMC do any formal outreach to the Native MMCs?					AKN
Submission No.	CommentNumber	13	Database Reference ID	192	ISSUES
The EIS should contain an EJ analysis assessing the potential to disproportionately affect EJ communities.					AKN NEP
Submission No.	CommentNumber	12	Database Reference ID	191	ISSUES
Please describe how NMFS involved potentially affected Environmental Justice communities into the decision making process. How were EJ communities identified and how did the agency ensure non English speaking communities were involved in the NEPA process?					AKN
Submission No.	CommentNumber	11	Database Reference ID	190	ISSUES
...what role, if any, tribal governments that may be impacted would play in the development of this EIS.					AKN
Submission No.	CommentNumber	10	Database Reference ID	189	ISSUES
As the proposed action potentially affects subsistence users/Tribal governments/Tribal uses, will NOAA/NMFS have potentially affected Tribal Governments as Cooperating Agencies on the EIS?					AKN

DRAFT COMMENT ISSUE REPORT
SSL and NFS Research EIS
MARCH 2006

Alternatives

Submission No.	CommentNumber	Database Reference ID	ISSUES
	30	341	

Alternative 2.3.2 in the EA is the only prudent alternative until such time as the agency completes a more thorough evaluation of the level and nature of research necessary to provide answer the important conservation questions, without unnecessarily subjecting thousands of animals to capture and "intrusive" procedures.

ALT

Submission No.	CommentNumber	Database Reference ID	ISSUES
	29	340	

It is simply not sufficient for the agency charged with protecting this endangered species to simply adopt the assertion of the researcher applicants that they must risk the lives and health of animals and add to the already unsuitable cumulative impacts on the stock, without consideration of other alternatives.

ALT
CUM

Submission No.	CommentNumber	Database Reference ID	ISSUES
	28	339	

The EA also fails to consider all reasonable alternatives. The EA proposes only two alternatives: the no action alternative and granting all of the requested permits. This is not acceptable.

ALT

Submission No.	CommentNumber	Database Reference ID	ISSUES
	25	264	

Of these three alternatives, we favor Alternative 3.

ALT

Submission No.	CommentNumber	Database Reference ID	ISSUES
	2	241	

While we do not feel that all options for issuing permits were not adequately considered, we support Alternative 3 which would limit the invasive research.

ALT

Submission No.	CommentNumber	Database Reference ID	ISSUES
	46	238	

Without some assurance that there can be adequate post-handling monitoring of effects, the most viable alternative is to suspend intrusive research for both Steller sea lions and fur seals until such a plan is in place.

ALT

Submission No.	CommentNumber	Database Reference ID	ISSUES
	38	230	

The NMFS should also consider refining the wording of its proposed alternative such that it will not merely result in a continuation of the already unfettered approach to research that necessitated this review in the first place.

ALT

Alternatives

Submission No.	CommentNumber		Database Reference ID		ISSUES
		33		225	
Given its a priori proposal to eliminate most of the alternatives from consideration, and the impracticality or illegality of allowing virtually unlimited intrusive research on declining stocks, the NMFS has conveniently left itself with no viable alternative other than its proposed action. This defeats the purpose of the EIS.					ALT NEP
Submission No.	CommentNumber	32	Database Reference ID	224	ISSUES
The HSUS believes that this alternative (suspension of intrusive research) should receive detailed study because, at least in the case of Steller sea lions, thousands of animals have already been branded and sampled. Analysis of this alternative helps assure that whatever research goes forward will do so only after considering what has already gone before.					ALT
Submission No.	CommentNumber	31	Database Reference ID	223	ISSUES
We question whether it is NMFS itself that believes that this research is necessary or whether the serious consideration suspension of intrusive activities as an alternative may be eliminated simply based on the self-interested assertion of researchers themselves.					ALT
Submission No.	CommentNumber	3	Database Reference ID	182	ISSUES
The EIS should describe an appropriate No Action Alternative as defined in CEQ guidance					ALT NEP
Submission No.	CommentNumber	65	Database Reference ID	85	ISSUES
One alternative empirical approach that should be reflected in the Service's NEPA analysis would be to prohibit fishing in areas large enough to ensure that fishing has no effect on prey availability and then observe sea lion population trends to determine whether they do, in fact, respond. The advantage of this more direct approach would be that it could address the hypothesis more directly, and perhaps more quickly, and pose less risk to sea lions and their recovery.					ALT

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Take (incidental; direct)

Submission No.	CommentNumber	Database Reference ID	ISSUES
	13	324	
Rather than seeking to reduce the incidental mortalities, the researchers are now seeking permission to increase potential lethal takes to 85 animals, with approximately 36 in the western stock (p. 103). This number is over 50% higher than the negligible level for the western stock, and higher the fisheries-related incidental mortality.			TAK
	59	79	
...known human-related take would be about twice the potential biological removal level. It is not clear how such a level can be considered insignificant.			PBR TAK
	35	55	
(page 41). Task 2. The application does not include branding in the list of requested take activities, and it is not clear if these animals would be branded.			BRD PER TAK

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Sample Sizes; Techniques; Locations

Submission No.	CommentNumber	Database Reference ID	ISSUES
	28	171	
..."should have included more than one site in declining and stable areas to avoid the confounding effects of site variability and ensure that observed differences were really a product of the 'experimental' variable."			SAM
	40	60	
...it is essential that the samples collected during the course of research should be representative of the sea lion populations from which they were taken and should be pertinent to identification of the causes of the decline or steps that can be taken to facilitate the species' recovery.			INA MET SAM
	42	62	
Nevertheless, several proposals either fail to describe where the studies would occur or provide incomplete information.			INA SAM
	43	63	
It is not clear that these studies will be adequately dispersed to assess potentially important spatial variation in the factors being assessed.			INA SAM
	44	64	
The lack of information on the area and time during which research activities would occur also makes it impossible to determine if the research is being suitably coordinated to provide the best scientific information with the least practicable adverse effects on the animals resulting from handling and disturbance.			COR SAM
	45	65	
Some previous studies of Steller sea lions have been limited to very small sample sizes of animals selected on the basis of criteria that may have reduced the difficulty of the study or avoided related risks (i.e., animals at the edge of the rookery, animals appearing to be in excellent or good condition, or animals of sufficient age or size), but selection by such criteria may introduce bias that raises questions as to whether those animals are truly representative of all the animals at a particular site or all the animals in the population.			INA SAM

Sample Sizes; Techniques; Locations

Submission No.	CommentNumber	46	Database Reference ID	66	ISSUES
...the applications do not describe how the animals would be selected and it is therefore not possible to determine if the sampling scheme is adequate to allow reliable interpretation of results.					PER SAM
Submission No.	CommentNumber	22	Database Reference ID	165	ISSUES
...the rationale for mass flipper-tagging of young animals as a standard practice is not at all clear in this EA.					CON SAM
Submission No.	CommentNumber	32	Database Reference ID	52	ISSUES
(page 31) Task 5. Permission is requested to capture more animals than will be sampled. It is not clear why some animals that are captured would not be sampled.					INA SAM
Submission No.	CommentNumber	27	Database Reference ID	170	ISSUES
..."Logistical constraints resulted in sample sizes that were so small in most physiological studies that few conclusions can be drawn."					SAM
Submission No.	CommentNumber	42	Database Reference ID	353	ISSUES
Telemetry is an important tool, yet is not clear if it is necessary for four different permittees to use this tool or whether there is any coordination among researchers to assure that the animals being sampled are representative for obtaining the information that is necessary.					COR SAM
Submission No.	CommentNumber	29	Database Reference ID	172	ISSUES
Test subjects were selected non-randomly among healthy survivors on the rookeries, and did not include weaned juveniles or adult females without pups that may not have been on the rookeries.					SAM
Submission No.	CommentNumber	30	Database Reference ID	173	ISSUES
There is a need for more focus on non-summer and year-round observation and sampling.					SAM
Submission No.	CommentNumber	15	Database Reference ID	207	ISSUES
The level of research must be evaluated in a manner that illuminates stratification of sampling. That is, in what demographic classes, areas or times is sampling most appropriate for the investigation of various hypotheses?					NEP SAM
Submission No.	CommentNumber	16	Database Reference ID	208	ISSUES
The EIS should evaluate how sample sizes should be determined and then it, or the NMFS permits office, must limit the number of individuals subjected to the stress of research rather than simply allowing unfettered sampling.					SAM

Sample Sizes; Techniques; Locations

Submission No.	CommentNumber 22	Database Reference ID 288	ISSUES
We are concerned that the large numbers that will be sampled range wide risk duplication of effort. The applicant (and any others proposing similar sampling) should provide specificity in where they will sample and the geographic and demographic parameters that will be examined.			INA SAM

Submission No.	CommentNumber 25	Database Reference ID 291	ISSUES
This permit alone proposes to collect, sample and potentially brand 1,100 pups (50 per rookery) aged 5 days to 2 months; up to 120 juveniles aged 2 months through 3 years; and 60 juveniles and adults over aged 3. Considering the power analysis that was done by Dr. Horning, the number being sampled seems excessive.			SAM

Submission No.	CommentNumber 5	Database Reference ID 316	ISSUES
The various applicants propose to brand more than 800 animals – they propose over 3,000. This seems excessive for the degree of precision needed based on Horning's analysis.			BRD SAM

Submission No.	CommentNumber 6	Database Reference ID 317	ISSUES
The NMFS should prepare an EIS with a power analysis to determine sample sizes, and consider a range-wide research design that would assure that an excessive number of animals is not branded, and that re-sighting effort is uniform to assure precision in estimates.			NEP SAM

Submission No.	CommentNumber 26	Database Reference ID 169	ISSUES
...a lack of integrated research, poor coordination of existing research projects, as well as serious limitations in experimental protocols, sample sizes, and statistical power to detect effects.			COR SAM

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Reporting requirements

Submission No.	CommentNumber	Database Reference ID	ISSUES
	15	326	
According to the EA, less than 10 mortalities were reported each year (p. 40). Despite this, researchers are seeking an increase in the number of incidental mortalities. Either they do not need this permission, or they were not reporting mortalities that occurred under their currently permitted activities and are in violation of the ESA and their permit conditions.			ESA REP
	27	293	
...there are apparent discrepancies in the mortalities that this applicant reports. Discrepancies of this sort call into question the accuracy of the reportand and thus the impacts on these ESA listed stocks.			EDI REP
	28	220	
The EIS can also examine permittees who have a history of frequent amendments and assess whether, or how, data gathered before or after the amendments were used or accounted for in published reports.			NEP REP

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Permits

Submission No.	CommentNumber	Database Reference ID	ISSUES
	38	58	
The list of sampling activities does not include branding. It would be useful if the applicant would clarify whether these animals would be branded prior to release.			PER

Submission No.	CommentNumber	Database Reference ID	ISSUES
	13	140	
No permit should be modified until and unless the permittee demonstrates that the modification will not invalidate results from previous or ongoing studies.			PER

Submission No.	CommentNumber	Database Reference ID	ISSUES
	9	136	
...permits should not be issued for Alaska-wide research until and unless there is a written plan indicating how multiple permittees will coordinate their studies and ensure that that research will cover appropriate times, area, and demographic classes, and is not duplicative.			COR DUP PER

Submission No.	CommentNumber	Database Reference ID	ISSUES
	5	132	
Applicants should have to specify how their research will address the critical need and why their chosen methodology is more appropriate if there are other less intrusive approaches to addressing the question.			PER

Submission No.	CommentNumber	Database Reference ID	ISSUES
	2	129	
The proposed action would grant permits to conduct research determined to be critical to the conservation of Steller Sea Lions and Fur Seals, and permit lower priority only if there is no adverse impact.			PER

Submission No.	CommentNumber	Database Reference ID	ISSUES
	3	127	
right now the same items are being researched over and over and over and permits are granted for them each time.			PER

Submission No.	CommentNumber	Database Reference ID	ISSUES
	6	124	
It is important that NMFS consider the interests of co-management organizations and the likelihood that they will require research permits to carry out mandated research programs under their respective co-management agreements.			PER

Permits

Submission No.	CommentNumber	80	Database Reference ID	100	ISSUES
It is not clear that all of the planned research is essential, and that the potential merits outweigh the cumulative or combined risks.					MET PER

Submission No.	CommentNumber	77	Database Reference ID	97	ISSUES
· as appropriate, the applicants obtain the necessary permits under the Convention of International Trade in Endangered Species of Wild Fauna and Flora prior to importing or exporting tissue samples into or from the United States.					PER

Submission No.	CommentNumber	76	Database Reference ID	96	ISSUES
· the Service ensure that activities to be conducted under these permits and those of other permit holders who might be carrying out research on the same species in the same areas are coordinated and, as possible, data are shared to avoid unnecessary duplication of research and disturbance of animals; and					COR PER

Submission No.	CommentNumber	75	Database Reference ID	95	ISSUES
· the proposed studies have been reviewed by the permittee's Institutional Animal Care and Use Committees in accordance with § 2.31 of the Animal and Plant Health Inspection Service's regulations governing the humane handling, care, treatment, and transportation of marine mammals;					PER

Submission No.	CommentNumber	57	Database Reference ID	77	ISSUES
...the number of accidental mortalities requested in the permit applications does not appear to be consistent with the finding of no significant adverse impact.					MOR PER

Submission No.	CommentNumber	46	Database Reference ID	66	ISSUES
...the applications do not describe how the animals would be selected and it is therefore not possible to determine if the sampling scheme is adequate to allow reliable interpretation of results.					PER SAM

Submission No.	CommentNumber	11	Database Reference ID	31	ISSUES
It is unclear whether the research activities and associated taking proposed in the applicant's Alaska SeaLife Center's 2001 Steller Sea Lion Research Plan have been included in the take table on page 4 of the application.					INA PER

Permits

Submission No.	CommentNumber	Database Reference ID	ISSUES
	39	59	
· what is the minimum age at which pups may be captured? · what are the weights of the transmitter devices that will be implanted in juvenile animals and the animals themselves? how does one determine the maximum size (dimensions, size) of instruments that can be implanted safely into the animals? · what precisely will be done in terms of "re-evaluating the process" (as noted on page 44 of the application) if more than three captive animals are deemed to be non-releasable within the period of one year? and · under what circumstances would animals deemed non-releasable be euthanized?			MET PER
	8	151	
There are specific research proposals (such as the capture and long-term retention of wild animals as proposed by ASLC for surgical implantation of devices) that should not be permitted as described.			PER
	37	57	
This section again refers to injections of adrenocorticotropic hormone to "challenge" juveniles. The purpose and utility of such tests are not clear, and the applicant should provide a rationale and research protocol for them; and			INA MET PER
	36	56	
If information exists that demonstrates that tooth size and wear patterns can be used to determine if an animal is weaned, the applicant should be asked to provide or reference such information. If such information is not available, then the applicant should recognize this and be prepared to handle some animals that may not yet be weaned.			MET PER
	35	55	
(page 41). Task 2. The application does not include branding in the list of requested take activities, and it is not clear if these animals would be branded.			BRD PER TAK
	34	54	
(page 36) End of first paragraph. The application states that "An emergency kit... should be readily available." (Emphasis added). An emergency kit should be required if this activity is permitted.			PER
	33	53	
(page 33) Task 3.3. Table 1 includes an entry pertaining to adrenocorticotropic hormone challenge. This activity is not further explained and no rationale for such a study is provided. Thus, it is not clear why it is included here, how it might contribute to recovery efforts for Steller sea lions, or why permission for this activity is being requested. Such information should be provided before authorization of this activity is considered.			CON PER

Permits

Submission No.	CommentNumber	Database Reference ID	Comment	ISSUES
	31	51	...it is not clear how the applicant determined that the total number of disturbed animals would be only 2,100, unless they are assuming that multiple captures would result in the incidental disturbance of the same animals at the same time.	INA PER
	29	49	It is not clear if the applicants are providing these as examples of activities that could conceivably be attempted using a blind or whether they are requesting permission to conduct these activities.	INA PER
	27	47	...the applicant does not, but should, provide an estimate of the length of time that animals may be anesthetized. The applicant should also be asked to describe any potential consequences of repeatedly anesthetizing animals (i.e., on a weekly basis).	INA PER
	22	42	Clarification should be requested as to the minimum age and size of pups that will be hot-branded.	BRD INA PER
	17	37	...attempts to take biopsies by shooting darts at these targets pose an unacceptable risk of striking an animal in the head and causing serious injury.	EFF PER
	14	34	However, it is not clear that the research design is sufficient to test this hypothesis and to characterize any differences in the use of forage fish by sea lions in the two populations.	INA MIT PER
	12	32	Further, the table makes no reference to the use of location-only satellite-linked transmitters as is indicated in the text of the application. Clarification of these points should be provided by the applicant.	INA PER
	41	61	The permit applications under review often do not provide sufficient information on their research sampling design and thus it is not always possible to determine if they will meet their stated objectives.	PER
	4	270	The applicant proposes that up to one Steller sea lion out of 12 may die as a result of the procedures. This is a fatality rate well in excess of most other researchers and should be, but is not, explained.	MOR PER

Permits

Submission No.	CommentNumber		Database Reference ID		ISSUES
	CommentNumber	2	Database Reference ID	371	ISSUES
How big of an amendment to a permit is okay and could be processed?					PER
Submission No.	CommentNumber	1	Database Reference ID	368	ISSUES
How much is dealing with grants and permits already issued? Are there grants and permits that are affected by this EIS?					PER
Submission No.	CommentNumber	2	Database Reference ID	367	ISSUES
What is going on with pending permits or modifications for SSLs?					PER
Submission No.	CommentNumber	35	Database Reference ID	301	ISSUES
Approval for invasive studies by this applicant should be suspended until NMFS can conduct a more comprehensive evaluation of range-wide research, its contribution to specific recovery plan needs and compliance with requirements of NEPA, the ESA, MMPA and Animal Welfare Act.					ESA MMP NEP PER WEL
Submission No.	CommentNumber	30	Database Reference ID	296	ISSUES
...the applicant proposes on page 3 of the December 7, 2003 amendment request to extract teeth from 80 adult females to allow age determination, although stating in the same paragraph that "prominent agencies such as ADFG and NMML" recognized "that these methods are inaccurate for older animals." If this is the case, then why is the applicant requesting permission for this invasive activity and why would NMFS grant it?					MET PER
Submission No.	CommentNumber	19	Database Reference ID	285	ISSUES
...Page 11 of this proposal that "although not a necessary part of our research, we will hot brand our animals at the request of the permit office." This indicates that researchers do not necessarily desire to hot brand animals, but are being required to do so by the permit office. Can NMFS explain this?					BRD PER
Submission No.	CommentNumber	18	Database Reference ID	284	ISSUES
Dr. Davis states that animals may need to be re-captured up to three times to attach and remove instrumentation to replace batteries and video tape. There is no provision a risk-benefit analysis such that the increased risk of repeated capture and anesthesia in a space of a few weeks is balanced against the value of data obtained by the video camera.					MET PER
Submission No.	CommentNumber	11	Database Reference ID	277	ISSUES
Hot branding has been conducted for three decades, with varying levels of success and mortality... Thus it would appear that this sort of study is unnecessary.					BRD PER

Permits

Submission No.	CommentNumber	Database Reference ID	ISSUES
	10	276	

The HSUS questions the conservation benefit of this proposal to the conservation needs of threatened eastern stock Steller sea lions.
...given the ESA and MMPA prohibition against stressful and invasive research that is not intended to address conservation and recovery goals.
Thus, this permit should be denied.

CON
PER

Submission No.	CommentNumber	Database Reference ID	ISSUES
	9	275	

Though the applicant requests permission to capture and sample and/or brand 12 Steller sea lions, they have no basis other than wild guessing as to the reason for this number. When asked by NMFS (3/12/05 cover) to justify this number, Harriet Huber of NMML stated that it was determined "arbitrarily—in 2003 we had funding to instrument up to six SSL." When questioned about the need to remotely tag 3 Steller sea lions and not more or less, she responded "[it] was arbitrarily chosen." This is inappropriate.

MET
PER

Submission No.	CommentNumber	Database Reference ID	ISSUES
	8	274	

The applicant proposes to clip vibrissae instead, some thing that other research discount as reliable. While clipping is less invasive, if it cannot reliably answer the question being posed, then it should not be done. The NMFS should determine whether the desired information can be collected in a manner other than that proposed by the applicant.

MET
PER

Submission No.	CommentNumber	Database Reference ID	ISSUES
	7	273	

The applicant also states that although it will only take 20 minutes to "sample" each sea lion, they will be held for up to 3 hours "while other animals are being processed." This level of stress seems excessive and unnecessary.

MET
PER

Submission No.	CommentNumber	Database Reference ID	ISSUES
	14	141	

NMFS should neither issue nor modify permits that other agencies, such as APHIS, the Animal Plant Health Inspection Service, has recommended for denial.

PER

Submission No.	CommentNumber	Database Reference ID	ISSUES
	5	271	

The applicant proposes that no anesthesia will be used and that "squeeze cages" will suffice to restrain animals sufficiently to achieve a readable brand. This appears to disregard humane considerations.

MET
PER

Submission No.	CommentNumber	Database Reference ID	ISSUES
	15	142	

Permittees who do not comply with permit conditions, such as timely submission of reports, should have permits suspended.

PER

Submission No.	CommentNumber	Database Reference ID	ISSUES
	26	265	

...it is imperative that the NMFS give serious consideration to denying all or part of the two permits which appear to impose unacceptable levels of inhumane treatment or/and mortality risk.

PER

Permits

Submission No.	CommentNumber 24	Database Reference ID 263	ISSUES
The HSUS notes that the applicant requests 8 mortalities per year (p. 33), whereas the chart on p. 69 states that they are only requesting 5 accidental mortalities. It is not clear that these mortalities are warranted, particularly the 3 that are reserved for animals captured and held at the ASLC. This represents a 3-month death rate of 18%, which is unacceptably high for animals in a captive facility. This level is far from humane and far from negligible for the number in captivity. This portion of the permit should be denied.			EDI MOR PER

Submission No.	CommentNumber 19	Database Reference ID 258	ISSUES
It is not entirely clear why Dr. Davis, who is receiving funding from two other permit applicants (NMFS and ASLC) cannot conduct his activities under the auspices of their permits rather than seeking separate take authorizations. Effort should be made to avoid duplicative sampling or harassment wherever possible.			DUP PER

Submission No.	CommentNumber 14	Database Reference ID 253	ISSUES
Clearly this level of harassment and mortality does not meet the conditions specified for issuance of permits under the MMPA to assure that impacts will not have a significant impact. On that basis, all of the permits cannot be granted.			MMP PER

Submission No.	CommentNumber 12	Database Reference ID 251	ISSUES
...discrepancies between numbers in the various permit applications and numbers in summary charts, complicates understanding the true impact of these applications.			PER

Submission No.	CommentNumber 37	Database Reference ID 229	ISSUES
...we believe that NMFS should give serious consideration to the suspension of intrusive research until there is clearly adequate study of already marked animals and a thorough analysis of existing samples. Only after it is clear that there are deficiencies in the available data would the agency permit additional intrusive studies.			PER

Submission No.	CommentNumber 36	Database Reference ID 228	ISSUES
If they propose to do invasive sampling or marking, they should justify why their chosen methodologies are more appropriate than other less intrusive measures or approaches to addressing the question. This specifically will also aid the NMFS in its efforts to coordinate research and assure minimal effect.			COR PER

Submission No.	CommentNumber 35	Database Reference ID 227	ISSUES
Applicants should have to justify quite specifically how their research will address the critical need.			PER

Submission No.	CommentNumber 30	Database Reference ID 222	ISSUES
The EIS should also examine the number of instances in which permits were granted or amended without the permittee having fulfilled requirements of previous permits for timely submission of annual and final reports and/or reports of mortalities.			NEP PER

Permits

Submission No.	CommentNumber	29	Database Reference ID	221	ISSUES
The EIS should examine how NMFS should reconcile situations in which granting a permit or amendment would be counter to recommendations from other management agencies.					NEP PER
Submission No.	CommentNumber	27	Database Reference ID	219	ISSUES
No permit should be modified until and unless the permittee can clearly demonstrate in writing why the modification will not bring into question the validity of results from previous on-going studies.					PER
Submission No.	CommentNumber	2	Database Reference ID	194	ISSUES
NMFS has granted the multiple proposals without any apparent regard to how they fit together to illuminate key questions. Previous permit applications show little evidence of a coordinated approach to sampling. Permits have been issued for "Alaska wide" activities to multiple permittees with no plan for coordination. This sort of approach can lead to some areas being over sampled and some areas receiving no sampling, with no justification provided for the geographic structure of sampling.					COR PER
Submission No.	CommentNumber	1	Database Reference ID	372	ISSUES
What is the status of northern fur seal permits?					PER
Submission No.	CommentNumber	6	Database Reference ID	272	ISSUES
There is no apparent justification for subjecting animals to the pain stress of hot branding, tissue sampling and application of invasive instrumentation with no anesthesia.					INA PER

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Potential Biological Removal

Submission No.	CommentNumber 27	Database Reference ID 338	ISSUES
...the combined incidental lethal take that is requested by the applicants, when added to the native harvest and fisheries-related mortality is in excess of the PBR for the western Steller sea lions. This squarely refutes the earlier NMFS finding of no significant impact and, further, shows that the additive effort of this research on the stock could contribute to its decline. In this situation, an EIS is warranted and anything less in unlawful.			NEP PBR

Submission No.	CommentNumber 14	Database Reference ID 325	ISSUES
The cumulative research-related incidental mortality could exceed the PBR for the stock when added to other anthropogenic mortality and is clearly a significant impact. This endangered stock is already subjected to cumulative mortality that is arguably unsustainable, given its on-going decline. The request for research-related incidental mortality is well above a level that the ESA would consider "negligible."			CUM PBR

Submission No.	CommentNumber 13	Database Reference ID 252	ISSUES
If scientific permit-related mortalities in the Western stock reach 10 (the number that merely triggers consultation), then the entire PBR will have been exceeded by all sources. This is unacceptable.			PBR

Submission No.	CommentNumber 5	Database Reference ID 244	ISSUES
If more than 10 animals from the western stock were killed, then NMFS would require researches to consult on how to reduce mortality so that it does not exceed 20 animals, which is 10% of the PBR of 208. It is not clear from the EA whether such an assessment will be time-sensitive or whether consultation can take place before the number is exceeded when it appears that a monitoring plan is not currently in place.			INA PBR

Submission No.	CommentNumber 59	Database Reference ID 79	ISSUES
...known human-related take would be about twice the potential biological removal level. It is not clear how such a level can be considered insignificant.			PBR TAK

Submission No.	CommentNumber 58	Database Reference ID 78	ISSUES
...the environmental assessment determined that this minimum number would not constitute a significant adverse impact, it did so partly on the basis of comparisons with the species' potential biological removal level, which is one standard used to characterize a species' or stock's tolerance for human-related mortality.			NEP PBR

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National Marine Mammal Laboratory

Submission No.	CommentNumber 1	Database Reference ID 366	ISSUES
What is the role of the National Marine Mammal Laboratory (NMML) – are they considered the public or an agency? How should NMML be involved in this project?			NMM

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National Environmental Policy Act

Submission No.	CommentNumber	Database Reference ID	ISSUES
	1	180	
Please describe whether other agencies in tribal govts were sought out to be cooperating agencies.			NEP
	2	2	
The EIS be completed before any further research permits are issued.			NEP
	3	146	
Other proposed projects entail the use of techniques or experimental procedures whose efficacy is not demonstrated in this EA.			NEP
	12	155	
...EA analysis is not adequate to distinguish between projects that merit permitting and those that are unnecessary, duplicative, inhumane or in violation of other established permitting criteria.			NEP
	13	156	
...analysis of the various research activities is being piecemealed, rather than considered in a single NEPA document.			COR NEP
	14	157	
The direct, indirect and cumulative effects of all research activities should be analyzed in a single NEPA document.			CUM NEP
	17	160	
...we have specific concerns about the proposed research program that have not been adequately address in this EA.			NEP
	19	162	
...the proposed action does not appear to provide NMFS the flexibility to deny permits for individual projects or procedures of this type, or to suspend a permit if further review shows that action results in unnecessary or unacceptable impacts.			NEP

National Environmental Policy Act

Submission No.	CommentNumber	Database Reference ID	ISSUES
	21	164	
...the cursory EA discussion of the effects of flipper tagging (pp. 51, 53-54) barely acknowledges that physical wounds and infections may result, much less that there is a risk of increased predation on test subjects.			NEP

Submission No.	CommentNumber	Database Reference ID	ISSUES
	31	174	
The EA should have addressed these concerns and evaluated the degree to which proposed action will or will not remedy the limitations and shortcomings identified by peer reviewers of the existing research program.			NEP

Submission No.	CommentNumber	Database Reference ID	ISSUES
	32	175	
As a matter of NEPA process, we are quite concerned that NMFS issued the Final EA and signed the FONSI on this project without any involvement by the public.			NEP

Submission No.	CommentNumber	Database Reference ID	ISSUES
	11	138	
Research and methodology should be evaluated as to how effective they are in providing key information with minimal adverse effects, and how they can be used in combination with each other.			MET NEP

Submission No.	CommentNumber	Database Reference ID	ISSUES
	36	179	
The EA fails to demonstrate that all the projects and procedures in the proposed action are essential and will accomplish the stated research objectives, as currently designed.			NEP

Submission No.	CommentNumber	Database Reference ID	ISSUES
	10	137	
The EIS should evaluate all of the most common methods of providing insight into important food habits.			MET NEP

Submission No.	CommentNumber	Database Reference ID	ISSUES
	2	181	
The EIS should describe the potential impacts to recovery of the species from the proposed actions.			EFF NEP

Submission No.	CommentNumber	Database Reference ID	ISSUES
	3	182	
The EIS should describe an appropriate No Action Alternative as defined in CEQ guidance			ALT NEP

Submission No.	CommentNumber	Database Reference ID	ISSUES
	4	183	
The EIS should describe whether modifications to permits/grants will be subject to NEPA compliance. What level of NEPA compliance will be done for permit/grant modifications?			NEP

National Environmental Policy Act

Submission No.	CommentNumber	Database Reference ID	ISSUES
	5	184	
Chapter 1 should discuss how the EIS will be used to fulfill NEPA compliance responsibilities for not only the grant and permit program, but also the individual permit and grant actions under the program.			NEP
	6	185	
Why was this document not called a Programmatic EIS if in fact it is analyzing the grant and permit programs as a whole and deciding upon appropriate program direction?			NEP
	7	186	
The EIS should assess the potential impacts to the predator & prey species potentially affected by the proposed actions for research permit & grant actions.			NEP
	8	187	
The EIS should describe the potential mitigation measures, if any, that should be implemented as part of the proposed actions. If mitigation measures are feasible, then the EIS should stipulate whether a portion of grant funds will be used to pay for that mitigation.			MIT NEP
	9	188	
...the EIS should discuss how information from the permit applicant or grantee will be used for further NEPA documentation. Will NMFS require permit/grant applicants to submit environmental information or prepare Environmental Assessments?			NEP
	13	192	
The EIS should contain an EJ analysis assessing the potential to disproportionately affect EJ communities.			AKN NEP
	1	193	
While The HSUS commends the National Marine Fisheries Service (NMFS) for undertaking the analysis necessary to prepare an Environmental Impact Statement (EIS), we must point out that this process should be undertaken prior to issuance of permits rather than after the fact, as is the case for Steller sea lion research.			NEP
	33	176	
Accordingly, we urge NMFS to withdraw the FONSI and to issue a revised EA or EIS that takes into account the comments received on this document.			NEP

National Environmental Policy Act

Submission No.	CommentNumber		Database Reference ID		ISSUES
	CommentNumber	66	Database Reference ID	86	ISSUES
...Service reconsider the finding of no significant impact set forth in the environmental assessment and either (1) do a better job of explaining its rationale for such a finding, (2) scale back those research projects that have the highest potential to result in sea lion mortalities and other adverse impacts such that a finding of no significant impact is more defensible, or (3) prepare an environmental impact statement on the proposed action.					NEP
Submission No.	CommentNumber	3	Database Reference ID	3	ISSUES
· The EIS include an evaluation of what demographic classes and in what geographic areas research is most needed and most likely to provide meaningful information that will aid in the recovery of the species.					NEP
Submission No.	CommentNumber	5	Database Reference ID	5	ISSUES
· The EIS evaluate the special vulnerability of pups to capture and sampling techniques.					NEP
Submission No.	CommentNumber	6	Database Reference ID	6	ISSUES
· The EIS evaluate the short, intermediate, and long-term impacts of capture and sampling techniques on the welfare and survival of individual animals.					NEP
Submission No.	CommentNumber	7	Database Reference ID	7	ISSUES
· Finally, that the humaneness of the techniques used are critically evaluated. Hot iron branding, for example, should be prohibited. Limited time, money, energy, and motivation are not excuses for using painful and harmful techniques on animals when alternatives are available or can be developed.					BRD MET NEP
Submission No.	CommentNumber	2	Database Reference ID	9	ISSUES
Firstly, we question why the National Environmental Policy Act was not followed prior to the issuance of the eight permits. Secondly, there should be an immediate cessation of all research subject to the permits and the EIS should be completed prior to allowing further invasive studies.					NEP
Submission No.	CommentNumber	3	Database Reference ID	10	ISSUES
The EIS should include a thorough evaluation of the purpose and need for the research. This evaluation should include an analysis of previous research studies on Steller sea lions and a comparison with the planned research.					NEP
Submission No.	CommentNumber	5	Database Reference ID	12	ISSUES
The EIS should review the feasibility of employing alternative research techniques that will produce comparable results to those presented and subject to the EIS. These alternative techniques should include those that are not invasive, painful or life-threatening. Such techniques may include scat analysis, hair sampling, body condition evaluation and non-invasive scanning imaging.					MET NEP

National Environmental Policy Act

Submission No.	CommentNumber	Database Reference ID	ISSUES
	6	20	
There appears to be a lower standard for permitting research on Steller sea lions than on other endangered species. We urge NMFS to not allow this research to move forward until a thorough EIS is complete that addresses the above questions.			NEP
	2	16	
The EIS must address the costs and benefits of this research to the population.			NEP
	1	15	
First, permits for invasive research should not be issued before an EIS is prepared. Doing so violates the purpose of an EIS. The proposed research should certainly not go forward until an appropriate EIS outlining the need for this research and the possible consequences have been completed.			NEP
	16	143	
...the EIS should discuss the need for appropriate ecosystem research that may not depend on synoptic and intrusive research directed at a single species or two species.			NEP
	62	82	
Therefore, the cumulative effects analysis is incomplete and, in the absence of such an analysis, the conclusion of no significant adverse impact seems unfounded.			CUM NEP
	7	199	
...the EIS should pay special attention to the particular vulnerability of pups and young animals to the impacts of intrusive procedures and branding.			BRD NEP
	5	107	
Defenders agrees with comments submitted by the Humane Society of the United States (HSUS) that "before any further permits, extensions or amendments are granted, that NMFS should prepare an in-depth Environmental Impact Statement (EIS) similar to that being proposed for research on North Atlantic right whales (Eubalaena glacialis) in the Northeast.			NEP
	6	108	
Defenders urges that the NMFS defer final action on the permits, permit extensions or permit modifications until such time as you have completed an EIS that fully evaluates the individual and cumulative impacts of the proposed research and weighs its contribution to cumulative effects on the stocks from multiple factors discussed previously. Only that research which is clearly non-duplicative and addresses compelling conservation needs should be permitted. This degree of analysis is required under both the ESA and the MMPA and is lacking at this time.			CUM ESA MMP NEP

National Environmental Policy Act

Submission No.	CommentNumber 3	Database Reference ID 121	ISSUES
WWF strongly urges the NMFS to carefully consider the need for dedicated support of long-term research in the EIS process. In particular, the balance between the ability of agency and university research programs to maintain consistent research protocols and field efforts should be carefully analyzed.			MET NEP

Submission No.	CommentNumber 4	Database Reference ID 122	ISSUES
WWF also recommends that the socio-economic analysis associated with this EIS process consider the conditions set forth in the 2005 Marine Stewardship Council certification of the Bering Sea and Aleutian Islands Pollock fishery.			NEP

Submission No.	CommentNumber 5	Database Reference ID 123	ISSUES
Finally, WWF also strongly urges NMFS to consider the implications of the EIS review of the permitting and grant process on the development of long-term research programs by the Pribilof Island communities.			NEP

Submission No.	CommentNumber 1	Database Reference ID 128	ISSUES
...the agency believes that this process should have been undertaken prior to issuing permits to conduct intrusive research on Steller Sea Lions.			NEP

Submission No.	CommentNumber 3	Database Reference ID 130	ISSUES
...the EIS should address how NMFS will identify which questions are, indeed, the most critical.			NEP

Submission No.	CommentNumber 4	Database Reference ID 131	ISSUES
NMFS should identify and prioritize the most critical needs prior to granting the permits.			NEP

Submission No.	CommentNumber 6	Database Reference ID 133	ISSUES
...the EIS should identify the level of research that is appropriate and the appropriate demographic classes and temporal and spatial bounds for research to address those questions.			MET NEP

Submission No.	CommentNumber 7	Database Reference ID 134	ISSUES
A power analysis for particular research questions and/or methodologies should be done before granting permits for invasive research and sampling.			MET NEP

National Environmental Policy Act

Submission No.	CommentNumber 58	Database Reference ID 78	ISSUES
...the environmental assessment determined that this minimum number would not constitute a significant adverse impact, it did so partly on the basis of comparisons with the species' potential biological removal level, which is one standard used to characterize a species' or stock's tolerance for human-related mortality.			NEP PBR

Submission No.	CommentNumber 32	Database Reference ID 343	ISSUES
Clearly permitting these activities was a significant increase over the status quo and should have triggered construction of an EIS and consultation under the Endangered Species Act. Instead, NMFS ignored this obligation and now seeks to allow an even greater impact on the stocks.			ESA NEP

Submission No.	CommentNumber 2	Database Reference ID 268	ISSUES
...we believe that this and all other permit applications seeking takes for invasive/intrusive activities should be held in abeyance pending a thorough EIS, a consultation under Section 7 and an analysis of the scope and demographic and geographic parameters that need to be studied, the best techniques for answering key questions and a power analysis of the numbers of animals minimally necessary for invasive/intrusive studies.			ESA MET NEP

Submission No.	CommentNumber 26	Database Reference ID 292	ISSUES
As we have previously stated, we believe that this and all other permit applications seeking takes for invasive/intrusive activities should be held in abeyance pending a through EIS, a consultation under Section 7 and an analysis of the scope and demographic and geographic parameters that need to be studied, the best techniques for answering key questions and a power analysis of the numbers of animals minimally necessary for invasive/intrusive studies.			ESA MET NEP

Submission No.	CommentNumber 35	Database Reference ID 301	ISSUES
Approval for invasive studies by this applicant should be suspended until NMFS can conduct a more comprehensive evaluation of range-wide research, its contribution to specific recovery plan needs and compliance with requirements of NEPA, the ESA, MMPA and Animal Welfare Act.			ESA MMP NEP PER WEL

Submission No.	CommentNumber 36	Database Reference ID 302	ISSUES
The information and analysis provided by NMFS so far entirely fails to demonstrate that these permits can be issued without violating NEPA, the ESA and the MMPA.			ESA MMP NEP

Submission No.	CommentNumber 38	Database Reference ID 304	ISSUES
Accordingly, the HSUS must insist that the NMFS not issue any permits, permit extensions or permit modifications involving invasive research until such time as you have completed an Environmental Impact Statement that fully evaluates the individual and cumulative impacts of the proposed research and weighs its contribution to cumulative effects on the stocks from combined mortality and serious injury resulting from fisheries-related mortality and native harvest. The quality of analysis required by NEPA and by both the ESA and the MMPA is simply lacking at this time. Furthermore, we believe that NMFS has an obligation to consult under Section 7 of the ESA on the impacts that this activity will have on the western stock of Steller sea lions, particularly with regard to the additive effects of these permits along with those of native harvest mortality and incidental fisheries-related mortality.			CUM ESA MMP NEP

National Environmental Policy Act

Submission No.	CommentNumber 40	Database Reference ID 306	ISSUES
The HSUS cannot countenance the conduct of research that will not clearly contribute to the conservation of the species or is inhumane to the individual animals that are affected. Accordingly, should NMFS issue the proposed permits, The HSUS will have no choice but to consider all methods, including legal action, to ensure that NMFS adheres to the requirements of federal laws and regulations before authorizing scientific research on endangered and threatened species of marine mammals.			CON NEP

Submission No.	CommentNumber 1	Database Reference ID 312	ISSUES
The HSUS strongly opposes issuance of these permits at this time. We find that the National Marine Fisheries Service (NMFS) has not satisfied the requirements of the National Environmental Policy Act, nor has it met its obligations under the Endangered Species Act (ESA) and the Marine Mammal Protection Act (MMPA). Because the western stock of Steller sea lions is endangered and declining in numbers, NMFS must demonstrate that the permits are non-duplicative, unlikely to adversely affect the stock, and in service of a significant gain in conservation of the species.			ESA MMP NEP

Submission No.	CommentNumber 2	Database Reference ID 313	ISSUES
Many of the research projects involve the use of invasive studies and physical handling of animals that subjects them to risk of severe injury and death and appear likely to disadvantage the western stock of Steller sea lions. ...the HSUS believes that the NMFS cannot issue the requested permits without violating the requirements of NEPA, the MMPA and the ESA.			EFF ESA MMP NEP

Submission No.	CommentNumber 6	Database Reference ID 317	ISSUES
The NMFS should prepare an EIS with a power analysis to determine sample sizes, and consider a range-wide research design that would assure that an excessive number of animals is not branded, and that re-sighting effort is uniform to assure precision in estimates.			NEP SAM

Submission No.	CommentNumber 8	Database Reference ID 319	ISSUES
...the EA states (p. 39) that "[t]here have been no recent studies dedicated to documenting and assessing the effects of research on Steller sea lions or other marine mammals at a population level, nor on the synergistic or cumulative effects of various research activities and other human-related impacts on individual marine mammals or populations." Yet NMFS asserts that the proposed research will not likely have adverse effects. This contention appears unsupported.			CUM NEP

Submission No.	CommentNumber 5	Database Reference ID 197	ISSUES
...NMFS, either in collaborations between the protected resources division and the endangered species division or, under the auspices of this EIS, should identify the priorities for research for these species.			NEP

Submission No.	CommentNumber 31	Database Reference ID 342	ISSUES
No permits for invasive studies should be issued or renewed until such time as the NMFS has completed an adequate environmental review and can meet the legal requirement that they serve conservation goals for the species without an adverse impact on the stock. To that end, before any further permits, extensions, or amendments are granted, the NMFS should prepare an in-depth Environmental Impact Statement (ESI) similar to that being proposed for research on North Atlantic right whales (Eubalaena glacialis) in the Northeast.			NEP

National Environmental Policy Act

Submission No.	CommentNumber 41	Database Reference ID 233	ISSUES
We note that and environmental impact statement conducted pursuant to authorizing native subsistence hunting of fur seals found that there are "conditionally significant adverse cumulative effect[s]" from commercial fisheries and native subsistence hatvest. (NMFS 2005) Because of this, it is important that the EIS weigh potential impacts of capture and intrusive research quite carefully.			CUM NEP

Submission No.	CommentNumber 38	Database Reference ID 349	ISSUES
If NMFS has information on the number of animals from each stock that may have died as a result of proposed activities, or even similar information on mortality and morbidity from other species of sea lions that could elucidate mortality levels, it should be provided to reviewers in summary fashion so that a more thorough evaluation of potential impacts from various procedures and among the various applicants can be made.			MOR NEP

Submission No.	CommentNumber 43	Database Reference ID 354	ISSUES
Instead of providing assurance that the intrusive procedures that are proposed are necessary and proportional to the questions that need to be addressed, the NMFS has simply passed along each proposal ad hoc, with no attempt in the EA to address the necessity or scope of the research proposals or to assess cumulative effects on mortality and morbidity of individuals and any consequent range-wide or localized population level effects.			CUM MET NEP

Submission No.	CommentNumber 45	Database Reference ID 356	ISSUES
The MMPA stipulates that research cannot result in the lethal take of a depleted stock unless the research fulfills a critically important research need. [12 U.S.C. 1374 (c)(3)(B)] As we have discussed above, the NMFS has never undertaken a review of the most efficacious means of answering the critical questions nor the number of animals minimally necessary to do so. Without such a review it cannot assure that all of the incidental lethal takes that will be authorized are in service of important conservation needs.			MMP NEP

Submission No.	CommentNumber 46	Database Reference ID 357	ISSUES
The MMPA also requires NMFS to consult with the Marine Mammal Commission. Because its previous consultations with the Commission yielded critical comments (see Appendix A of EA), that questioned the need for some of the research permits and the scope of the activities, we believe that NMFS has erred in its assertion that the research is justified.			MMP NEP

Submission No.	CommentNumber 52	Database Reference ID 363	ISSUES
These sorts of experiments on lactating females and newly born pups seem risky, and both legally and ethically questionable.			MET NEP

Submission No.	CommentNumber 2	Database Reference ID 369	ISSUES
The SSL Recovery Plan Team meeting is scheduled for March 15-17. This would be valuable information to have for the workshop.			NEP

National Environmental Policy Act

Submission No.	CommentNumber	2	Database Reference ID	373	ISSUES
Who has been contacted regarding this project? What is the schedule for scoping?					NEP
Submission No.	CommentNumber	3	Database Reference ID	374	ISSUES
It will be important to involve NOAA GC in this project, especially for review of project alternatives. Is there a conflict of interest because NMML would help with this process but are also researchers seeking permits?					NEP
Submission No.	CommentNumber	3	Database Reference ID	375	ISSUES
The MMC does not plan to draft separate comments for this comment period. Please consider our comments submitted on the Permits EA and other recent comments regarding this topic our formal submittal for the pubic scoping period of this EIS.					NEP
Submission No.	CommentNumber	1	Database Reference ID	376	ISSUES
Is the workshop more for comments on the process?					NEP
Submission No.	CommentNumber	27	Database Reference ID	338	ISSUES
...the combined incidental lethal take that is requested by the applicants, when added to the native harvest and fisheries-related mortality is in excess of the PBR for the western Steller sea lions. This squarely refutes the earlier NMFS finding of no significant impact and, further, shows that the additive effort of this research on the stock could contribute to its decline. In this situation, an EIS is warranted and anything less in unlawful.					NEP PBR
Submission No.	CommentNumber	22	Database Reference ID	214	ISSUES
...NMFS has stated that little is known about the effect of many procedures. These are vulnerable species, with two stocks in decline. If this more thorough evaluation finds little information on which to evaluate effects of various procedures, the EIS should state this clearly and recommend a means of remedying the situation before allowing procedures with unknown effects to proceed.					INA NEP
Submission No.	CommentNumber	1	Database Reference ID	377	ISSUES
Is the intent to develop strawman alternatives for the workshop to help focus the group?					NEP
Submission No.	CommentNumber	8	Database Reference ID	200	ISSUES
The EIS should also examine various methods of capturing animals for study and evaluate them with regard to how humane, risk averse or effective each may be.					MET NEP

National Environmental Policy Act

Submission No.	CommentNumber	Database Reference ID	ISSUES
	9	201	
The EIS should evaluate the various methods of marking, including their utility and impact on animals, and discuss which monitoring methodologies are likely to be most effective.			MET NEP
	10	202	
The EIS should discuss each the wide variety of research methods and protocols and rank them according to their utility, invasiveness or need for specialized training in their use.			MET NEP
	11	203	
The EIS should evaluate where, when, how or whether each of these can be used individually or in which effective combinations to illuminate the various aspects of the role in the decline played by resource limitation or nutritional stress.			MET NEP
	12	204	
Within the EIS, there should be discussion the synergistic effects of using a variety of sampling procedures on individuals.			CUM NEP
	14	206	
...the EIS should evaluate the types and amounts of procedures to which individuals of various demographic classes should be subjected without elevating the risk of serious injury or death.			MET NEP
	15	207	
The level of research must be evaluated in a manner that illuminates stratification of sampling. That is, in what demographic classes, areas or times is sampling most appropriate for the investigation of various hypotheses?			NEP SAM
	17	209	
The EIS should evaluate level of research in a manner that results in identifying, where possible, indicator sites that can be sampled in lieu of permitting projects throughout the entire range of the stock.			MET NEP
	18	210	
The EIS should also examine what research has been done to date and how that research can inform the need for additional research using certain techniques.			MET NEP
	47	239	
We believe that the EIS should discuss the need for appropriate ecosystem research that may not depend on synoptic and intrusive research directed at a single species or two species.			NEP

National Environmental Policy Act

Submission No.	CommentNumber	21	Database Reference ID	213	ISSUES
...the EIS should examine research conducted elsewhere on various pinniped species to ascertain effects. It is also important that the EIS evaluate the appropriateness of using less vulnerable surrogate species to test hypotheses regarding the short and long-term effects of a multiplicity of procedures used on Steller sea lions and used or proposed for use on fur seals.					CUM MET NEP

Submission No.	CommentNumber	42	Database Reference ID	234	ISSUES
NMFS should evaluate the degree to which data from fur seals killed by natives can provide information, without the need of additional invasive sampling.					NEP

Submission No.	CommentNumber	23	Database Reference ID	215	ISSUES
It is also critical that the EIS evaluate methodologies for post-handling monitoring of effects.					MON NEP

Submission No.	CommentNumber	24	Database Reference ID	216	ISSUES
The EIS should assess the need for the capture and temporary holding and testing of animals, and evaluate whether studies on already captive Steller sea lions or surrogate species might be substituted.					MET NEP

Submission No.	CommentNumber	25	Database Reference ID	217	ISSUES
The degree of supervision is not specified and the degree to which they will be performing intrusive, potentially injurious procedures is not clear, simply that their "qualifications and experience must be commensurate with his/her assigned responsibilities"... It would be helpful for the EIS to evaluate standards used in other species as well as for pinniped research in other species and/or areas.					CRE NEP

Submission No.	CommentNumber	28	Database Reference ID	220	ISSUES
The EIS can also examine permittees who have a history of frequent amendments and assess whether, or how, data gathered before or after the amendments were used or accounted for in published reports.					NEP REP

Submission No.	CommentNumber	29	Database Reference ID	221	ISSUES
The EIS should examine how NMFS should reconcile situations in which granting a permit or amendment would be counter to recommendations from other management agencies.					NEP PER

Submission No.	CommentNumber	30	Database Reference ID	222	ISSUES
The EIS should also examine the number of instances in which permits were granted or amended without the permittee having fulfilled requirements of previous permits for timely submission of annual and final reports and/or reports of mortalities.					NEP PER

National Environmental Policy Act

Submission No.	CommentNumber 33	Database Reference ID 225	ISSUES
Given its a priori proposal to eliminate most of the alternatives from consideration, and the impracticality or illegality of allowing virtually unlimited intrusive research on declining stocks, the NMFS has conveniently left itself with no viable alternative other than its proposed action. This defeats the purpose of the EIS.			ALT NEP

Submission No.	CommentNumber 34	Database Reference ID 226	ISSUES
...we believe the EIS should address how the NMFS will identify for each species which questions are indeed the most critical.			NEP

Submission No.	CommentNumber 39	Database Reference ID 231	ISSUES
If NMFS goes forward with analyzing its proposed action as it is currently written, we are concerned that we will see no improvement in the understanding of why there are declines, because it provides no assurance that there will be an analysis of research priorities and methodologies that is not self-interested.			NEP

Submission No.	CommentNumber 40	Database Reference ID 232	ISSUES
It is critical that this EIS re-examine the bases for the conclusions of these peer review panels and assess not only how individual procedures or research protocol can affect individuals and stocks, but also examine how basic flaws in research design such as those identified by the peer review panels of 1997-1999 may themselves impede understanding of research needs and impacts of research.			MET NEP

Submission No.	CommentNumber 6	Database Reference ID 198	ISSUES
Critiques and recommendation for the Steller sea lion research program were made by expert panels (NMFS 1997, NMFS 1999) that should be taken into consideration in the EIS process and allowed to inform the process of designing appropriate research programs.			NEP

Submission No.	CommentNumber 19	Database Reference ID 211	ISSUES
The EIS should consider the appropriateness of granting permits for smaller geographic areas or coordinating research of a particular type through a single permit as a means of assisting in coordination.			CRE NEP

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Mortality

Submission No.	CommentNumber	Database Reference ID	ISSUES
	35	178	
...some of this research will simply cause unnecessary disturbance and increase mortality on the endangered stock without contributing significantly to the conservation of Steller sea lions – a key consideration when determining whether or not to permit the proposed research activities:			EFF MOR
	13	33	
This would be a mortality rate of almost 30 percent of the animals handled, which, if it actually occurred, would be unacceptably high.			MOR
	26	46	
Finally, the applicant has not, but should, explain why such a high number of research-related mortalities (10) are needed on an annual basis.			MOR
	53	73	
The lack of information on incidental mortality also could confound research results and, if not accounted for, could undermine the ability of the projects to produce information that can be expected to contribute to the recovery and conservation of the Steller sea lion.			INA MOR
	57	77	
...the number of accidental mortalities requested in the permit applications does not appear to be consistent with the finding of no significant adverse impact.			MOR PER
	72	92	
surgical implantation of instruments be immediately suspended, until reauthorized by the Service, in the event that two animals die or are injured during or following the surgery and the mortality or injury can reasonably be attributed to that activity;			MOR

Mortality

Submission No.	CommentNumber	73	Database Reference ID	93	ISSUES
the Service, in consultation with the applicants, review the basis for the numbers of accidental mortalities requested and provide reasonable justification for the number that can occur annually before research activities must be suspended. It may be useful, as part of such review, to examine the data concerning the number of accidental mortalities authorized and the number of animals actually killed during permitted Steller sea lion research over the past five years. On a related matter, in the event that a lactating female is killed or seriously injured as a result of the activities, the female's orphaned pup should be humanely provided for (i.e., salvaged and cared for, or if salvage is not possible, euthanized);					MET MOR

Submission No.	CommentNumber	2	Database Reference ID	104	ISSUES
Based on our review of the permits and previous comments submitted by the Marine Mammal Commission, we find that the National Marine Fisheries Service (NMFS) cannot meet its burden under the Endangered Species Act (ESA) and the Marine Mammal Protection Act (MMPA) to show that this research will clearly benefit the conservation of this species, that there is good coordination between the different research projects, that the effects of the research can be adequately monitored by NMFS, and that the level of incidental mortality (as a result of the research) is below an acceptable level.					CON COR ESA MMP MOR

Submission No.	CommentNumber	4	Database Reference ID	106	ISSUES
The need to limit accidental mortality as a result of this research is critical to showing that the proposed studies will clearly have a benefit to the species. It is unclear to us from the permit descriptions if the number of deaths related to incidental mortality from research is greater in these revised permits. If it is equal to or greater than this previous number calculated by the Commission, this is still a number that seems to be at an unacceptable level, especially for the "endangered" western population.					INA MOR

Submission No.	CommentNumber	8	Database Reference ID	28	ISSUES
Darting adult female sea lions with Telazol, as proposed, involves a high risk of mortality, either from their reaction to the drug or from drowning if they enter the water before the drug takes full effect.					EFF MOR

Submission No.	CommentNumber	20	Database Reference ID	163	ISSUES
Even commonly practiced techniques such as tooth extraction and the attachment of flipper tags may result directly or indirectly in increased mortality due to infection, illness, reduced foraging success or increased predation.					MOR

Submission No.	CommentNumber	51	Database Reference ID	362	ISSUES
Researchers from Texas A&M are proposing surgical implantation of tracking devices. ...that means that 70 percent of the animals are expected to die well before their life expectancy. ...this causes us some concern, particularly since the applicant projects that as many as 15 lethal takes may need to be authorized for their activities that will be implanting 80 tags in the 120 animals captured.					INA MOR

Mortality

Submission No.	CommentNumber 11	Database Reference ID 250	ISSUES
If we look at the total number of animals to be captured... This totals 2,185 Steller sea lions who will be subjected to "one of the most stressful incidents in life"! Of those animals who will be captured, applicants seek permission to have over 50 of them die as a result of their activities. This appears to be an unacceptably high level of stress and mortality for a stock that is already declining in many parts of its range.			EFF MOR

Submission No.	CommentNumber 20	Database Reference ID 259	ISSUES
This is a mortality rate of approximately 20%. Particularly in light of these extremely high mortality rates, we don not see that the justification for this permit outweighs the potential risk to animals, as would be required by the MMPA and ESA. This permit should be denied.			INA MOR

Submission No.	CommentNumber 24	Database Reference ID 263	ISSUES
The HSUS notes that the applicant requests 8 mortalities per year (p. 33), whereas the chart on p. 69 states that they are only requesting 5 accidental mortalities. It is not clear that these mortalities are warranted, particularly the 3 that are reserved for animals captured and held at the ASLC. This represents a 3-month death rate of 18%, which is unacceptably high for animals in a captive facility. This level is far from humane and far from negligible for the number in captivity. This portion of the permit should be denied.			EDI MOR PER

Submission No.	CommentNumber 1	Database Reference ID 267	ISSUES
If the applicants themselves worry that 6 mortalities in a year is too many, then clearly NMFS would be justified in suspending all research, including this applicant's, if more than this number occur.			MOR

Submission No.	CommentNumber 4	Database Reference ID 270	ISSUES
The applicant proposes that up to one Steller sea lion out of 12 may die as a result of the procedures. This is a fatality rate well in excess of most other researchers and should be, but is not, explained.			MOR PER

Submission No.	CommentNumber 14	Database Reference ID 280	ISSUES
All in all, this proposal is requesting a mortality rate as high as 29% of the sampled animals, many of which may be female, a segment of the population that is critical to recovery of the stock. This level of mortality is shocking. It is not clear why any animal care committee would approve this or how the ESA would permit it. If this applicant has experienced mortality in his already permitted research, we see no mention made of it in the EA. If he has not experienced mortalities, it is not clear why such a high percentage of the study population is being sought.			ESA INA MOR

Submission No.	CommentNumber 17	Database Reference ID 283	ISSUES
The application discusses the possible death of up to 65 animals "during research activities" in a five year period. It is not clear whether or how this will be determined and documented by researchers but these deaths should be counted against this permit and against a total of 10 mortalities across the western stock.			INA MOR

Mortality

Submission No.	CommentNumber 38	Database Reference ID 349	ISSUES
If NMFS has information on the number of animals from each stock that may have died as a result of proposed activities, or even similar information on mortality and morbidity from other species of sea lions that could elucidate mortality levels, it should be provided to reviewers in summary fashion so that a more thorough evaluation of potential impacts from various procedures and among the various applicants can be made.			MOR NEP

Submission No.	CommentNumber 4	Database Reference ID 147	ISSUES
...direct and indirect mortalities attributable to research are poorly assessed or difficult to quantify.			MOR

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Monitoring

Submission No.	CommentNumber	Database Reference ID	ISSUES
	23	215	
It is also critical that the EIS evaluate methodologies for post-handling monitoring of effects.			MON NEP
	3	23	
...whether, and to what extent, attempts will be made to monitor the short- and long-term adverse effects of the research efforts;			EFF MON
	52	72	
...the lack of a monitoring plan will preclude an analysis of the effects of the proposed research, both while it is in progress and after it has been completed.			INA MON
	56	76	
The second factor, the development of a monitoring plan will not contribute to the reduction of significant effects that may result from the proposed research until a plan is completed and implemented. Although such a plan is needed, it is not expected to be in place for some time, and therefore will be of no use in describing incidental effects during the first years of this research.			MON
	63	83	
In light of the considerable increase in research activities (including a number that would employ invasive techniques that pose risks to the sea lions involved), the potential for disturbance of animals at rookeries and haulouts, the lack of a monitoring plan to assess incidental impacts, the lack of an adequate cumulative effects analysis, and the ongoing decline of the western population of Steller sea lions, significant adverse effects resulting from the proposed and ongoing research activities cannot be ruled out.			CUM EFF MON
	67	87	
...the researchers take steps to minimize disturbance of the subject animals by exercising caution when approaching animals, particularly mother-pup pairs, and halt an approach if there is evidence that the activity may be interfering with pair bonding, nursing, reproduction, feeding, or other vital functions;			MET MON
	68	88	
...all branding activities be accompanied by effective programs to monitor their short- and long-term effects;			BRD MON

Monitoring

Submission No.	CommentNumber	Database Reference ID	ISSUES
	81	101	
To ensure that such adverse effects do not occur and become a significant factor in the decline, the Service should develop a monitoring program to assess the effects of research that may affect individuals or populations.			MON
	10	153	
...absolute need for an accompanying monitoring program to assess the effects of research on the threatened and endangered populations.			MON
	7	14	
Animals should also be should be monitored after the research projects for long term impacts.			MON
	24	167	
...potential for harm from such techniques may be outweighed by the benefits to be gained from the ability to identify animals across multiple years, but only if there is a long-term commitment to monitor the status of branded animals.			BRD EFF MON
	33	344	
The FONSI also stated that there would be long-term monitoring of branded animals, yet neither the researchers themselves nor NMFS' EA discuss the extent to which this was done.			MON
	6	245	
It is not clear whether or how a 5-year permit will be halted to allow evaluation of longer-term effects. More alarming, it is clear that such a plan to monitor lethal and sub-lethal effects in not in place at this time.			INA MON
	7	246	
The HSUS believes that the time for developing a plan to monitor potential effects is before the research is undertaken, rather than after permits are granted and research is underway.			MON
	8	247	
The limited discussion of the need for a monitoring plan only addresses concerns regarding synergistic effects of invasive procedures. It is not apparent that such a plan would consider the stress of the cumulative effects of being captured multiple times, and of being harassed during survey activities and scat collection in the rookeries.			CUM MON

Monitoring

Submission No.	CommentNumber	Database Reference ID	ISSUES
	15	254	

The HSUS suggests that the ADFG may wish to spend more effort trying to re-sight animals and analyze the information from re-sighting, rather than continuing to brand additional animals. If continued or additional branding is authorized, the applicant must be required to monitor post-branding effects and provide evidence of little or no effect of their various activities on rookeries.

BRD
MON

Submission No.	CommentNumber	Database Reference ID	ISSUES
	16	255	

Additionally, we feel that insufficient attention was given to consideration of post-capture myopathy. We note that although NMFS states in the EA on p. 69 that ADFG proposes 10 accidental mortalities per year, the chart on p. 9 of the applications stipulates 5 per year.

EDI
MON

Submission No.	CommentNumber	Database Reference ID	ISSUES
	17	256	

We reiterate our concern expressed above that the applicant should institute a post-capture monitoring program and assessment of condition.

MON

Submission No.	CommentNumber	Database Reference ID	ISSUES
	22	261	

The HSUS believes that the NMFS should request post-capture monitoring of survival and re-sighting to fill apparent gaps in understanding this sort of information.

MON

Submission No.	CommentNumber	Database Reference ID	ISSUES
	24	290	

There should be additional information provided in the application to assure adequate monitoring of animal fates.

MON

Submission No.	CommentNumber	Database Reference ID	ISSUES
	11	154	

An adequate monitoring program should enable NMFS to suspend permits if subsequent information indicates that the research impacts are unacceptable or are exceeding the number of mortalities and injuries authorized under the permit.

MON

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Marine Mammal Protection Act

Submission No.	CommentNumber 46	Database Reference ID 357	ISSUES
The MMPA also requires NMFS to consult with the Marine Mammal Commission. Because its previous consultations with the Commission yielded critical comments (see Appendix A of EA), that questioned the need for some of the research permits and the scope of the activities, we believe that NMFS has erred in its assertion that the research is justified.			MMP NEP

Submission No.	CommentNumber 45	Database Reference ID 356	ISSUES
The MMPA stipulates that research cannot result in the lethal take of a depleted stock unless the research fulfills a critically important research need. [12 U.S.C. 1374 (c)(3)(B)] As we have discussed above, the NMFS has never undertaken a review of the most efficacious means of answering the critical questions nor the number of animals minimally necessary to do so. Without such a review it cannot assure that all of the incidental lethal takes that will be authorized are in service of important conservation needs.			MMP NEP

Submission No.	CommentNumber 2	Database Reference ID 313	ISSUES
Many of the research projects involve the use of invasive studies and physical handling of animals that subjects them to risk of severe injury and death and appear likely to disadvantage the western stock of Steller sea lions. ...the HSUS believes that the NMFS cannot issue the requested permits without violating the requirements of NEPA, the MMPA and the ESA.			EFF ESA MMP NEP

Submission No.	CommentNumber 1	Database Reference ID 312	ISSUES
The HSUS strongly opposes issuance of these permits at this time. We find that the National Marine Fisheries Service (NMFS) has not satisfied the requirements of the National Environmental Policy Act, nor has it met its obligations under the Endangered Species Act (ESA) and the Marine Mammal Protection Act (MMPA). Because the western stock of Steller sea lions is endangered and declining in numbers, NMFS must demonstrate that the permits are non-duplicative, unlikely to adversely affect the stock, and in service of a significant gain in conservation of the species.			ESA MMP NEP

Submission No.	CommentNumber 38	Database Reference ID 304	ISSUES
Accordingly, the HSUS must insist that the NMFS not issue any permits, permit extensions or permit modifications involving invasive research until such time as you have completed an Environmental Impact Statement that fully evaluates the individual and cumulative impacts of the proposed research and weighs its contribution to cumulative effects on the stocks from combined mortality and serious injury resulting from fisheries-related mortality and native harvest. The quality of analysis required by NEPA and by both the ESA and the MMPA is simply lacking at this time. Furthermore, we believe that NMFS has an obligation to consult under Section 7 of the ESA on the impacts that this activity will have on the western stock of Steller sea lions, particularly with regard to the additive effects of these permits along with those of native harvest mortality and incidental fisheries-related mortality.			CUM ESA MMP NEP

Marine Mammal Protection Act

Submission No.	CommentNumber	Database Reference ID	ISSUES
	36	302	
The information and analysis provided by NMFS so far entirely fails to demonstrate that these permits can be issued without violating NEPA, the ESA and the MMPA.			ESA MMP NEP
	35	301	
Approval for invasive studies by this applicant should be suspended until NMFS can conduct a more comprehensive evaluation of range-wide research, its contribution to specific recovery plan needs and compliance with requirements of NEPA, the ESA, MMPA and Animal Welfare Act.			ESA MMP NEP PER WEL
	14	253	
Clearly this level of harassment and mortality does not meet the conditions specified for issuance of permits under the MMPA to assure that impacts will not have a significant impact. On that basis, all of the permits cannot be granted.			MMP PER
	4	243	
While individual permit applications may comply with some or all of these requirements, it is not clear that these proposals in sum can comply with all of them.			MMP
	3	242	
The MMPA requires that a number of criteria be met prior to the issuance of research permits (50 CFR 216.34). (1) The proposed activity is humane and does not present any unnecessary risks to the health and welfare of marine mammals; and (2) The proposed activity, if it involves endangered or threatened marine mammals, will be conducted consistent with the purposes and policies set forth in section 2 of the Endangered Species Act (ESA); and (3) The proposed activity, by itself or in combination with other activities, will not likely have a significant adverse impact on the species or stock.			MMP
	1	240	
However, it is not clear that adequate coordination of these various research proposals has taken place and it is not clear that the proposals meet all of the conditions stipulated in the Marine Mammal Protection Act (MMPA or Act).			COR MMP
	6	108	
Defenders urges that the NMFS defer final action on the permits, permit extensions or permit modifications until such time as you have completed an EIS that fully evaluates the individual and cumulative impacts of the proposed research and weighs its contribution to cumulative effects on the stocks from multiple factors discussed previously. Only that research which is clearly non-duplicative and addresses compelling conservation needs should be permitted. This degree of analysis is required under both the ESA and the MMPA and is lacking at this time.			CUM ESA MMP NEP

Marine Mammal Protection Act

Submission No.	CommentNumber 2	Database Reference ID 104	ISSUES
Based on our review of the permits and previous comments submitted by the Marine Mammal Commission, we find that the National Marine Fisheries Service (NMFS) cannot meet its burden under the Endangered Species Act (ESA) and the Marine Mammal Protection Act (MMPA) to show that this research will clearly benefit the conservation of this species, that there is good coordination between the different research projects, that the effects of the research can be adequately monitored by NMFS, and that the level of incidental mortality (as a result of the research) is below an acceptable level.			CON COR ESA MMP MOR

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Mitigation

Submission No.	CommentNumber 39	Database Reference ID 350	ISSUES
Further he cites that the Recovery Plan encourages the use of mitigation measures to minimize impacts and the recommendation of alternative, less intrusive techniques. While we would generally agree with this premise, the HSUS does not believe that this standard has been satisfied.			MIT

Submission No.	CommentNumber 23	Database Reference ID 289	ISSUES
Mitigation measures were suggested in the primary research (Lewis 1987) including conducting counts at times and tidal cycles when non-pup presence is lowest, not conducting counts when rookery is small to prevent pups from drowning in pools. These are not discussed in this application's mitigation measures.			MIT

Submission No.	CommentNumber 8	Database Reference ID 187	ISSUES
The EIS should describe the potential mitigation measures, if any, that should be implemented as part of the proposed actions. If mitigation measures are feasible, then the EIS should stipulate whether a portion of grant funds will be used to pay for that mitigation.			MIT NEP

Submission No.	CommentNumber 14	Database Reference ID 34	ISSUES
However, it is not clear that the research design is sufficient to test this hypothesis and to characterize any differences in the use of forage fish by sea lions in the two populations.			INA MIT PER

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Methodology

Submission No.	CommentNumber 1	Database Reference ID 125	ISSUES
it is clear we need a definite limit on the impact of alleged "research" on sea lions and seals since their population numbers are so limited and they are under such assault.			MET

Submission No.	CommentNumber 7	Database Reference ID 7	ISSUES
- Finally, that the humaneness of the techniques used are critically evaluated. Hot iron branding, for example, should be prohibited. Limited time, money, energy, and motivation are not excuses for using painful and harmful techniques on animals when alternatives are available or can be developed.			BRD MET NEP

Submission No.	CommentNumber 3	Database Reference ID 111	ISSUES
In summary, when evaluating the impacts of any research technique it is important to recognize the stochastic nature of any disturbances caused. I think any technique might sometimes be done with very little disturbance, but the same methods may increase mortality considerably under different conditions.			MET

Submission No.	CommentNumber 4	Database Reference ID 112	ISSUES
Drive counts of pups should be avoided. In general ground counts are disruptive to the social order of sea lions, pups often end up in the water, and these counts interrupt nursing by separating pups and their mothers.			MET

Submission No.	CommentNumber 5	Database Reference ID 113	ISSUES
Collecting data on an active rookery should be minimized and never repeated in the same place regularly.			MET

Submission No.	CommentNumber 6	Database Reference ID 114	ISSUES
It might be beneficial to sea lions to have one section of the Forrester Island complex off limits to ground based research.			MET

Submission No.	CommentNumber 7	Database Reference ID 115	ISSUES
Additionally personnel who are working on a rookery should be briefed by an experienced biologist on how to minimize the spooking of sea lions (such as staying low and moving slow, minimizing time on a rookery).			CRE MET

Methodology

Submission No.	CommentNumber		Database Reference ID		ISSUES
		8		116	
Researchers camping near rookeries can be an asset in protecting rookeries from fishing and tourism disturbance.					MET
Submission No.	CommentNumber	73	Database Reference ID	93	ISSUES
· the Service, in consultation with the applicants, review the basis for the numbers of accidental mortalities requested and provide reasonable justification for the number that can occur annually before research activities must be suspended. It may be useful, as part of such review, to examine the data concerning the number of accidental mortalities authorized and the number of animals actually killed during permitted Steller sea lion research over the past five years. On a related matter, in the event that a lactating female is killed or seriously injured as a result of the activities, the female's orphaned pup should be humanely provided for (i.e., salvaged and cared for, or if salvage is not possible, euthanized);					MET MOR
Submission No.	CommentNumber	3	Database Reference ID	121	ISSUES
WWF strongly urges the NMFS to carefully consider the need for dedicated support of long-term research in the EIS process. In particular, the balance between the ability of agency and university research programs to maintain consistent research protocols and field efforts should be carefully analyzed.					MET NEP
Submission No.	CommentNumber	70	Database Reference ID	90	ISSUES
· surgical implants of instruments be performed by experienced marine mammal veterinarians, and the animals be fully recovered from anesthesia and exhibiting no ill effects of the surgery prior to release;					CRE MET
Submission No.	CommentNumber	6	Database Reference ID	133	ISSUES
...the EIS should identify the level of research that is appropriate and the appropriate demographic classes and temporal and spatial bounds for research to address those questions.					MET NEP
Submission No.	CommentNumber	7	Database Reference ID	134	ISSUES
A power analysis for particular research questions and/or methodologies should be done before granting permits for invasive research and sampling.					MET NEP
Submission No.	CommentNumber	8	Database Reference ID	135	ISSUES
We support convening a research panel with outside experts who can assist in clarifying the most appropriate research design and ensure it is not marred by self interest.					MET
Submission No.	CommentNumber	10	Database Reference ID	137	ISSUES
The EIS should evaluate all of the most common methods of providing insight into important food habits.					MET NEP

Methodology

Submission No.	CommentNumber 11	Database Reference ID 138	ISSUES
Research and methodology should be evaluated as to how effective they are in providing key information with minimal adverse effects, and how they can be used in combination with each other.			MET NEP

Submission No.	CommentNumber 12	Database Reference ID 139	ISSUES
We believe that only veterinarians should administer anesthesia.			MET

Submission No.	CommentNumber 23	Database Reference ID 166	ISSUES
...the preferred technique of hot-branding large numbers of pups and young juveniles may lead to substantial mortalities (EA, p. 53), raising questions about the degree to which vital rates information gleaned from branded animals may be biased by the experiment itself.			BRD MET

Submission No.	CommentNumber 10	Database Reference ID 118	ISSUES
If the aircraft is piloted well, such that there are no major changes in the engine sound, aerial photography can be done with little disturbance.			MET

Submission No.	CommentNumber 36	Database Reference ID 56	ISSUES
If information exists that demonstrates that tooth size and wear patterns can be used to determine if an animal is weaned, the applicant should be asked to provide or reference such information. If such information is not available, then the applicant should recognize this and be prepared to handle some animals that may not yet be weaned.			MET PER

Submission No.	CommentNumber 5	Database Reference ID 12	ISSUES
The EIS should review the feasibility of employing alternative research techniques that will produce comparable results to those presented and subject to the EIS. These alternative techniques should include those that are not invasive, painful or life-threatening. Such techniques may include scat analysis, hair sampling, body condition evaluation and non-invasive scanning imaging.			MET NEP

Submission No.	CommentNumber 6	Database Reference ID 13	ISSUES
If the true intent of the research is to prevent a further decline in numbers of animals, then studies should include zero mortalities and no procedure that could result in any condition that might affect the future success of the species, including stress.			MET

Submission No.	CommentNumber 4	Database Reference ID 18	ISSUES
Are the invasive methodologies absolutely necessary? Starving 16 juvenile sea lions hardly seems necessary or ethical.			EFF MET

Methodology

Submission No.	CommentNumber		Database Reference ID		ISSUES
		3		17	
Many of the methods are invasive and could have potential fitness costs, especially to the pups. Pups being subjected to as many as 15 different intrusive procedures each season seems excessive in and endangered/threatened population.					EFF MET
Submission No.	CommentNumber	15	Database Reference ID	35	ISSUES
However, it seems questionable that samples taken from the sea lions at two sites per population will be representative of the larger populations for several reasons:					MET
Submission No.	CommentNumber	16	Database Reference ID	36	ISSUES
Thus, the nature of the data collected will be unavoidably influenced by the selection of sample sites. The simple recognition that forage fish availability varies by site suggests that a more complicated sampling regime will likely be necessary to compare in a meaningful way the foraging patterns and the significance of forage fish to the two populations of sea lions.					MET
Submission No.	CommentNumber	19	Database Reference ID	39	ISSUES
...not clear that the design described will be sufficient to accomplish its purpose. The design appears to involve only a single flight during each spring period when spawning may occur.					INA MET
Submission No.	CommentNumber	80	Database Reference ID	100	ISSUES
It is not clear that all of the planned research is essential, and that the potential merits outweigh the cumulative or combined risks.					MET PER
Submission No.	CommentNumber	30	Database Reference ID	50	ISSUES
...it would be useful to compare the criteria developed by the Alaska SeaLife Center with similar criteria being developed by the Service for releasing captive marine mammals to the wild to ensure that the Center's list of criteria is comprehensive.					COR MET
Submission No.	CommentNumber	9	Database Reference ID	201	ISSUES
The EIS should evaluate the various methods of marking, including their utility and impact on animals, and discuss which monitoring methodologies are likely to be most effective.					MET NEP
Submission No.	CommentNumber	37	Database Reference ID	57	ISSUES
This section again refers to injections of adrenocorticotropic hormone to "challenge" juveniles. The purpose and utility of such tests are not clear; and the applicant should provide a rationale and research protocol for them; and					INA MET PER

Methodology

Submission No.	CommentNumber 39	Database Reference ID 59	ISSUES
· what is the minimum age at which pups may be captured? · what are the weights of the transmitter devices that will be implanted in juvenile animals and the animals themselves? how does one determine the maximum size (dimensions, size) of instruments that can be implanted safely into the animals? · what precisely will be done in terms of "re-evaluating the process" (as noted on page 44 of the application) if more than three captive animals are deemed to be non-releasable within the period of one year? and · under what circumstances would animals deemed non-releasable be euthanized?			MET PER

Submission No.	CommentNumber 40	Database Reference ID 60	ISSUES
...it is essential that the samples collected during the course of research should be representative of the sea lion populations from which they were taken and should be pertinent to identification of the causes of the decline or steps that can be taken to facilitate the species' recovery.			INA MET SAM

Submission No.	CommentNumber 54	Database Reference ID 74	ISSUES
Also, if animals are branded for the purpose of assessing survival, and some of the animals die from branding or its complications, then the resulting estimates of survival will be biased unless the effect of branding is somehow quantified and accounted for in the final analysis of survival.			MET

Submission No.	CommentNumber 64	Database Reference ID 84	ISSUES
The large increase in funding for this research reflects a concern about the effects of fisheries on Steller sea lions, and such effects may be difficult to describe if the research conducted lacks the investigative power to describe the mechanisms of interaction in detail.			MET

Submission No.	CommentNumber 67	Database Reference ID 87	ISSUES
· the researchers take steps to minimize disturbance of the subject animals by exercising caution when approaching animals, particularly mother-pup pairs, and halt an approach if there is evidence that the activity may be interfering with pair bonding, nursing, reproduction, feeding, or other vital functions;			MET MON

Submission No.	CommentNumber 69	Database Reference ID 89	ISSUES
· whenever possible, new invasive research procedures be tested on non-listed otariid species and on captive Steller sea lions before they are used on sea lions in the wild to ensure that the proposed techniques can be employed safely;			MET

Submission No.	CommentNumber 20	Database Reference ID 40	ISSUES
It is also not clear why this study is not being coordinated with other aerial surveys proposed for southeastern Alaska.			COR MET

Methodology

Submission No.	CommentNumber	12	Database Reference ID	323	ISSUES
There should be some agreement on the goals of studies and the best methodology for answering common questions while assuring minimal impact on animals.					MET
Submission No.	CommentNumber	26	Database Reference ID	292	ISSUES
As we have previously stated, we believe that this and all other permit applications seeking takes for invasive/intrusive activities should be held in abeyance pending a through EIS, a consultation under Section 7 and an analysis of the scope and demographic and geographic parameters that need to be studied, the best techniques for answering key questions and a power analysis of the numbers of animals minimally necessary for invasive/intrusive studies.					ESA MET NEP
Submission No.	CommentNumber	28	Database Reference ID	294	ISSUES
...ASLC has requested six separate permit modifications just in the past 18 months. This it is almost impossible for reviewers to ascertain whether these modifications (many of which request additional sampling procedures) will affect the reliability of the information that is being gathered and/or whether synergistic effects of multiple sampling of both free ranging and captive animals and changes in sampling protocols for the same animals or comparable cohorts compromises the reliability or validity of the data being collected.					CRE CUM MET
Submission No.	CommentNumber	30	Database Reference ID	296	ISSUES
...the applicant proposes on page 3 of the December 7, 2003 amendment request to extract teeth from 80 adult females to allow age determination, although stating in the same paragraph that "prominent agencies such as ADFG and NMML" recognized "that these methods are inaccurate for older animals." If this is the case, then why is the applicant requesting permission for this invasive activity and why would NMFS grant it?					MET PER
Submission No.	CommentNumber	37	Database Reference ID	303	ISSUES
Some of this research appears to be unnecessarily invasive and lacking reasonable precaution to assure that animals are handled in a manner that is humane and minimizes suffering and harm.					MET
Submission No.	CommentNumber	39	Database Reference ID	305	ISSUES
The HSUS also suggests that NMFS sponsor a workshop to delineate the specific questions that need to be answered, the best means of addressing those questions and the minimum number of animals necessary for valid research results.					MET
Submission No.	CommentNumber	3	Database Reference ID	309	ISSUES
When we're weighing the costs of a research project, we need to consider what the costs are...					MET
Submission No.	CommentNumber	4	Database Reference ID	310	ISSUES
...we need to consider the relationship between the type of research and its effect on the survival and reproduction of the species.					MET

Methodology

Submission No.	CommentNumber 4	Database Reference ID 196	ISSUES
When species are declining, they can ill afford this sort of ad hoc approach to investigating the causes of their decline. They need well designed, minimally intrusive, research that can point to possible future management measures to remedy their dire straits.			MET

Submission No.	CommentNumber 4	Database Reference ID 315	ISSUES
The EA stipulates that, since 1975 over 15,000 Steller sea lions have been hot branded (p. 127), with an additional 3,000 more proposed for branding by the current applicants. This is a procedure with significant risks, and it should only be done if there is no other less invasive alternative, and only if it is necessary to continue to brand animals beyond those already branded.			BRD MET

Submission No.	CommentNumber 9	Database Reference ID 275	ISSUES
Though the applicant requests permission to capture and sample and/or brand 12 Steller sea lions, they have no basis other than wild guessing as to the reason for this number. When asked by NMFS (3/12/05 cover) to justify this number, Harriet Huber of NMML stated that it was determined "arbitrarily—in 2003 we had funding to instrument up to six SSL." When questioned about the need to remotely tag 3 Steller sea lions and not more or less, she responded "[it] was arbitrarily chosen." This is inappropriate.			MET PER

Submission No.	CommentNumber 18	Database Reference ID 329	ISSUES
NMFS has not discussed whether the varying methodologies are addressing different questions or the same question. If they are addressing the same question, then less invasive procedures should be used to answer questions raised by the conservation goal. When there are conflicting methodologies offered (e.g., tagging vs. branding or scat collection vs. biopsy and removal or vibrissae) NMFS should clarify whether or how each is necessary to address conservation goals and how each fits into a larger matrix of information that will assist recovery efforts. But it has not done so.			INA MET

Submission No.	CommentNumber 24	Database Reference ID 335	ISSUES
Rather than continuing to fund stressful, invasive and potentially duplicative research on an ESA listed stock that is declining in many portions of its range, the NMFS and/or Marine Mammal Commission should fund a workshop that would bring together the past, current and potential future permittees along with outside scientists familiar with research methodology and with endangered species conservation biology to determine the nature of the research most likely to result in positive conservation gains for the species, with minimal adverse risk. A workshop could assess the number of animals that should be sampled using various methods to obtain the most critical information to assist in understanding the reasons for the decline and the potential management and mitigation measures that can be pursued.			MET

Submission No.	CommentNumber 25	Database Reference ID 336	ISSUES
Before invasive research is conducted on an endangered and declining stock, and in order to assure minimal adverse impacts on individuals or populations, the NMFS must clearly know: what information is necessary to answer the critical questions; how it is best obtained; how many animals are necessary for a reliable sample size; where, when and how the research should be conducted; and who is best qualified and equipped to conduct the research. This type of systematic look has never been undertaken.			MET

Methodology

Submission No.	CommentNumber		Database Reference ID		ISSUES
	CommentNumber	40	Database Reference ID	351	
There are a number of techniques for assessing body fat and general condition; not all of them are invasive (e.g., portable untrasonography and photogrammetry). It is clear that the least invasive should be used when at all possible, yet most applicants choose the most invasive (e.g., biopsy sampling).					MET
Submission No.	CommentNumber	43	Database Reference ID	354	ISSUES
Instead of providing assurance that the intrusive procedures that are proposed are necessary and proportional to the questions that need to be addressed, the NMFS has simply passed along each proposal ad hoc, with no attempt in the EA to address the necessity or scope of the research proposals or to assess cumulative effects on mortality and morbidity of individuals and any consequent range-wide or localized population level effects.					CUM MET NEP
Submission No.	CommentNumber	47	Database Reference ID	358	ISSUES
...the proposed research, in this case, is likely to significantly and adversely affect endangered species and that the permit applications do not comply with requirements of the ESA (conditions (3) and (4) above). The HSUS also believes that the research does not meet standards of humane treatment.					ESA MET
Submission No.	CommentNumber	49	Database Reference ID	360	ISSUES
If sampling protocol is adequately designed for the stock, only a limited number of animals need to be anesthetized and thus mortality risk can be limited as well. Current proposals would cause needless suffering.					EFF MET
Submission No.	CommentNumber	5	Database Reference ID	311	ISSUES
...we need to consider the reproductive value of the individuals influenced.					MET
Submission No.	CommentNumber	40	Database Reference ID	232	ISSUES
It is critical that this EIS re-examine the bases for the conclusions of these peer review panels and assess not only how individual procedures or research protocol can affect individuals and stocks, but also examine how basic flaws in research design such as those identified by the peer review panels of 1997-1999 may themselves impede understanding of research needs and impacts of research.					MET NEP
Submission No.	CommentNumber	52	Database Reference ID	363	ISSUES
These sorts of experiments on lactating females and newly born pups seem risky, and both legally and ethically questionable.					MET NEP
Submission No.	CommentNumber	10	Database Reference ID	202	ISSUES
The EIS should discuss each the wide variety of research methods and protocols and rank them according to their utility, invasiveness or need for specialized training in their use.					MET NEP

Methodology

Submission No.	CommentNumber	11	Database Reference ID	203	ISSUES
The EIS should evaluate where, when, how or whether each of these can be used individually or in which effective combinations to illuminate the various aspects of the role in the decline played by resource limitation or nutritional stress.					MET NEP
Submission No.	CommentNumber	14	Database Reference ID	206	ISSUES
...the EIS should evaluate the types and amounts of procedures to which individuals of various demographic classes should be subjected without elevating the risk of serious injury or death.					MET NEP
Submission No.	CommentNumber	17	Database Reference ID	209	ISSUES
The EIS should evaluate level of research in a manner that results in identifying, where possible, indicator sites that can be sampled in lieu of permitting projects throughout the entire range of the stock.					MET NEP
Submission No.	CommentNumber	18	Database Reference ID	210	ISSUES
The EIS should also examine what research has been done to date and how that research can inform the need for additional research using certain techniques.					MET NEP
Submission No.	CommentNumber	21	Database Reference ID	213	ISSUES
...the EIS should examine research conducted elsewhere on various pinniped species to ascertain effects. It is also important that the EIS evaluate the appropriateness of using less vulnerable surrogate species to test hypotheses regarding the short and long-term effects of a multiplicity of procedures used on Steller sea lions and used or proposed for use on fur seals.					CUM MET NEP
Submission No.	CommentNumber	18	Database Reference ID	284	ISSUES
Dr. Davis states that animals may need to be re-captured up to three times to attach and remove instrumentation to replace batteries and video tape. There is no provision a risk-benefit analysis such that the increased risk of repeated capture and anesthesia in a space of a few weeks is balanced against the value of data obtained by the video camera.					MET PER
Submission No.	CommentNumber	26	Database Reference ID	218	ISSUES
We believe that only veterinarians should administer anesthesia.					MET
Submission No.	CommentNumber	13	Database Reference ID	279	ISSUES
Methodology used by this researcher has some commonalities with others (e.g., scat collection, aerial surveys) but appears to have significant differences that are not likely to be replicated elsewhere that may make inter-stock comparisons difficult or impossible.					MET

Methodology

Submission No.	CommentNumber 43	Database Reference ID 235	ISSUES
The NMFS must assure that appropriate high-priority hypotheses are being tested and assure that priorities are not being set by each individual researcher.			MET

Submission No.	CommentNumber 45	Database Reference ID 237	ISSUES
Sampling designs need to be reviewed to assure that research is not duplicative; that the focus of research is appropriately framed demographically, geographically and temporally; and that only the most risk averse procedures are being used.			MET

Submission No.	CommentNumber 23	Database Reference ID 262	ISSUES
We question the value of some of the information gained from live captured animals that are caged in either 12' or 20' diameter pens and subjected to constant testing with regard to making reasonable conclusions about wild animals.			MET

Submission No.	CommentNumber 2	Database Reference ID 268	ISSUES
...we believe that this and all other permit applications seeking takes for invasive/intrusive activities should be held in abeyance pending a thorough EIS, a consultation under Section 7 and an analysis of the scope and demographic and geographic parameters that need to be studied, the best techniques for answering key questions and a power analysis of the numbers of animals minimally necessary for invasive/intrusive studies.			ESA MET NEP

Submission No.	CommentNumber 5	Database Reference ID 271	ISSUES
The applicant proposes that no anesthesia will be used and that "squeeze cages" will suffice to restrain animals sufficiently to achieve a readable brand. This appears to disregard humane considerations.			MET PER

Submission No.	CommentNumber 7	Database Reference ID 273	ISSUES
The applicant also states that although it will only take 20 minutes to "sample" each sea lion, they will be held for up to 3 hours "while other animals are being processed." This level of stress seems excessive and unnecessary.			MET PER

Submission No.	CommentNumber 8	Database Reference ID 274	ISSUES
The applicant proposes to clip vibrissae instead; some thing that other research discount as reliable. While clipping is less invasive, if it cannot reliably answer the question being posed, then it should not be done. The NMFS should determine whether the desired information can be collected in a manner other than that proposed by the applicant.			MET PER

Submission No.	CommentNumber 8	Database Reference ID 200	ISSUES
The EIS should also examine various methods of capturing animals for study and evaluate them with regard to how humane, risk averse or effective each may be.			MET NEP

Methodology

Submission No.	CommentNumber 24	Database Reference ID 216	ISSUES
The EIS should assess the need for the capture and temporary holding and testing of animals, and evaluate whether studies on already captive Steller sea lions or surrogate species might be substituted.			MET NEP

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Litigation; Lawsuit

Submission No.	CommentNumber	1	Database Reference ID	370	ISSUES
What is going on with the litigation?					LIT

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Inadequate Information to Assess Effects/ Unclear Inf

Submission No.	CommentNumber 29	Database Reference ID 49	ISSUES
It is not clear if the applicants are providing these as examples of activities that could conceivably be attempted using a blind or whether they are requesting permission to conduct these activities.			INA PER

Submission No.	CommentNumber 2	Database Reference ID 22	ISSUES
Based on the information provided in the applications and in the environmental assessment, the Commission is unable to adequately determine if this will be the case, and additional steps may be necessary to ensure that there will not be a significant impact.			INA

Submission No.	CommentNumber 60	Database Reference ID 80	ISSUES
It is not possible to determine from the permit applications how such coordination will be accomplished. In particular, we are concerned that the lack of information on the spatial and temporal distribution of the different research efforts precludes and analysis of overlap of research by different agencies and organizations, which would seem to be essential for adequate coordination.			COR INA

Submission No.	CommentNumber 53	Database Reference ID 73	ISSUES
The lack of information on incidental mortality also could confound research results and, if not accounted for, could undermine the ability of the projects to produce information that can be expected to contribute to the recovery and conservation of the Steller sea lion.			INA MOR

Submission No.	CommentNumber 52	Database Reference ID 72	ISSUES
...the lack of a monitoring plan will preclude an analysis of the effects of the proposed research, both while it is in progress and after it has been completed.			INA MON

Submission No.	CommentNumber 51	Database Reference ID 71	ISSUES
...the lack of information on the location and time of research activities precludes an evaluation of how proposed activities and their incidental effects may overlap or be concentrated.			DUP INA

Inadequate Information to Assess Effects/ Unclear Inf

Submission No.	CommentNumber 45	Database Reference ID 65	ISSUES
Some previous studies of Steller sea lions have been limited to very small sample sizes of animals selected on the basis of criteria that may have reduced the difficulty of the study or avoided related risks (i.e., animals at the edge of the rookery, animals appearing to be in excellent or good condition, or animals of sufficient age or size), but selection by such criteria may introduce bias that raises questions as to whether those animals are truly representative of all the animals at a particular site or all the animals in the population.			INA SAM

Submission No.	CommentNumber 43	Database Reference ID 63	ISSUES
It is not clear that these studies will be adequately dispersed to assess potentially important spatial variation in the factors being assessed.			INA SAM

Submission No.	CommentNumber 42	Database Reference ID 62	ISSUES
Nevertheless, several proposals either fail to describe where the studies would occur or provide incomplete information.			INA SAM

Submission No.	CommentNumber 40	Database Reference ID 60	ISSUES
...it is essential that the samples collected during the course of research should be representative of the sea lion populations from which they were taken and should be pertinent to identification of the causes of the decline or steps that can be taken to facilitate the species' recovery.			INA MET SAM

Submission No.	CommentNumber 37	Database Reference ID 57	ISSUES
This section again refers to injections of adrenocorticotropic hormone to "challenge" juveniles. The purpose and utility of such tests are not clear, and the applicant should provide a rationale and research protocol for them; and			INA MET PER

Submission No.	CommentNumber 4	Database Reference ID 106	ISSUES
The need to limit accidental mortality as a result of this research is critical to showing that the proposed studies will clearly have a benefit to the species. It is unclear to us from the permit descriptions if the number of deaths related to incidental mortality from research is greater in these revised permits. If it is equal to or greater than this previous number calculated by the Commission, this is still a number that seems to be at an unacceptable level, especially for the "endangered" western population.			INA MOR

Submission No.	CommentNumber 31	Database Reference ID 51	ISSUES
...it is not clear how the applicant determined that the total number of disturbed animals would be only 2,100, unless they are assuming that multiple captures would result in the incidental disturbance of the same animals at the same time.			INA PER

Inadequate Information to Assess Effects/ Unclear Inf

Submission No.	CommentNumber 3	Database Reference ID 195	ISSUES
There has been no explanation or rationale provided for any permittee's sampling design, let alone for coordinating the research of multiple permittees.			INA
Submission No.	CommentNumber 27	Database Reference ID 47	ISSUES
...the applicant does not, but should, provide an estimate of the length of time that animals may be anesthetized. The applicant should also be asked to describe any potential consequences of repeatedly anesthetizing animals (i.e., on a weekly basis).			INA PER
Submission No.	CommentNumber 25	Database Reference ID 45	ISSUES
...the applicant has not, but should, describe the sizes and weights of the instrument packages that will be placed on the animals.			INA
Submission No.	CommentNumber 23	Database Reference ID 43	ISSUES
The applicant also requests authority for the "optional" use of gas anesthesia to reduce stress on pups during branding, but does not explain the basis upon which decisions to use anesthesia will be made or why anesthesia will not be used in all cases.			INA
Submission No.	CommentNumber 22	Database Reference ID 42	ISSUES
Clarification should be requested as to the minimum age and size of pups that will be hot-branded.			BRD INA PER
Submission No.	CommentNumber 21	Database Reference ID 41	ISSUES
Without additional information on these studies, it does not seem possible to confirm that they will achieve the stated research objectives or will contribute to the conservation and recovery effort for Steller sea lions.			CON INA
Submission No.	CommentNumber 19	Database Reference ID 39	ISSUES
...not clear that the design described will be sufficient to accomplish its purpose. The design appears to involve only a single flight during each spring period when spawning may occur.			INA MET
Submission No.	CommentNumber 14	Database Reference ID 34	ISSUES
However, it is not clear that the research design is sufficient to test this hypothesis and to characterize any differences in the use of forage fish by sea lions in the two populations.			INA MIT PER
Submission No.	CommentNumber 12	Database Reference ID 32	ISSUES
Further, the table makes no reference to the use of location-only satellite-linked transmitters as is indicated in the text of the application. Clarification of these points should be provided by the applicant.			INA PER

Inadequate Information to Assess Effects/ Unclear Inf

Submission No.	CommentNumber	Database Reference ID	ISSUES
	11	31	
It is unclear whether the research activities and associated taking proposed in the applicant's Alaska SeaLife Center's 2001 Steller Sea Lion Research Plan have been included in the take table on page 4 of the application.			INA PER
	10	30	
The investigators describe the attachment of a number of instruments to animals, but do not provide complete information on the size and weight of the instruments. Although large animals may be unaffected by such instruments, this is not necessarily the case for smaller animals, and information on dimensions and weight should be provided as well as an assessment of possible effects.			EFF INA
	32	52	
(page 31) Task 5. Permission is requested to capture more animals than will be sampled. It is not clear why some animals that are captured would not be sampled.			INA SAM
	20	286	
There are, however, some discrepancies in information provided and the overarching goals that are attempted seem to ignore power analyses conducted by other researchers.			INA
	41	352	
Hot branding can be an important tool in satisfying the need to monitor survival across the range and in various cohorts, yet the remarkably large amount of branding that is proposed has not been justified in the EA.			BRD INA
	37	348	
Although NMFS states in the EA that mortalities occurred for at least one applicant, specific information to address this legal requirement is not evident in the EA.			INA
	34	345	
NMFS provides no assurance that all researchers reported mortalities nor does it explain why researchers would request an increase in the number of incidental mortalities if their research has had no lethal consequence.			INA
	20	331	
Although there are seven proposals to brand animals, there is little discussion in these proposals as to who will be monitoring the movements or survival of these marked animals, or how the information will be synthesized and reported such that the public and managers have the information necessary to make important decisions on management.			INA

Inadequate Information to Assess Effects/ Unclear Inf

Submission No.	CommentNumber 18	Database Reference ID 329	ISSUES
NMFS has not discussed whether the varying methodologies are addressing different questions or the same question. If they are addressing the same question, then less invasive procedures should be used to answer questions raised by the conservation goal. When there are conflicting methodologies offered (e.g., tagging vs. branding or scat collection vs. biopsy and removal or vibrissae) NMFS should clarify whether or how each is necessary to address conservation goals and how each fits into a larger matrix of information that will assist recovery efforts. But it has not done so.			INA MET

Submission No.	CommentNumber 11	Database Reference ID 322	ISSUES
It is not clear from the EA whether or how NMFS proposes to synthesize the information gained by the use of various data collection measures such that it can be useful to managers. This is particularly important when conflicting methodologies that are invasive to greater or lesser degrees are presented with no discussion as to whether some or all may be justified to fill data gaps.			INA

Submission No.	CommentNumber 34	Database Reference ID 300	ISSUES
There is no accompanying chart to allow reviewers to view the morphing of the various "tasks" that are requested for modification, nor is there any discussion of why any particular modification is important or whether it has been tried elsewhere or is novel and how it may or may not compromise comparison and analysis of data obtained from animals not subjected to the protocols. Nor is there discussion of the synergistic or cumulative effect of the various sampling and tracking and device attachment.			CUM INA

Submission No.	CommentNumber 33	Database Reference ID 299	ISSUES
The applicant has not provided any justification for increases that are requested in the number of animals that they wish to sample and or brand or the increase in the duration or frequency of captive research. We question whether these continual amendments that are requested with little or no supporting information or justification would meet the tests of the Animal Welfare Act or would pass the careful scrutiny of an independent animal welfare/care committee.			INA WEL

Submission No.	CommentNumber 31	Database Reference ID 297	ISSUES
There is no discussion of the effects of the drugs on pups who are dependent on milk from a mother who has been sedated multiple times (e.g., whether drugs may be transmitted to the pup and affect its viability) or how invasive sampling may impair survival.			INA

Submission No.	CommentNumber 29	Database Reference ID 295	ISSUES
That research has been done on one species does not necessarily mean that it needs to be replicated on others, but there is no means of judging this from the information provided in the permit application(s) or the EA.			INA

Submission No.	CommentNumber 1	Database Reference ID 103	ISSUES
...we have concerns that the research is duplicative, likely to adversely affect the stocks, and it is not clear from these permits that significant gains in conservation will clearly outweigh the negative impacts to the Steller sea lion populations.			DUP INA

Inadequate Information to Assess Effects/ Unclear Inf

Submission No.	CommentNumber	Database Reference ID	ISSUES
	21	287	

The use of another anesthesia should be justified.

ISSUES: INA

Submission No.	CommentNumber	Database Reference ID	ISSUES
	51	362	

Researchers from Texas A&M are proposing surgical implantation of tracking devices.
...that means that 70 percent of the animals are expected to die well before their life expectancy.
...this causes us some concern, particularly since the applicant projects that as many as 15 lethal takes may need to be authorized for their activities that will be implanting 80 tags in the 120 animals captured.

ISSUES: INA, MOR

Submission No.	CommentNumber	Database Reference ID	ISSUES
	17	283	

The application discusses the possible death of up to 65 animals "during research activities" in a five year period.
It is not clear whether or how this will be determined and documented by researchers but these deaths should be counted against this permit and against a total of 10 mortalities across the western stock.

ISSUES: INA, MOR

Submission No.	CommentNumber	Database Reference ID	ISSUES
	16	282	

There is also no discussion of how or whether pups orphaned by the death of one of the females will be identified and either euthanized or removed for rehabilitation.

ISSUES: INA

Submission No.	CommentNumber	Database Reference ID	ISSUES
	14	280	

All in all, this proposal is requesting a mortality rate as high as 29% of the sampled animals, many of which may be female, a segment of the population that is critical to recovery of the stock. This level of mortality is shocking. It is not clear why any animal care committee would approve this or how the ESA would permit it. If this applicant has experienced mortality in his already permitted research, we see no mention made of it in the EA. If he has not experienced mortalities, it is not clear why such a high percentage of the study population is being sought.

ISSUES: ESA, INA, MOR

Submission No.	CommentNumber	Database Reference ID	ISSUES
	6	272	

There is no apparent justification for subjecting animals to the pain stress of hot branding, tissue sampling and application of invasive instrumentation with no anesthesia.

ISSUES: INA, PER

Submission No.	CommentNumber	Database Reference ID	ISSUES
	3	269	

...this permit provides minimal information and justification and, indeed the applicant has refused to answer key questions of the NMFS permit office. Thus we cannot support this permit application, which appears incomplete at best.

ISSUES: INA

Submission No.	CommentNumber	Database Reference ID	ISSUES
	27	266	

...there is apparent duplication of sampling area; that some of the projects do not appear humane; and that the finding of negligible impacts, particularly for the Western stock, are not well founded.

ISSUES: DUP, EFF, INA

Inadequate Information to Assess Effects/ Unclear Inf

Submission No.	CommentNumber	Database Reference ID	ISSUES
	20	259	

This is a mortality rate of approximately 20%.
Particularly in light of these extremely high mortality rates, we don not see that the justification for this permit outweighs the potential risk to animals, as would be required by the MMPA and ESA.
This permit should be denied.

INA
MOR

Submission No.	CommentNumber	Database Reference ID	ISSUES
	6	245	

It is not clear whether or how a 5-year permit will be halted to allow evaluation of longer-term effects. More alarming, it is clear that such a plan to monitor lethal and sub-lethal effects in not in place at this time.

INA
MON

Submission No.	CommentNumber	Database Reference ID	ISSUES
	5	244	

If more than 10 animals from the western stock were killed, then NMFS would require researches to consult on how to reduce mortality so that it does not exceed 20 animals, which is 10% of the PBR of 208. It is not clear from the EA whether such an assessment will be time-sensitive or whether consultation can take place before the number is exceeded when it appears that a monitoring plan is not currently in place.

INA
PBR

Submission No.	CommentNumber	Database Reference ID	ISSUES
	22	214	

...NMFS has stated that little is known about the effect of many procedures. These are vulnerable species, with two stocks in decline. If this more thorough evaluation finds little information on which to evaluate effects of various procedures, the EIS should state this clearly and recommend a means of remedying the situation before allowing procedures with unknown effects to proceed.

INA
NEP

Submission No.	CommentNumber	Database Reference ID	ISSUES
	22	288	

We are concerned that the large numbers that will be sampled range wide risk duplication of effort. The applicant (and any others proposing similar sampling) should provide specificity in where they will sample and the geographic and demographic parameters that will be examined.

INA
SAM

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Endangered Species Act

Submission No.	CommentNumber 47	Database Reference ID 358	ISSUES
...the proposed research, in this case, is likely to significantly and adversely affect endangered species and that the permit applications do not comply with requirements of the ESA (conditions (3) and (4) above). The HSUS also believes that the research does not meet standards of humane treatment.			ESA MET

Submission No.	CommentNumber 44	Database Reference ID 355	ISSUES
As we have discussed above, it is clear that the cumulative impact of granting these permits is likely to have an adverse impact on the western stock of Steller sea lions and requires consultation under the ESA.			CUM ESA

Submission No.	CommentNumber 36	Database Reference ID 347	ISSUES
...if these permits are all granted, researchers will be permitted to engage in activities that may result in the deaths of eight times as many animals as might have been killed in the status quo during 2002; and will be capturing and hot branding almost twice as many. Not only is this level of impact not insignificant, it requires consultation under section 7 of the Endangered Species Act.			ESA

Submission No.	CommentNumber 32	Database Reference ID 343	ISSUES
Clearly permitting these activities was a significant increase over the status quo and should have triggered construction of an EIS and consultation under the Endangered Species Act. Instead, NMFS ignored this obligation and now seeks to allow an even greater impact on the stocks.			ESA NEP

Submission No.	CommentNumber 15	Database Reference ID 326	ISSUES
According to the EA, less than 10 mortalities were reported each year (p. 40). Despite this, researchers are seeking an increase in the number of incidental mortalities. Either they do not need this permission, or they were not reporting mortalities that occurred under their currently permitted activities and are in violation of the ESA and their permit conditions.			ESA REP

Submission No.	CommentNumber 2	Database Reference ID 313	ISSUES
Many of the research projects involve the use of invasive studies and physical handling of animals that subjects them to risk of severe injury and death and appear likely to disadvantage the western stock of Steller sea lions. ...the HSUS believes that the NMFS cannot issue the requested permits without violating the requirements of NEPA, the MMPA and the ESA.			EFF ESA MMP NEP

Endangered Species Act

Submission No.	CommentNumber	Database Reference ID	ISSUES
	1	312	
The HSUS strongly opposes issuance of these permits at this time. We find that the National Marine Fisheries Service (NMFS) has not satisfied the requirements of the National Environmental Policy Act, nor has it met its obligations under the Endangered Species Act (ESA) and the Marine Mammal Protection Act (MMPA). Because the western stock of Steller sea lions is endangered and declining in numbers, NMFS must demonstrate that the permits are non-duplicative, unlikely to adversely affect the stock, and in service of a significant gain in conservation of the species.			ESA MMP NEP
	38	304	
Accordingly, the HSUS must insist that the NMFS not issue any permits, permit extensions or permit modifications involving invasive research until such time as you have completed an Environmental Impact Statement that fully evaluates the individual and cumulative impacts of the proposed research and weighs its contribution to cumulative effects on the stocks from combined mortality and serious injury resulting from fisheries-related mortality and native harvest. The quality of analysis required by NEPA and by both the ESA and the MMPA is simply lacking at this time. Furthermore, we believe that NMFS has an obligation to consult under Section 7 of the ESA on the impacts that this activity will have on the western stock of Steller sea lions, particularly with regard to the additive effects of these permits along with those of native harvest mortality and incidental fisheries-related mortality.			CUM ESA MMP NEP
	36	302	
The information and analysis provided by NMFS so far entirely fails to demonstrate that these permits can be issued without violating NEPA, the ESA and the MMPA.			ESA MMP NEP
	35	301	
Approval for invasive studies by this applicant should be suspended until NMFS can conduct a more comprehensive evaluation of range-wide research, its contribution to specific recovery plan needs and compliance with requirements of NEPA, the ESA, MMPA and Animal Welfare Act.			ESA MMP NEP PER WEL
	26	292	
As we have previously stated, we believe that this and all other permit applications seeking takes for invasive/intrusive activities should be held in abeyance pending a through EIS, a consultation under Section 7 and an analysis of the scope and demographic and geographic parameters that need to be studied, the best techniques for answering key questions and a power analysis of the numbers of animals minimally necessary for invasive/intrusive studies.			ESA MET NEP
	14	280	
All in all, this proposal is requesting a mortality rate as high as 29% of the sampled animals, many of which may be female, a segment of the population that is critical to recovery of the stock. This level of mortality is shocking. It is not clear why any animal care committee would approve this or how the ESA would permit it. If this applicant has experienced mortality in his already permitted research, we see no mention made of it in the EA. If he has not experienced mortalities, it is not clear why such a high percentage of the study population is being sought.			ESA INA MOR

Endangered Species Act

Submission No.	CommentNumber 2	Database Reference ID 268	ISSUES
...we believe that this and all other permit applications seeking takes for invasive/intrusive activities should be held in abeyance pending a thorough EIS, a consultation under Section 7 and an analysis of the scope and demographic and geographic parameters that need to be studied, the best techniques for answering key questions and a power analysis of the numbers of animals minimally necessary for invasive/intrusive studies.			ESA MET NEP

Submission No.	CommentNumber 6	Database Reference ID 108	ISSUES
Defenders urges that the NMFS defer final action on the permits, permit extensions or permit modifications until such time as you have completed an EIS that fully evaluates the individual and cumulative impacts of the proposed research and weighs its contribution to cumulative effects on the stocks from multiple factors discussed previously. Only that research which is clearly non-duplicative and addresses compelling conservation needs should be permitted. This degree of analysis is required under both the ESA and the MMPA and is lacking at this time.			CUM ESA MMP NEP

Submission No.	CommentNumber 2	Database Reference ID 104	ISSUES
Based on our review of the permits and previous comments submitted by the Marine Mammal Commission, we find that the National Marine Fisheries Service (NMFS) cannot meet its burden under the Endangered Species Act (ESA) and the Marine Mammal Protection Act (MMPA) to show that this research will clearly benefit the conservation of this species, that there is good coordination between the different research projects, that the effects of the research can be adequately monitored by NMFS, and that the level of incidental mortality (as a result of the research) is below an acceptable level.			CON COR ESA MMP MOR

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Effects of Research

Submission No.	CommentNumber	Database Reference ID	ISSUES
	17	37	
...attempts to take biopsies by shooting darts at these targets pose an unacceptable risk of striking an animal in the head and causing serious injury.			EFF PER
	1	8	
The level of cruelty of this research is disturbing, and we query the rationale to justify such studies. Extensive research on these populations has already been performed.			EFF
	1	109	
Any given research method can have a wide range of disturbance effects depending on other variables.			EFF
	78	98	
...the proposed multi-year activities could have adverse effects on both individual Steller seal lions and sea lion populations.			EFF
	63	83	
In light of the considerable increase in research activities (including a number that would employ invasive techniques that pose risks to the sea lions involved), the potential for disturbance of animals at rookeries and haulouts, the lack of a monitoring plan to assess incidental impacts, the lack of an adequate cumulative effects analysis, and the ongoing decline of the western population of Steller sea lions, significant adverse effects resulting from the proposed and ongoing research activities cannot be ruled out.			CUM EFF MON
	55	75	
...it is important to evaluate the research activities thoroughly to ensure that they do not, either by themselves or in combination with other activities, have significant adverse impacts on the subject populations or their recovery.			EFF
	1	144	
...it is essential that all direct, indirect and cumulative impacts of the research program are carefully evaluated and all projects are shown to be essential for the conservation of the species.			CON EFF

Effects of Research

Submission No.	CommentNumber 47	Database Reference ID 67	ISSUES
Branding poses risks associated with capture, handling, and infliction of burn wounds that may become infected, and the disruption to rookeries. The permit applications (and the environmental assessment) do not discuss these concerns in sufficient detail and have not provided the requisite level of assurance that resighting efforts will be adequate to yield meaningful results.			BRD EFF

Submission No.	CommentNumber 2	Database Reference ID 145	ISSUES
Some of the proposed research entails extensive disturbance affecting thousands of animals at multiple times of the year as well as highly intrusive procedures directly affecting thousands of animals at multiple times of the year as well as highly intrusive procedures directly affecting hundreds of individual animals every year, particularly those young animals whose survival is thought to be most at risk.			EFF

Submission No.	CommentNumber 10	Database Reference ID 30	ISSUES
The investigators describe the attachment of a number of instruments to animals, but do not provide complete information on the size and weight of the instruments. Although large animals may be unaffected by such instruments, this is not necessarily the case for smaller animals, and information on dimensions and weight should be provided as well as an assessment of possible effects.			EFF INA

Submission No.	CommentNumber 8	Database Reference ID 28	ISSUES
Darting adult female sea lions with Telazol, as proposed, involves a high risk of mortality, either from their reaction to the drug or from drowning if they enter the water before the drug takes full effect.			EFF MOR

Submission No.	CommentNumber 6	Database Reference ID 26	ISSUES
...the Marine Mammal Commission recommends that clarification of the basis for the three-hour time frame be provided by the applicant, including the length of time that animals will be held after concluding the research procedures to ensure that they have recovered sufficiently from the effects of the anesthesia.			EFF

Submission No.	CommentNumber 3	Database Reference ID 23	ISSUES
...whether, and to what extent, attempts will be made to monitor the short- and long-term adverse effects of the research efforts;			EFF MON

Submission No.	CommentNumber 3	Database Reference ID 17	ISSUES
Many of the methods are invasive and could have potential fitness costs, especially to the pups. Pups being subjected to as many as 15 different intrusive procedures each season seems excessive in and endangered/threatened population.			EFF MET

Submission No.	CommentNumber 4	Database Reference ID 18	ISSUES
Are the invasive methodologies absolutely necessary? Starving 16 juvenile sea lions hardly seems necessary or ethical.			EFF MET

Effects of Research

Submission No.	CommentNumber	Database Reference ID	ISSUES
	49	69	
Research activities may pose significant risks to a study population if they cause reductions in survival or reproduction. Such effects can result directly (e.g., animals that die in the course of sampling or experimentation) or indirectly (e.g., animals that are disturbed by research activities and abandon important habitat or dependent pups).			EFF
	10	249	
The total number of animals that would potentially be harassed/disturbed/sampled is approximately 40,400! Harassing this large a number of an endangered or threatened species should not be taken lightly and disturbance may be considerable in certain areas.			CUM EFF
	54	365	
HSUS simply cannot countenance research of this magnitude with the potential for duplicative sampling, inhumane treatment and unproven conservation benefit.			CON DUP EFF
	49	360	
If sampling protocol is adequately designed for the stock, only a limited number of animals need to be anesthetized and thus mortality risk can be limited as well. Current proposals would cause needless suffering.			EFF MET
	26	337	
While the HSUS questions the appropriateness and humaneness of some of the research that is proposed, our greatest concern is that the combined effect of this research is NOT negligible.			EFF
	2	313	
Many of the research projects involve the use of invasive studies and physical handling of animals that subjects them to risk of severe injury and death and appear likely to disadvantage the western stock of Steller sea lions. ...the HSUS believes that the NMFS cannot issue the requested permits without violating the requirements of NEPA, the MMPA and the ESA.			EFF ESA MMP NEP
	12	278	
...NMFS needs to examine the area wide consequences of displacement of animals during close vessel approaches and while researchers enter a colony to collect scat. It would be helpful to provide reviewers with a report of at least the previous year's studies to allow a better understanding of the adverse consequences of sampling.			EFF
	2	110	
...the weather following a minor research disturbance can amplify disturbance effects.			EFF

Effects of Research

Submission No.	CommentNumber	Database Reference ID	ISSUES
	11	250	
If we look at the total number of animals to be captured... This totals 2,185 Steller sea lions who will be subjected to "one of the most stressful incidents in life"! Of those animals who will be captured, applicants seek permission to have over 50 of them die as a result of their activities. This appears to be an unacceptably high level of stress and mortality for a stock that is already declining in many parts of its range.			EFF MOR
	48	359	
...the HSUS is not convinced that all of the research meets the mandates for humane treatment of research subjects.			EFF
	2	181	
The EIS should describe the potential impacts to recovery of the species from the proposed actions			EFF NEP
	35	178	
...some of this research will simply cause unnecessary disturbance and increase mortality on the endangered stock without contributing significantly to the conservation of Steller sea lions – a key consideration when determining whether or not to permit the proposed research activities:			EFF MOR
	25	168	
NMFS should more carefully evaluate the extent to which research procedures may increase the incidence of infection, disease and/or predation on test animals that are subjected to repeated stress and disturbance, immobilizing drugs, anesthesia, tooth extractions, biopsies, branding, attachment of instruments, or even long-term (up to 3 months) captivity and surgical implantation of experimental monitoring devices.			EFF
	24	167	
...potential for harm from such techniques may be outweighed by the benefits to be gained from the ability to identify animals across multiple years, but only if there is a long-term commitment to monitor the status of branded animals.			BRD EFF MON
	18	161	
Using captive animals from the endangered population as guinea pigs to test the viability of the surgical implantation technique is not an appropriate form of research, and we agree with the decision of NMFS that this portion of the ASLC project should not be considered or permitted at this time.			CON EFF
	6	149	
NMFS has not demonstrated that the impacts of the proposed action will be insignificant or satisfy all permitting criteria. In fact, we are concerned that substantial direct, indirect, and cumulative effects of the proposed action in Alternative 2 may result in further jeopardy to the species.			CUM EFF

Effects of Research

Submission No.	CommentNumber 27	Database Reference ID 266	ISSUES
...there is apparent duplication of sampling area; that some of the projects do not appear humane; and that the finding of negligible impacts, particularly for the Western stock, are not well founded.			DUP EFF INA

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Editorial

Submission No.	CommentNumber 27	Database Reference ID 293	ISSUES
...there are apparent discrepancies in the mortalities that this applicant reports. Discrepancies of this sort call into question the accuracy of the reportand and thus the impacts on these ESA listed stocks.			EDI REP

Submission No.	CommentNumber 24	Database Reference ID 263	ISSUES
The HSUS notes that the applicant requests 8 mortalities per year (p. 33), whereas the chart on p. 69 states that they are only requesting 5 accidental mortalities. It is not clear that these mortalities are warranted, particularly the 3 that are reserved for animals captured and held at the ASLC. This represents a 3-month death rate of 18%, which is unacceptably high for animals in a captive facility. This level is far from humane and far from negligible for the number in captivity. This portion of the permit should be denied.			EDI MOR PER

Submission No.	CommentNumber 18	Database Reference ID 255	ISSUES
Additionally, we feel that insufficient attention was given to consideration of post-capture myopathy. We note that although NMFS states in the EA on p. 69 that ADFG proposes 10 accidental mortalities per year, the chart on p. 9 of the applications stipulates 5 per year.			EDI MON

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Duplication of Research Effort or Goals

Submission No.	CommentNumber 54	Database Reference ID 365	ISSUES
HSUS simply cannot countenance research of this magnitude with the potential for duplicative sampling, inhumane treatment and unproven conservation benefit.			CON DUP EFF
Submission No.	CommentNumber 35	Database Reference ID 346	ISSUES
NMFS cannot continue to assert that the research has no adverse consequence nor that NMFS can properly control the levels of mortalities or assure that research is coordinated, and non-duplicative and likely to yield results that will significantly aid conservation and management.			COR DUP
Submission No.	CommentNumber 3	Database Reference ID 314	ISSUES
The NMFS is proposing to issue nine permits. Many of them propose to conduct identical activities. For example, seven of the applicants seek to capture animals for sampling of tissues, hot branding and other invasive procedures, four of them indicate that their activities would be "state wide," and one additional permit would overlap in the Gulf of Alaska and Aleutians.			COR DUP
Submission No.	CommentNumber 27	Database Reference ID 268	ISSUES
...there is apparent duplication of sampling area; that some of the projects do not appear humane; and that the finding of negligible impacts, particularly for the Western stock, are not well founded.			DUP EFF INA
Submission No.	CommentNumber 19	Database Reference ID 258	ISSUES
It is not entirely clear why Dr. Davis, who is receiving funding from two other permit applicants (NMFS and ASLC) cannot conduct his activities under the auspices of their permits rather than seeking separate take authorizations. Effort should be made to avoid duplicative sampling or harassment wherever possible.			DUP PER
Submission No.	CommentNumber 18	Database Reference ID 257	ISSUES
This proposal would utilize a crossbow to collect biopsy samples... It states that "whenever possible" this will be done in conjunction with NMFS and ADFG. This should be made mandatory to avoid duplicative sampling of animals.			DUP
Submission No.	CommentNumber 9	Database Reference ID 136	ISSUES
...permits should not be issued for Alaska-wide research until and unless there is a written plan indicating how multiple permittees will coordinate their studies and ensure that that research will cover appropriate times, area, and demographic classes, and is not duplicative.			COR DUP PER

Duplication of Research Effort or Goals

Submission No.	CommentNumber	Database Reference ID	ISSUES
	1	103	
...we have concerns that the research is duplicative, likely to adversely affect the stocks, and it is not clear from these permits that significant gains in conservation will clearly outweigh the negative impacts to the Steller sea lion populations.			DUP INA
	51	71	
...the lack of information on the location and time of research activities precludes an evaluation of how proposed activities and their incidental effects may overlap or be concentrated.			DUP INA
	4	11	
Any intended research project that duplicates previous efforts should be dismissed.			DUP
	4	4	
- Issued research permits are limited to specific geographic areas to reduce duplication and encourage coordination.			CRE DUP

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Cumulative Effects

Submission No.	CommentNumber 6	Database Reference ID 108	ISSUES
Defenders urges that the NMFS defer final action on the permits, permit extensions or permit modifications until such time as you have completed an EIS that fully evaluates the individual and cumulative impacts of the proposed research and weighs its contribution to cumulative effects on the stocks from multiple factors discussed previously. Only that research which is clearly non-duplicative and addresses compelling conservation needs should be permitted. This degree of analysis is required under both the ESA and the MMPA and is lacking at this time.			CUM ESA MMP NEP
Submission No.	CommentNumber 1	Database Reference ID 1	ISSUES
API asks that NMFS consider the impacts to the population as well as the welfare of individual animals when reviewing research proposals.			CUM WEL
Submission No.	CommentNumber 12	Database Reference ID 204	ISSUES
Within the EIS, there should be discussion the synergistic effects of using a variety of sampling procedures on individuals.			CUM NEP
Submission No.	CommentNumber 16	Database Reference ID 159	ISSUES
The cumulative effects analysis needs to consider the effects of research stress being added to nutritional stress.			CUM
Submission No.	CommentNumber 15	Database Reference ID 158	ISSUES
...the cumulative effects analysis the EA does contain is internally confused and appears to be inadequate.			CUM
Submission No.	CommentNumber 14	Database Reference ID 157	ISSUES
The direct, indirect and cumulative effects of all research activities should be analyzed in a single NEPA document.			CUM NEP
Submission No.	CommentNumber 8	Database Reference ID 149	ISSUES
NMFS has not demonstrated that the impacts of the proposed action will be insignificant or satisfy all permitting criteria. In fact, we are concerned that substantial direct, indirect, and cumulative effects of the proposed action in Alternative 2 may result in further jeopardy to the species.			CUM EFF

Cumulative Effects

Submission No.	CommentNumber	Database Reference ID	ISSUES
	41	233	
We note that and environmental impact statement conducted pursuant to authorizing native subsistence hunting of fur seals found that there are "conditionally significant adverse cumulative effect[s]" from commercial fisheries and native subsistence hatvest. (NMFS 2005) Because of this, it is important that the EIS weigh potential impacts of capture and intrusive research quite carefully.			CUM NEP
Submission No.	CommentNumber 3	Database Reference ID 105	ISSUES
Cumulative effects of the proposed research, in combination with other factors (fisheries interactions through incidental take in gear and depletion of preferred sea lion prey, regime shifts causing changes in prey abundance, native subsistence hunting, deliberate shooting of sea lions viewed as "competitors", disease and other possible impacts) that are affecting Steller sea lion populations, especially the "endangered" western stock, could have significant adverse impacts on the population. Understanding better how these cumulative effects might affect Steller sea lion populations is particularly important for assessing the effects and benefits to a species listed under the Endangered Species Act.			CUM
Submission No.	CommentNumber 44	Database Reference ID 236	ISSUES
Sampling techniques should be evaluated for their individual and cumulative or synergistic effect on individual animals and/or populations.			CUM
Submission No.	CommentNumber 79	Database Reference ID 99	ISSUES
It is conceivable that the extensive research described in the existing permits, together with the additional research requested in the proposed amendments, and other research, may become a significant factor affecting the status of the species.			CUM
Submission No.	CommentNumber 63	Database Reference ID 83	ISSUES
In light of the considerable increase in research activities (including a number that would employ invasive techniques that pose risks to the sea lions involved), the potential for disturbance of animals at rookeries and haulouts, the lack of a monitoring plan to assess incidental impacts, the lack of an adequate cumulative effects analysis, and the ongoing decline of the western population of Steller sea lions, significant adverse effects resulting from the proposed and ongoing research activities cannot be ruled out.			CUM EFF MON
Submission No.	CommentNumber 62	Database Reference ID 82	ISSUES
Therefore, the cumulative effects analysis is incomplete and, in the absence of such an analysis, the conclusion of no significant adverse impact seems unfounded.			CUM NEP
Submission No.	CommentNumber 61	Database Reference ID 81	ISSUES
...the environmental assessment includes a cumulative effects analysis that fails to consider the effects of the proposed research together with the effects of all of the other factors that are, or may be, affecting sea lions.			CUM

Cumulative Effects

Submission No.	CommentNumber 50	Database Reference ID 70	ISSUES
Although such effects are not intentional, they may be of sufficient magnitude that, either by themselves or in combination with other human-related effects, they result in significant adverse effects on the study population.			CUM

Submission No.	CommentNumber 1	Database Reference ID 21	ISSUES
However, we are concerned that, given the number of projects authorized and proposed, many of which are invasive in nature, they may cumulatively operate to the disadvantage of the western Steller sea lion population.			CUM

Submission No.	CommentNumber 2	Database Reference ID 126	ISSUES
the commercial fishermen are taking all their food and shooting them to death the researchers hassle them to death the ships kill them the polluters like exxon cause their death the govt agencies (air force) etc kill them the developers kill them with their building explosions sonar kills them (us navy)			CUM

Submission No.	CommentNumber 1	Database Reference ID 307	ISSUES
...PBR was originally developed to deal with fishery situations when the removals were from immediate injuries or death, however, I think we should expand that concept to include cumulative effects.			CUM

Submission No.	CommentNumber 43	Database Reference ID 354	ISSUES
Instead of providing assurance that the intrusive procedures that are proposed are necessary and proportional to the questions that need to be addressed, the NMFS has simply passed along each proposal ad hoc, with no attempt in the EA to address the necessity or scope of the research proposals or to assess cumulative effects on mortality and morbidity of individuals and any consequent range-wide or localized population level effects.			CUM MET NEP

Submission No.	CommentNumber 29	Database Reference ID 340	ISSUES
It is simply not sufficient for the agency charged with protecting this endangered species to simply adopt the assertion of the researcher applicants that they must risk the lives and health of animals and add to the already unsuitable cumulative impacts on the stock, without consideration of other alternatives.			ALT CUM

Submission No.	CommentNumber 16	Database Reference ID 327	ISSUES
The EA also fails to adequately address the cumulative impacts of the proposed permits, as required by NEPA.			CUM

Cumulative Effects

Submission No.	CommentNumber 14	Database Reference ID 325	ISSUES
The cumulative research-related incidental mortality could exceed the PBR for the stock when added to other anthropogenic mortality and is clearly a significant impact. This endangered stock is already subjected to cumulative mortality that is arguably unsustainable, given its on-going decline. The request for research-related incidental mortality is well above a level that the ESA would consider "negligible."			CUM PBR

Submission No.	CommentNumber 10	Database Reference ID 321	ISSUES
The current EA proposes research on an even greater scale, speculates that even more research will be proposed in the future, and yet it provides no further analysis of possible adverse effects from past research or cumulative effects from this research.			CUM

Submission No.	CommentNumber 9	Database Reference ID 320	ISSUES
Researchers note (see below) that dependent pups may be separated from their mothers and that rookeries may suffer significant and repeated short-term disruption. The EA does little to attempt to assess cumulative impacts from either of these incidental effects, nor did the previous EA from 2002.			CUM

Submission No.	CommentNumber 21	Database Reference ID 213	ISSUES
...the EIS should examine research conducted elsewhere on various pinniped species to ascertain effects. It is also important that the EIS evaluate the appropriateness of using less vulnerable surrogate species to test hypotheses regarding the short and long-term effects of a multiplicity of procedures used on Steller sea lions and used or proposed for use on fur seals.			CUM MET NEP

Submission No.	CommentNumber 2	Database Reference ID 308	ISSUES
...how well researchers coordinate their efforts and avoid duplication of effort will impact the cumulative effect.			CUM

Submission No.	CommentNumber 44	Database Reference ID 355	ISSUES
As we have discussed above, it is clear that the cumulative impact of granting these permits is likely to have an adverse impact on the western stock of Steller sea lions and requires consultation under the ESA.			CUM ESA

Submission No.	CommentNumber 38	Database Reference ID 304	ISSUES
Accordingly, the HSUS must insist that the NMFS not issue any permits, permit extensions or permit modifications involving invasive research until such time as you have completed an Environmental Impact Statement that fully evaluates the individual and cumulative impacts of the proposed research and weighs its contribution to cumulative effects on the stocks from combined mortality and serious injury resulting from fisheries-related mortality and native harvest. The quality of analysis required by NEPA and by both the ESA and the MMPA is simply lacking at this time. Furthermore, we believe that NMFS has an obligation to consult under Section 7 of the ESA on the impacts that this activity will have on the western stock of Steller sea lions, particularly with regard to the additive effects of these permits along with those of native harvest mortality and incidental fisheries-related mortality.			CUM ESA MMP NEP

Cumulative Effects

Submission No.	CommentNumber 34	Database Reference ID 300	ISSUES
There is no accompanying chart to allow reviewers to view the morphing of the various "tasks" that are requested for modification, nor is there any discussion of why any particular modification is important or whether it has been tried elsewhere or is novel and how it may or may not compromise comparison and analysis of data obtained from animals not subjected to the protocols. Nor is there discussion of the synergistic or cumulative effect of the various sampling and tracking and device attachment.			CUM INA

Submission No.	CommentNumber 28	Database Reference ID 294	ISSUES
...ASLC has requested six separate permit modifications just in the past 18 months. This it is almost impossible for reviewers to ascertain whether these modifications (many of which request additional sampling procedures) will affect the reliability of the information that is being gathered and/or whether synergistic effects of multiple sampling of both free ranging and captive animals and changes in sampling protocols for the same animals or comparable cohorts compromises the reliability or validity of the data being collected.			CRE CUM MET

Submission No.	CommentNumber 10	Database Reference ID 249	ISSUES
The total number of animals that would potentially be harassed/disturbed/sampled is approximately 40,400! Harassing this large a number of an endangered or threatened species should not be taken lightly and disturbance may be considerable in certain areas.			CUM EFF

Submission No.	CommentNumber 9	Database Reference ID 248	ISSUES
Cumulative impacts are not addressed.			CUM

Submission No.	CommentNumber 8	Database Reference ID 247	ISSUES
The limited discussion of the need for a monitoring plan only addresses concerns regarding synergistic effects of invasive procedures. It is not apparent that such a plan would consider the stress of the cumulative effects of being captured multiple times, and of being harassed during survey activities and scat collection in the rookeries.			CUM MON

Submission No.	CommentNumber 8	Database Reference ID 319	ISSUES
...the EA states (p. 39) that "[t]here have been no recent studies dedicated to documenting and assessing the effects of research on Steller sea lions or other marine mammals at a population level, nor on the synergistic or cumulative effects of various research activities and other human-related impacts on individual marine mammals or populations." Yet NMFS asserts that the proposed research will not likely have adverse effects. This contention appears unsupported.			CUM NEP

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Credentials of Researchers Are Questioned

Submission No.	CommentNumber 28	Database Reference ID 294	ISSUES
...ASLC has requested six separate permit modifications just in the past 18 months. This it is almost impossible for reviewers to ascertain whether these modifications (many of which request additional sampling procedures) will affect the reliability of the information that is being gathered and/or whether synergistic effects of multiple sampling of both free ranging and captive animals and changes in sampling protocols for the same animals or comparable cohorts compromises the reliability or validity of the data being collected.			CRE CUM MET

Submission No.	CommentNumber 25	Database Reference ID 217	ISSUES
The degree of supervision is not specified and the degree to which they will be performing intrusive, potentially injurious procedures is not clear, simply that their "qualifications and experience must be commensurate with his/her assigned responsibilities"... It would be helpful for the EIS to evaluate standards used in other species as well as for pinniped research in other species and/or areas.			CRE NEP

Submission No.	CommentNumber 20	Database Reference ID 212	ISSUES
In any case, we believe that there should be no research conducted until and unless the NMFS has a written coordination plan indicating when, where and who specific permittees will be sampling to assure that there is no duplication of effort and that sampling is being conducted in all appropriate areas and times.			CRE

Submission No.	CommentNumber 19	Database Reference ID 211	ISSUES
The EIS should consider the appropriateness of granting permits for smaller geographic areas or coordinating research of a particular type through a single permit as a means of assisting in coordination.			CRE NEP

Submission No.	CommentNumber 7	Database Reference ID 115	ISSUES
Additionally personnel who are working on a rookery should be briefed by an experienced biologist on how to minimize the spooking of sea lions (such as staying low and moving slow, minimizing time on a rookery).			CRE MET

Submission No.	CommentNumber 74	Database Reference ID 94	ISSUES
· inasmuch as the use of a crossbow for biopsy sampling has not been previously used on Steller sea lions, the Service be satisfied that the individual(s) carrying out the biopsy sampling are sufficiently experienced and the technique and equipment have been adequately tested prior to authorizing the activity on animals in the field;			CRE

Credentials of Researchers Are Questioned

Submission No.	CommentNumber	Database Reference ID	ISSUES
	70	90	
· surgical implants of instruments be performed by experienced marine mammal veterinarians, and the animals be fully recovered from anesthesia and exhibiting no ill effects of the surgery prior to release;			CRE MET
	71	91	
· an experienced marine mammal veterinarian be present in the field to carry out or to provide direct on-site supervision of all activities involving anesthesia of animals;			CRE
	28	48	
Although the application implies that a veterinarian will be present to monitor anesthetized animals and to supervise personnel directly, it is not clear that this will be the case.			CRE
	24	44	
Further, a curriculum vitae for the veterinarian(s) who would be involved in the research has not been, but should be, provided.			CRE
	18	38	
In addition, the individual(s) who will be darting the animals should be thoroughly trained and experienced in using the technique prior to employing this method in the field, and animals in the water should not be darted.			CRE
	9	29	
...only veterinarians and biologists with significant experience in darting marine mammals be authorized to conduct the activity.			CRE
	7	27	
We also note that, although the application states that a veterinarian will be present to monitor anesthetized animals, a curriculum vitae for the veterinarian(s) who would be involved has not been, but should be, provided.			CRE
	5	25	
...the Commission remains concerned that the cumulative effects of the proposed research, in combination with other factors that are affecting the western population of Steller sea lions, could have significant adverse impacts on the population.			CRE

Credentials of Researchers Are Questioned

Submission No.	CommentNumber 4	Database Reference ID 4	ISSUES
Issued research permits are limited to specific geographic areas to reduce duplication and encourage coordination.			CRE DUP

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Coordination

Submission No.	CommentNumber 9	Database Reference ID 152	ISSUES
...we have major concerns about the efficacy of the experimental protocols, sampling regimes, and statistical power to detect effects, as well as the ability of NMFS to coordinate and synthesize the data generated by such a large research program involving many different agencies and institutions as well as hundreds of scientists.			COR

Submission No.	CommentNumber 20	Database Reference ID 40	ISSUES
It is also not clear why this study is not being coordinated with other aerial surveys proposed for southeastern Alaska.			COR MET

Submission No.	CommentNumber 30	Database Reference ID 50	ISSUES
...it would be useful to compare the criteria developed by the Alaska SeaLife Center with similar criteria being developed by the Service for releasing captive marine mammals to the wild to ensure that the Center's list of criteria is comprehensive.			COR MET

Submission No.	CommentNumber 44	Database Reference ID 64	ISSUES
The lack of information on the area and time during which research activities would occur also makes it impossible to determine if the research is being suitably coordinated to provide the best scientific information with the least practicable adverse effects on the animals resulting from handling and disturbance.			COR SAM

Submission No.	CommentNumber 60	Database Reference ID 80	ISSUES
It is not possible to determine from the permit applications how such coordination will be accomplished. In particular, we are concerned that the lack of information on the spatial and temporal distribution of the different research efforts precludes and analysis of overlap of research by different agencies and organizations, which would seem to be essential for adequate coordination.			COR INA

Submission No.	CommentNumber 76	Database Reference ID 96	ISSUES
the Service ensure that activities to be conducted under these permits and those of other permit holders who might be carrying out research on the same species in the same areas are coordinated and, as possible, data are shared to avoid unnecessary duplication of research and disturbance of animals; and			COR PER

Coordination

Submission No.	CommentNumber 82	Database Reference ID 102	ISSUES
...the recovery plan should be updated and the recovery team should be more effectively incorporated into research planning.			CON COR

Submission No.	CommentNumber 2	Database Reference ID 104	ISSUES
Based on our review of the permits and previous comments submitted by the Marine Mammal Commission, we find that the National Marine Fisheries Service (NMFS) cannot meet its burden under the Endangered Species Act (ESA) and the Marine Mammal Protection Act (MMPA) to show that this research will clearly benefit the conservation of this species, that there is good coordination between the different research projects, that the effects of the research can be adequately monitored by NMFS, and that the level of incidental mortality (as a result of the research) is below an acceptable level.			CON COR ESA MMP MOR

Submission No.	CommentNumber 2	Database Reference ID 120	ISSUES
As NMFS develops and considers the alternatives to be presented in the Draft EIS, it is important that attention is given to the ways in which the permit process and the associated NOAA grant programs can ensure committed long-term funding and coordination of research programs designed to collect critical life-history data for these long-lived species.			COR

Submission No.	CommentNumber 4	Database Reference ID 24	ISSUES
...the extent to which the various research activities will be coordinated.			COR

Submission No.	CommentNumber 9	Database Reference ID 136	ISSUES
...permits should not be issued for Alaska-wide research until and unless there is a written plan indicating how multiple permittees will coordinate their studies and ensure that that research will cover appropriate times, area, and demographic classes, and is not duplicative.			COR DUP PER

Submission No.	CommentNumber 42	Database Reference ID 353	ISSUES
Telemetry is an important tool, yet is not clear if it is necessary for four different permittees to use this tool or whether there is any coordination among researchers to assure that the animals being sampled are representative for obtaining the information that is necessary.			COR SAM

Submission No.	CommentNumber 13	Database Reference ID 156	ISSUES
...analysis of the various research activities is being piecemealed, rather than considered in a single NEPA document.			COR NEP

Submission No.	CommentNumber 26	Database Reference ID 169	ISSUES
...a lack of integrated research, poor coordination of existing research projects, as well as serious limitations in experimental protocols, sample sizes, and statistical power to detect effects.			COR SAM

Coordination

Submission No.	CommentNumber 2	Database Reference ID 194	ISSUES
NMFS has granted the multiple proposals without any apparent regard to how they fit together to illuminate key questions. Previous permit applications show little evidence of a coordinated approach to sampling. Permits have been issued for "Alaska wide" activities to multiple permittees with no plan for coordination. This sort of approach can lead to some areas being over sampled and some areas receiving no sampling, with no justification provided for the geographic structure of sampling.			COR PER

Submission No.	CommentNumber 36	Database Reference ID 228	ISSUES
If they propose to do invasive sampling or marking, they should justify why their chosen methodologies are more appropriate than other less intrusive measures or approaches to addressing the question. This specifically will also aid the NMFS in its efforts to coordinate research and assure minimal effect.			COR PER

Submission No.	CommentNumber 1	Database Reference ID 240	ISSUES
However, it is not clear that adequate coordination of these various research proposals has taken place and it is not clear that the proposals meet all of the conditions stipulated in the Marine Mammal Protection Act (MMPA or Act).			COR MMP

Submission No.	CommentNumber 3	Database Reference ID 314	ISSUES
The NMFS is proposing to issue nine permits. Many of them propose to conduct identical activities. For example, seven of the applicants seek to capture animals for sampling of tissues, hot branding and other invasive procedures, four of them indicate that their activities would be "state wide," and one additional permit would overlap in the Gulf of Alaska and Aleutians.			COR DUP

Submission No.	CommentNumber 7	Database Reference ID 318	ISSUES
Without coordination, there is no way to assure that there will not be an overlap of effort and an unnecessarily adverse impact on the stock.			COR

Submission No.	CommentNumber 35	Database Reference ID 346	ISSUES
NMFS cannot continue to assert that the research has no adverse consequence nor that NMFS can properly control the levels of mortalities or assure that research is coordinated, and non-duplicative and likely to yield results that will significantly aid conservation and management.			COR DUP

Submission No.	CommentNumber 1	Database Reference ID 119	ISSUES
A central component of [Pribilof Islands Collaborative] PIC statement, as well as the conservation and recovery plans for these species is the need for focused long-term studies that are carefully coordinated among research organizations.			COR

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Conservation (of the species; conservation goals)

Submission No.	CommentNumber 18	Database Reference ID 161	ISSUES
Using captive animals from the endangered population as guinea pigs to test the viability of the surgical implantation technique is not an appropriate form of research, and we agree with the decision of NMFS that this portion of the ASLC project should not be considered or permitted at this time.			CON EFF

Submission No.	CommentNumber 21	Database Reference ID 41	ISSUES
Without additional information on these studies, it does not seem possible to confirm that they will achieve the stated research objectives or will contribute to the conservation and recovery effort for Steller sea lions.			CON INA

Submission No.	CommentNumber 33	Database Reference ID 53	ISSUES
(page 33) Task 3.3. Table 1 includes an entry pertaining to adrenocorticotropic hormone challenge. This activity is not further explained and no rationale for such a study is provided. Thus, it is not clear why it is included here, how it might contribute to recovery efforts for Steller sea lions, or why permission for this activity is being requested. Such information should be provided before authorization of this activity is considered.			CON PER

Submission No.	CommentNumber 48	Database Reference ID 68	ISSUES
If such efforts are not adequate, then the studies proposed will not achieve their stated objectives, the animals involved will be exposed to unnecessary risks, and the research will not contribute to the recovery and conservation of the Steller sea lion.			CON

Submission No.	CommentNumber 82	Database Reference ID 102	ISSUES
...the recovery plan should be updated and the recovery team should be more effectively incorporated into research planning.			CON COR

Submission No.	CommentNumber 2	Database Reference ID 104	ISSUES
Based on our review of the permits and previous comments submitted by the Marine Mammal Commission, we find that the National Marine Fisheries Service (NMFS) cannot meet its burden under the Endangered Species Act (ESA) and the Marine Mammal Protection Act (MMPA) to show that this research will clearly benefit the conservation of this species, that there is good coordination between the different research projects, that the effects of the research can be adequately monitored by NMFS, and that the level of incidental mortality (as a result of the research) is below an acceptable level.			CON COR ESA MMP MOR

Conservation (of the species; conservation goals)

Submission No.	CommentNumber	Database Reference ID	ISSUES
	1	144	
...it is essential that all direct, indirect and cumulative impacts of the research program are carefully evaluated and all projects are shown to be essential for the conservation of the species.			CON EFF
	5	19	
To what extent does this research benefit the animals? Only research that ultimately benefits the population should be allowed. Research should be directed towards the recovery of the population and should be evaluated on that basis.			CON
	7	150	
We do not think NMFS has shown that all projects and procedures in the proposed action are necessary and essential to the conservation of Steller sea lions...			CON
	54	365	
HSUS simply cannot countenance research of this magnitude with the potential for duplicative sampling, inhumane treatment and unproven conservation benefit.			CON DUP EFF
	22	165	
...the rationale for mass flipper-tagging of young animals as a standard practice is not at all clear in this EA.			CON SAM
	34	177	
...we express our support for legitimate, coordinated research that is focused on gathering information that will contribute to our understanding of the causes of decline of Steller sea lions.			CON
	21	260	
While underwater videotaping may be interesting, we do not believe it is critical to understanding the foraging issues facing Steller sea lions.			CON
	10	276	
The HSUS questions the conservation benefit of this proposal to the conservation needs of threatened eastern stock Steller sea lions. ...given the ESA and MMPA prohibition against stressful and invasive research that is not intended to address conservation and recovery goals. Thus, this permit should be denied.			CON PER

Conservation (of the species; conservation goals)

Submission No.	CommentNumber	Database Reference ID	ISSUES
	40	306	
The HSUS cannot countenance the conduct of research that will not clearly contribute to the conservation of the species or is inhumane to the individual animals that are affected. Accordingly, should NMFS issue the proposed permits, The HSUS will have no choice but to consider all methods, including legal action, to ensure that NMFS adheres to the requirements of federal laws and regulations before authorizing scientific research on endangered and threatened species of marine mammals.			CON NEP
	17	328	
The EA outlines the various priorities of Congress and the recovery plan with regard to gathering information to elucidate the causes and extent of the decline in western Steller sea lions. Yet, without some guidance by the NMFS or an outside group, it is not clear that the activities proposed in these permits meet these goals individually or in total.			CON
	19	330	
...we are also concerned that the proposed research does not appear to have been constructed in such a way as to assure that the goals of conservation are served.			CON
	5	148	
...permitted research projects must be shown to contribute significantly to fulfillment of objectives for understanding the management actions needed to recover Steller sea lions, using techniques without significant adverse impacts to the species (EA, p. 11).			CON

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Hot Branding

Submission No.	CommentNumber	Database Reference ID	ISSUES
	11	277	
Hot branding has been conducted for three decades, with varying levels of success and mortality... Thus it would appear that this sort of study is unnecessary.			BRD PER
	22	42	
Clarification should be requested as to the minimum age and size of pups that will be hot-branded.			BRD INA PER
	35	55	
(page 41). Task 2. The application does not include branding in the list of requested take activities, and it is not clear if these animals would be branded.			BRD PER TAK
	47	67	
Branding poses risks associated with capture, handling, and infliction of burn wounds that may become infected, and the disruption to rookeries. The permit applications (and the environmental assessment) do not discuss these concerns in sufficient detail and have not provided the requisite level of assurance that resighting efforts will be adequate to yield meaningful results.			BRD EFF
	68	88	
· all branding activities be accompanied by effective programs to monitor their short- and long-term effects;			BRD MON
	9	117	
Branding is a valuable tool for Steller sea lion researchers, however it can be a large disturbance also. The time spent on a rookery branding, which separates parents and pups, might lead to higher pup mortality, depending on conditions.			BRD
	23	166	
...the preferred technique of hot-branding large numbers of pups and young juveniles may lead to substantial mortalities (EA, p. 53), raising questions about the degree to which vital rates information gleaned from branded animals may be biased by the experiment itself.			BRD MET

Hot Branding

Submission No.	CommentNumber	Database Reference ID	ISSUES
	24	167	
...potential for harm from such techniques may be outweighed by the benefits to be gained from the ability to identify animals across multiple years, but only if there is a long-term commitment to monitor the status of branded animals.			BRD EFF MON
	7	7	
· Finally, that the humaneness of the techniques used are critically evaluated. Hot iron branding, for example, should be prohibited. Limited time, money, energy, and motivation are not excuses for using painful and harmful techniques on animals when alternatives are available or can be developed.			BRD MET NEP
	15	254	
The HSUS suggests that the ADFG may wish to spend more effort trying to re-sight animals and analyze the information from re-sighting, rather than continuing to brand additional animals. If continued or additional branding is authorized, the applicant must be required to monitor post-branding effects and provide evidence of little or no effect of their various activities on rookeries.			BRD MON
	50	361	
If indeed little is known about the post-branding effects, this research proposal should go forward and all other permits involving branding should be halted until infection rates and morbidity and mortality can be better understood.			BRD
	19	285	
...Page 11 of this proposal that "although not a necessary part of our research, we will hot brand our animals at the request of the permit office." This indicates that researchers do not necessarily desire to hot brand animals, but are being required to do so by the permit office. Can NMFS explain this?			BRD PER
	4	315	
The EA stipulates that, since 1975 over 15,000 Steller sea lions have been hot branded (p. 127), with an additional 3,000 more proposed for branding by the current applicants. This is a procedure with significant risks, and it should only be done if there is no other less invasive alternative, and only if it is necessary to continue to brand animals beyond those already branded.			BRD MET
	5	316	
The various applicants propose to brand more than 800 animals – they propose over 3,000. This seems excessive for the degree of precision needed based on Horning's analysis.			BRD SAM
	21	332	
Additionally, neither the permittees nor the EA present results of information gained from past branding efforts to offer evidence that this practice is useful or to suggest that additional branding is necessary.			BRD

Hot Branding

Submission No.	CommentNumber	Database Reference ID	ISSUES
	22	333	
No additional branding should be authorized until the NMFS has assured that this procedure is still necessary and that the conservation goals addressed by hot branding cannot be served simply by permitting field studies utilizing animals already branded.			BRD
	23	334	
Considering that the NMFS has been permitting hot branding of this species for several decades, this research would seem unnecessary. If it is necessary, then NMFS should halt all other branding studies until it is completed.			BRD
	41	352	
Hot branding can be an important tool in satisfying the need to monitor survival across the range and in various cohorts, yet the remarkably large amount of branding that is proposed has not been justified in the EA.			BRD INA
	7	199	
...the EIS should pay special attention to the particular vulnerability of pups and young animals to the impacts of intrusive procedures and branding.			BRD NEP

DRAFT COMMENT ISSUE REPORT
SSL and NFS Research EIS
MARCH 2006

Welfare

Submission No.	CommentNumber	Database Reference ID	ISSUES
	53	364	
...the Alaska Sea Life Center (ASLC) has requested continual modifications of its permit to conduct experiments on captive animals, many of them adult females. It is not clear that either the procedures or the research design have been approved by any institutional animal welfare/care committee.			WEL
	35	301	
Approval for invasive studies by this applicant should be suspended until NMFS can conduct a more comprehensive evaluation of range-wide research, its contribution to specific recovery plan needs and compliance with requirements of NEPA, the ESA, MMPA and Animal Welfare Act.			ESA MMP NEP PER WEL
	33	299	
The applicant has not provided any justification for increases that are requested in the number of animals that they wish to sample and or brand or the increase in the duration or frequency of captive research. We question whether these continual amendments that are requested with little or no supporting information or justification would meet the tests of the Animal Welfare Act or would pass the careful scrutiny of an independent animal welfare/care committee.			INA WEL
	1	1	
API asks that NMFS consider the impacts to the population as well as the welfare of individual animals when reviewing research proposals.			CUM WEL

Comments Received on 2005 Environmental Assessment of the Effects of Permit Issuance for Research and Recovery Activities on Steller Sea Lions

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A Quick Message From: Jim Curland
Marine Program Associate
P.O. Box 959
Moss Landing, CA. 95039
(831)726-9010-phone
(831)726-9020-fax
curland@earthlink.net

[redacted]

Pages (Including Cover): 5

Tuesday, May 3, 2005

Please deliver ASAP to: Chief, Permits
National Marine Fisheries Service
(301) 427-2521

Regarding: Comments on ANRA for Steller sea lion research permit file nos: 434-1669, 1010-1641, 800-1664, 881-1668, 782-1768, 358-1769, 715-1784, and 1034-1773

Please find attached our comments. These have been emailed and will also be sent by first class mail. Thank you for the opportunity to comment.

Sincerely,

Jim Curland

05/03/2005 06:13PM

May 3, 2005

VIA EMAIL AND FIRST CLASS MAIL

Chief, Permits
Conservation and Education Division, F/PR1
Office of Protected Resources
National Marine Fisheries Service
1315 East-West Highway, Room 13705
Silver Spring, MD 20910

Re: **Advance Notice on Steller Sea Lion Research Permit Application Nos. 434-1669 (Oregon Department of Fish and Wildlife), 1010-1641 (Aleutians East Borough), 800-1664 (Dr. Randall Davis, Texas A&M University), 881-1668 (Alaska SeaLife Center), 782-1768 (National Marine Mammal Laboratory), 358-1769 (Alaska Department of Fish and Game), 715-1784 (North Pacific Universities Marine Mammal Research Consortium), and 1034-1773 (Dr. Markus Horning, Texas A&M)**

Dear Chief, Permits,

On behalf of nearly one half million members and supporters, including nearly 35,000 throughout the Pacific Northwest and southern British Columbia, over 100,000 in California, 2,000 in Alaska and an additional 200,000 activists on marine issues, Defenders of Wildlife ("Defenders") appreciates the opportunity to comment on the National Marine Fisheries Service's ("NMFS") Advance Notice of Receipt of Applications ("ANRA") for the following permits: Nos. 434-1669 (Oregon Department of Fish and Wildlife), 1010-1641 (Aleutians East Borough), 800-1664 (Dr. Randall Davis, Texas A&M University), 881-1668 (Alaska SeaLife Center), 782-1768 (National Marine Mammal Laboratory), 358-1769 (Alaska Department of Fish and Game), 715-1784 (North Pacific Universities Marine Mammal Research Consortium), and 1034-1773 (Dr. Markus Horning, Texas A&M). Defenders is submitting the following comments on the eight permits seeking to conduct research with Steller Sea Lions (*Eumetopias jubatus*) in Alaska, Washington, California and Oregon. 70 Fed. Reg. 17072 (April 4, 2005). Defenders of Wildlife hereby incorporates by reference the comments of the Marine Mammal Commission ("Commission") (letters of August 2, 2002 and March 7, 2003) submitted on four of these same eight permits and two similar permits the Commission commented on in a July 27, 2001 letter.

Defenders, established in 1947, is a national non-profit organization dedicated to the protection of all native wild animals and plants in their natural communities. Defenders focuses its programs on what scientists consider two of the most serious environmental threats to our planet: the accelerating rate of

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species extinction and associated loss of biological diversity, and habitat alteration and destruction. Long known for its leadership role on endangered species issues, Defenders also advocates new approaches to wildlife conservation that will help prevent species from becoming endangered. Our programs encourage protection of entire ecosystems and interconnected habitats while protecting predators that serve as indicator species for ecosystem health.

Defenders understands the importance and necessity of the suite of research projects reflected in these permit requests to better understand the declines in the "endangered" western stock (Prince William Sound, Alaska and westward) and the status of the "threatened" eastern stock (California through southeastern Alaska). Defenders interest and support of the nature of this research is both for the benefit of assisting in the recovery of this species, but to also understand how Steller sea lion declines are contributing to the collapse of the food chain in Alaska and the Bering Sea ecosystem, which some surmise is contributing to serious declines in sea otters in the Aleutian Islands. However, we have concerns that the research is duplicative, likely to adversely affect the stocks, and it is not clear from these permits that significant gains in conservation will clearly outweigh the negative impacts to the Steller sea lion populations.

Based on our review of the permits and previous comments submitted by the Marine Mammal Commission, we find that the National Marine Fisheries Service (NMFS) cannot meet its burden under the Endangered Species Act (ESA) and the Marine Mammal Protection Act (MMPA) to show that this research will clearly benefit the conservation of this species, that there is good coordination between the different research projects, that the effects of the research can be adequately monitored by NMFS, and that the level of incidental mortality (as a result of the research) is below an acceptable level.

In commenting on the research power and sampling design in the Commission's letter dated, August 2, 2002, they indicated that:

The utility of the proposed research depends largely on the power of the projects to describe important factors and processes (e.g., weaning of sea lion pups) and detect significant effects (e.g., competition with fisheries) if they occur. The power of the research depends on, among other things, the sampling protocol used, which should ensure that important effects are detected if they occur and faulty conclusions of no-effect are avoided. This being the case, it is essential that the samples collected during the course of research should be representative of the sea lion populations from which they were taken and should be pertinent to identification of the causes of the decline or steps that can be taken to facilitate the species' recovery. The permit applications under review often do not provide sufficient information on their research sampling design and thus it is not always possible to determine if they will meet their stated objectives.

Cumulative effects of the proposed research, in combination with other factors (fisheries interactions through incidental take in gear and depletion of preferred sea lion prey, regime shifts causing changes in prey abundance, native subsistence hunting, deliberate shooting of sea lions viewed as "competitors", disease and other possible impacts) that are affecting Steller sea lion populations, especially the "endangered" western stock, could have significant adverse impacts on the population. Understanding better how these cumulative effects might affect Steller sea lion populations is particularly important for assessing the effects and benefits to a species listed under the Endangered Species Act.

The need to limit accidental mortality as a result of this research is critical to showing that the proposed studies will clearly have a benefit to the species. When the Commission commented on many of these same permits in their August 2, 2002 letter, they determined that a total incidental mortality would equal 51 sea lions (41 of them from the western stock) per year and that, "in the absence of effective monitoring, it is possible, if not likely, that the number of observed deaths will constitute only a minimum estimate of the actual number of animals that die as a result of the research effort." It is unclear to us from the permit descriptions if the number of deaths related to incidental mortality from research is greater in these revised permits. If it is equal to or greater than this previous number calculated by the Commission, this is still a number that seems to be at an unacceptable level, especially for the "endangered" western population.

Defenders agrees with comments submitted by the Humane Society of the United States (HSUS) that "before any further permits, extensions or amendments are granted, that NMFS should prepare an in-depth Environmental Impacts Statement (EIS) similar to that being proposed for research on North Atlantic right whales (*Eubalaena glacialis*) in the Northeast. Like, western Steller sea lions, right whales are an endangered and declining stock with multiple researchers wishing to study the status of the stock and the reason for its decline. Unlike Steller sea lions, no captures of right whales are proposed, the research is generally non-invasive, and no lethal takes are sought or expected."

In one of the conclusions from the Commission's August 2, 2002 letter, they state:

In light of the considerable increase in research activities (including a number that would employ invasive techniques that pose risks to the sea lions involved), the potential for disturbance of animals at rookeries and haulouts, the lack of a monitoring plan to assess incidental impacts, the lack of an adequate cumulative effects analysis, and the ongoing decline of the western population of Steller sea lions, significant adverse effects resulting from the proposed and ongoing research activities cannot be ruled out.

Defenders urges that the NMFS defer final action on the permits, permit extensions or permit modifications until such time as you have completed an EIS that fully evaluates the individual and cumulative impacts of the proposed research and weighs its contribution to cumulative effects on the stocks from multiple factors discussed previously. Only that research which is clearly non-duplicative and addresses compelling conservation needs should be permitted. This degree of analysis is required under both the ESA and the MMPA and is lacking at this time.

Chief, Permits
May 3, 2005
Page 4 of 4

Defenders supports the need to conduct research to better understand the cause and extent of the decline of the western stock and status of the eastern stock, as well as understand the biological and ecological factors that contribute to it. However, we strongly believe this must be carried out in a responsible and effective manner. Please feel free to contact us should you wish to discuss any of our comments.

Sincerely,

Jim Curland

Jim Curland, Marine Program Associate

Cc: David Cottingham, Tim Ragen, **Marine Mammal Commission**
Sharon Young, **The Humane Society of the United States**

05/03/2005 06:13PM

HUMANE SOCIETY OF THE UNITED STATES

Fax

To: Steve Leathery From: Sharon Young

Fax: 301-427-2521 Pages: 25 plus cover

reply Phone: 508-833-0181 Date: 5/4/2005

Re: Steller EA & Permits CC:

☑ Urgent ☑ For Review ☐ Please Comment ☐ Please Reply ☐ Please Recycle

• Comments:

Original follows in Mail. Thanks.

Sh

05/04/2005 05:05PM

THE HUMANE SOCIETY OF THE UNITED STATES

Mr. Steven Leathery, Chief
Permits, Conservation and Education Division
National Marine Fisheries Service
Room 13705
1315 East West Highway
Silver Spring, Md. 21401

Re: Comments and Notice of Potential Violations of The ESA, MMPA, and NEPA Concerning Stellar Sea Lion Research Permits.

4 May 2005

Dear Mr. Leathery,

On behalf of the nearly nine million members and constituents of The Humane Society of the United States (The HSUS), we are submitting the following comments on the Draft Environmental Assessment and the nine permits seeking to conduct research with Steller Sea Lions (*Eumetopias jubatus*) in Alaska [70 FR 17072]. The HSUS strongly opposes issuance of these permits at this time. We find that the National Marine Fisheries Service (NMFS) has not satisfied the requirements of the National Environmental Policy Act, nor has it met its obligations under the Endangered Species Act (ESA) and the Marine Mammal Protection Act (MMPA) Because the western stock of Steller sea lions is endangered and declining in numbers, NMFS must demonstrate that the permits are non-duplicative, unlikely to adversely affect the stock, and in service of a significant gain in conservation of the species. This would not seem to be the case with many of these permits. Many of the research projects involve the use of invasive studies and physical handling of animals that subjects them to risk of severe injury and death and appear likely to disadvantage the western stock of Steller sea lions. As a consequence, the HSUS believes that the NMFS cannot issue the requested permits without violating the requirements of NEPA, the MMPA and the ESA. We offer more specific comments below.

The Research is Duplicative, Invasive, and Likely to Adversely Affect an Endangered Stock

Duplicative Research

The NMFS is proposing to issue nine permits. Many of them propose to conduct identical activities. For example, seven of the applicants seek to capture animals for sampling of tissues, hot branding and other invasive procedures; four of them

Promoting the protection of all animals
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05/04/2005 05:05PM

indicate that their activities would be "state wide," and one additional permit would overlap in the Gulf of Alaska and Aleutians. Because no specific sampling areas are delineated by most researchers, there is clear opportunity for researchers to be separately branding animals from the same accessible rookeries thus sampling the same population for the same purpose, rather than assuring that sampling is distributed across key and representative sites. We have similar concerns with potentially duplicative sampling of animals to determine body condition and with the tissue collection that will accompany all captures.

The EA stipulates that, since 1975 over 15,000 Steller sea lions have been hot branded (p. 127), with an additional 3,000 more proposed for branding by the current applicants. This is a procedure with significant risks, and it should only be done if there is no other less invasive alternative, and only if it is necessary to continue to brand animals beyond those already branded.

One of the applicants (Horning) provides a summary chart showing that almost 2000 western Steller sea lions have been hot branded just in the past 15 years. The Horning proposal provides an estimate of the number of animals that need to be branded to obtain a precision in estimates of survival (which still does not answer the question of *why* animals may or may not survive). He states that "the goal of the present Steller sea lion program is to brand 200 pups per year at up to four rookeries (800 per year total)," and states that this number, in combination with previous branding efforts, can yield estimates of survival with acceptable precision. The various applicants propose to brand more than 800 animals--they propose over 3,000. This seems excessive for the degree of precision needed based on Horning's analysis. Horning goes on to say that "if branding continues as planned through at least 2006, it is estimated that CVs of pooled rookery age-specific survival rate estimates will be reduced to approximately 4%." Horning also states that animals in some areas had lower resighting probabilities (e.g., Ugamak) largely because there was less re-sight effort in these areas.

The NMFS should prepare an EIS with a power analysis to determine sample sizes, and consider a range-wide research design that would assure that an excessive number of animals is not branded, and that re-sighting effort is uniform to assure precision in estimates. What is truly unacceptable is that each permitee apparently determines in isolation what he or she considers the necessary number of takes and they are often unaware of the effort proposed by other researchers. This ad hoc approach can result in excessive sampling in some areas, years, or demographic categories, while leaving others inappropriately studied (see Horning, ADFG and Gelatt in which sampling areas are not specified but stated to be state wide).

The NMFS states that, as a condition of permits, researchers will be required to coordinate their activities. Yet, several applicants acknowledge that they are not aware of other permit holder activities even though they and other applicants may have held permits at least since 2002 and this was a condition of permits at that time as well. For

... to greater or lesser degrees are presented with no discussion as to whether some or all may be justified to fill data gaps. For example, some researchers assert that they need to both brand and tag animals (e.g. Huber/NMML) and others state that tagging may not be necessary if an animal is branded (e.g., Horning). Some researchers (e.g., example permit application 800-1664 (Davis) states that "we are unaware of the full scope of other research projects on SSL currently being conducted or under consideration." (p. 19) While this degree of honesty is refreshing, it questions the NMFS commitment to assuring coordination among researchers as a means of avoiding duplication of effort and unnecessarily adverse impacts. Without coordination, there is no way to assure that there will not be an overlap of effort and an unnecessarily adverse impact on the stock.

Adverse Impacts on the Stock

In 2002, The HSUS submitted comments to NMFS on seven permit applications, which are incorporated into the record here by reference. NMFS now proposes to authorize nine permittees and dramatically increase the number of animals that will be "taken." The EA acknowledges that "the number of permits, and associated takes by harassment alone, indicate a high level of research effort relative to the population." (p. 53) Further, the EA states (p. 39) that "[t]here have been no studies dedicated to documenting and assessing the effects of research on Steller sea lions or other marine mammals at a population level, nor on the synergistic or cumulative effects of various research activities and other human-related impacts on individual marine mammals or populations." Yet NMFS asserts that the proposed research will not likely have adverse effects. This contention appears unsupported.

Even though there is a great deal of non-invasive work being done (e.g., scat collection in rookeries, vessel based surveys) these activities also can have effects on populations. Population level effects can occur if individual animals are killed (incidental mortalities are sought by applicants) or indirectly if animals are repeatedly disturbed in a manner that compromises feeding, nursing or resting behavior. Researchers note (see below) that dependent pups may be separated from their mothers and that rookeries may suffer significant and repeated short-term disruption. The EA does little to attempt to assess cumulative impacts from either of these incidental effects, nor did the previous EA from 2002. At that time the EA stated that the effort that was proposed represented the largest scale ever for research attempting to identify factors causing the decline of a marine mammal. The current EA proposes research on an even greater scale, speculates that even more research will be proposed in the near future; and yet it provides no further analysis of possible adverse effects from past research or cumulative effects from this research.

It is not clear from the EA whether or how NMFS proposes to synthesize the information gained by the use of various data collection measures such that it can be useful to managers. This is particularly important when conflicting methodologies that are invasive to greater or lesser degrees are presented with no discussion as to whether some or all may be justified to fill data gaps. For example, some researchers assert that they need to both brand and tag animals (e.g. Huber/NMML) and others state that tagging may not be necessary if an animal is branded (e.g., Horning). Some researchers (e.g., Huber/NMML) assert that animals must be recaptured to retrieve tag data, while others utilize remote sensing (e.g. Davis) that does not appear to require re-capture, and Trites discusses the need to "recover an automatically released instrument package" that is deployed by ADFG. There should be some agreement on the goals of studies and the best methodology for answering common questions while assuring minimal impact on animals.

In our previous comments, The HSUS pointed out that the proposed level of incidental mortality for researchers would need to be added to the mortality that the endangered western stock is sustaining as a result of native harvest and fisheries-related mortality. As of the 2002 stock assessment, these estimate are a downwardly biased estimate of 171 from native harvest and 29.5 annual average mortality from fisheries. The resulting mortality to the stock from these two sources alone would be 197; only 11 animals less than the Potential Biological Removal (PBR) level of 208 for the stock. According to the 2002 stock assessment (the most recent available) the level of mortality that is considered insignificant (or negligible) is 20.8 animals. Currently, under the status quo option, NMFS provided researchers with permits for up to 49 incidental mortalities (p. 79) many of which were for takes in the western stock. We raised concerns in 2002 that this number was not negligible. NMFS chose to ignore our concerns and those of the Marine Mammal Commission. Rather than seeking to reduce the incidental mortalities, researchers are now seeking permission to *increase* potential lethal takes to 85 animals, with approximately 36 in the western stock (p. 103). This number is *over 50% higher* than the negligible level for the western stock, and higher the fisheries-related incidental mortality. To say the least, it seems odd that researchers would be permitted to incidentally kill more marine mammals than commercial fisheries. The cumulative research-related incidental mortality could exceed the PBR for the stock when added to other anthropogenic mortality and is clearly a significant impact. This endangered stock is already subjected to cumulative mortality that is arguably unsustainable, given its on-going decline. The request for research-related incidental mortality is well above a level that the ESA would consider "negligible."

The HSUS is concerned, not only with the high level of mortality, but with the fact that NMFS stated in the previous EA that mortalities in excess of 10 animals in a year would result in a halt to activities likely to result in mortality until a more thorough analysis of factors contributing to mortality could be undertaken (FONSI, page 118). According to the EA, less than10 mortalities were reported each year (p.40). Despite this, researchers are seeking an increase in the number of incidental mortalities. Either they do not need this permission, or they were not reporting mortalities that occurred under their currently permitted activities and are in violation of the ESA and their permit conditions.

The EA also fails to adequately address the cumulative impacts of the proposed permits, as required by NEPA. On page 56, in the section on cumulative impacts, the EA states that "it is reasonable to presume" that permit holders will continue to request additional procedures, protocols and takes of animals. In particular the EA points out that the Alaska Sea Life Center (ASLC) has requested six separate permit modifications just in the past

18 months that have resulted in additional takes of animals and use of additional invasive procedures on the same individuals or populations and concludes "impacts are likely to be incremental." This is simply unacceptable, especially given the large number of animals that the various permit holders propose to capture and "sample."

Research Should Serve Conservation Goals

The EA outlines the various priorities of Congress and the recovery plan with regard to gathering information to elucidate the causes and extent of the decline in western Steller sea lions. Yet, without some guidance by the NMFS or an outside group, it is not clear that the activities proposed in these permits meet these goals individually or in total.

Reviewing conflicting methodology and justification by researchers raises as many questions as it answers. For example, while a number of researchers propose to collect information on diets by collecting scat (e.g. Aleutians East, Hegwer, Trites); others (e.g., HUBER/NMML) question its value and assert that only invasive sampling with biopsy darts can provide appropriate information. Understanding of diets is a key element of understanding impacts on survival but NMFS has not discussed whether the varying methodologies are addressing different questions or the same question. If they are addressing the same question, then less invasive procedures should be used to answer questions raised by the conservation goal. When there are conflicting methodologies offered (e.g., tagging vs. branding or scat collection vs. biopsy and removal of vibrissae) NMFS should clarify whether or how each is necessary to address conservation goals and how each fits into a larger matrix of information that will assist recovery efforts. But it has not done so.

While it is clear that there are important questions that need to be answered to help conserve this species, it is critical that the research that is undertaken to answer them be done in a manner that is likely to assure that animals will not be adversely affected. Some of this is discussed in our comments above. However, we are also concerned that the proposed research does not appear to have been constructed in such a way as to assure that the goals of conservation are served. For example, some applicants have done a power analysis of the minimum sample size that is necessary to ascertain the desired information (e.g., Horning) yet other proponents simply state that the number of animals proposed for capture was determined because it "seemed a reasonable number, not too big, not too small…"(Huber/NMML). Although there are seven proposals to brand animals, there is little discussion in these proposals as to who will be monitoring the movements or survival of these marked animals, or how the information will be synthesized and reported such that the public and managers have the information necessary to make important decisions on management.

Additionally, neither the permittees nor the EA present results of information gained from past branding efforts to offer evidence that this practice is useful or to suggest that additional branding is necessary. At least one applicant (Horning) provides evidence that, with regard to hot branding, a number significantly less than the proposed 3,000

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animals is sufficient to address questions of survivorship. No additional branding should be authorized until the NMFS has assured that this procedure is still necessary and that the conservation goals addressed by hot branding cannot be served simply by permitting field studies utilizing animals already branded.

Furthermore, some of the research is of questionable conservation value. For example the Oregon Division of Fish and Wildlife is proposing to brand animals for the purpose of determining whether branding is an effective tool for long term identification with minimal adverse consequence. Considering that the NMFS has been permitting hot branding of this species for several decades, this research would seem unnecessary. If it is necessary, then NMFS should halt all other branding studies until it is completed. Likewise, The National Marine Mammal Lab (permit 782-1702) proposes to tag three animals from the eastern stock of Steller sea lions to identify "nuisance animals." Yet, when questioned by NMFS (cover memorandum of 3/12/2005) they state that this number was "arbitrarily chosen. It could have been 2 or 4." They also state that they refuse to answer NMFS' question as to the ultimate species recovery goal served by identifying "nuisance" animals because "we don't understand why it is being asked." Clearly this permit activity should be denied. The applicant appears arbitrary in her choice of subjects and unclear as to what goal is served by capturing animals from this threatened stock. These are but two of the many examples of research that may not be necessary to serve the goals of the recovery plan (additional detail is contained in our comments on specific permits).

Rather than continuing to fund stressful, invasive and potentially duplicative research on an ESA listed stock that is declining in many portions of its range, the NMFS and/or Marine Mammal Commission should fund a workshop that would bring together the past, current and potential future permittees along with outside scientists familiar with research methodology and with endangered species conservation biology to determine the nature of the research most likely to result in positive conservation gains for the species, with minimal adverse risk. A workshop could assess the number of animals that should be sampled using various methods to obtain the most critical information to assist in understanding the reasons for the decline and the potential management and mitigation measures that can be pursued.

Before invasive research is conducted on an endangered and declining stock, and in order to assure minimal adverse impacts on individuals or populations, the NMFS must clearly know: what information is necessary to answer the critical questions; how it is best obtained; how many animals are necessary for a reliable sample size; where, when and how the research should be conducted; and who is best qualified and equipped to conduct the research. This type of systematic look has never been undertaken.

Issuance of the Permits Would Violate NEPA, The ESA, and the MMPA

The EA Violates NEPA

As a threshold matter, we agree with NMFS that the research that is proposed should not be categorically excluded from review as described in NAO 216-6. It is clear that these permits meet the criteria for cumulatively significant impacts and potential adverse effects on endangered or threatened species. Furthermore, as the EA acknowledges, there is significant "controversy over the adequacy of the NMFS finding of no significant impact in issuance of the previous Steller sea lion permits" (p. 16).

Despite this controversy, the NMFS has chosen to issue another abbreviated EA, with a mere 30-day comment period rather than complete an Environmental Impact Statement (EIS). However, the controversy is not simply over whether commenters disapprove the action, but rather it is a substantive disagreement over the environmental effects of the action that warrants a more complete impact analysis. While the HSUS questions the appropriateness and humaneness of some of the research that is proposed, our greatest concern is that the combined effect of this research is *NOT* negligible. Moreover, the combined incidental lethal take that is requested by the applicants, when added to the native harvest and fisheries-related mortality is in excess of the PBR for western Steller sea lions. This squarely refutes the earlier NMFS finding of no significant impact and, further, shows that the additive effect of this research on the stock could contribute to its decline. In this situation, an EIS is warranted and anything less is unlawful.

The EA also fails to consider all reasonable alternatives. The EA proposes only two alternatives: the no action alternative and granting all of the requested permits. This is not acceptable. The NMFS is aware of an alternative that would permit only non-invasive research for the western stock of Steller sea lions, with possible exception for a limited number of invasive takes where no other option was available and the need to gather information was well justified. Yet this alternative was not examined in the current EA. Instead, NMFS merely states that it was dismissed because "permit holders and applicants have indicated it is important for them to conduct the intrusive studies…"(p. 30)

The EA provides no justification or substantiation for this unsupported assertion by permit applicants. It is simply not sufficient for the agency charged with protecting this endangered species to simply adopt the assertion of the researcher applicants that they *must* risk the lives and health of animals and add to the already unsustainable cumulative impacts on the stock, without consideration of other alternatives. Alternative 2.3.2 in the EA is the only prudent alternative until such time as the agency completes a more thorough evaluation of the level and nature of research necessary to provide answer the important conservation questions, without unnecessarily subjecting thousands of animals to capture and "intrusive" procedures.

No permits for invasive studies should be issued or renewed until such time as the NMFS has completed an adequate environmental review and can meet the legal requirement that they serve conservation goals for the species without an adverse impact on the stock. To that end, before any further permits, extensions or amendments are granted, the NMFS should prepare an in-depth Environmental Impact Statement (EIS) similar to that being proposed for research on North Atlantic right whales (*Eubalaena glacialis*) in the Northeast. Like, western Steller sea lions, right whales are an endangered and declining stock with multiple researchers wishing to study the status of the stock and the reason for its decline. Unlike Steller sea lions, no captures of right whales are proposed, the research is generally non-invasive, and no lethal takes are sought or expected. We believe that the multiplicity of invasive, and potentially lethal, Steller sea lion research permits should be subjected to at least the same level of scrutiny as NMFS proposes for non-invasive North Atlantic right whale research.

NMFS's Previous FONSI Violated NEPA

In 2002, the NMFS made a FONSI determination, stating that the issuance of additional permits would not appreciably contribute to adverse impacts on the western stock of Steller sea lions. This was based, in part, on the assertion that previous permits held by the National Marine Mammal Lab (NMML) and Alaska Division of Fish and Game (ADFG) had been granted a previous categorical exclusion from NEPA, though NMFS noted that these permits would expire in December 2004 and June 2005 respectively. NMFS asserted that it had determined that granting the additional permits in 2002 would have no significant additive impact.

This was an erroneous determination. Among other permitted activities, these two original permit holders were provided up 10 ten incidental mortalities as well as permits to apply 1,700 hot brands. When NMFS granted the additional permits, it added a variety of new studies, including takes for, among other things, muscle biopsy, stomach intubation, electrical impedance testing which involves the insertion of electrodes in the skull and capture and temporary captivity for the purpose of invasive studies and nutritional deprivation. NMFS also increased the number of captures allowed to sample and hot brand animals to 2,020; an almost 20% increase in takes for a highly stressful procedure that has resulted in mortality of pups and females.

Furthermore, permissible incidental mortalities were increased from 10 to 51 (p. 69 of FONSI), *a five fold increase* in mortality. Despite this, in 2002 NMFS found that "the activities conducted under this Proposed Alternative neither result in a significant increase over the status quo, such that an EIS is required, nor does the proposed action increase the level of takes such that the categorical exclusion made in previous determinations under NEPA should be altered." Clearly permitting these activities was a significant increase over the status quo and should have triggered construction of an EIS and consultation under the Endangered Species Act. Instead, NMFS ignored this obligation and now seeks to allow an even greater impact on the stocks.

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The FONSI determination stipulated that permits would be limited in duration to the term of existing permits that are being modified, yet many have been modified since then with no additional analysis or public comment. The FONSI also stated that there would be long-term monitoring of branded animals, yet neither the researchers themselves nor NMFS' EA discuss the extent to which this was done.

In appendix F of the EA, where effects on animals is discussed, the only mention of effects from hot branding, for example, states that at least seven pups died in one research project. Alaska Division of Fish and Wildlife states that as many as 15 died during a three year period, though the numbers in each year were not specified and the number may be higher based on reports by other researchers.

A third stipulation in the FONSI for permittees was that researchers should consult with one another if more than 10 mortalities occurred and NMFS stated in the 2002 EA, and this one as well, that research would be suspended if there were more than 10 mortalities to animals. Despite this assurance, NMFS merely states that there were "less than 10 mortalities" in any year but acknowledges that this may be an under-estimate and did not require any consultation among researchers. NMFS provides no assurance that all researchers reported mortalities nor does it explain why researchers would request an increase in the number of incidental mortalities if their research has had no lethal consequence. Given that there is a disincentive for reporting (i.e., research will be terminated) and that effects from capture myopathy are often not noted for more than a week (see Davis application), it is difficult for NMFS to assert that this condition was met.

The last condition in the FONSI was that researchers should coordinate their activities. As discussed above, this condition too was clearly not met. NMFS cannot continue to assert that the research has no adverse consequence nor that NMFS can properly control the levels of mortalities or assure that research is coordinated, and non-duplicative and likely to yield results that will significantly aid conservation and management.

In the current EA, NMFS proposes to add additional invasive activities including extracting milk from lactating mothers, surgically implanting tracking devices in free-ranging animals from shipboard, and injecting tetracycline to "mark" whiskers of animals. NMFS also proposes increase the number of incidental lethal takes to 85, an increase of 66% over the present level and eight times the 2002 status quo. NMFS also proposes to increase the number of captures to conduct sampling and hot branding to 3,065, a further increase of more than 50% from the previous level of captures. This means that, if these permits are all granted, researchers will be permitted to engage in activities that may result in the deaths of eight times as many animals as might have been killed in the status quo during 2002; and will be capturing and hot branding almost twice as many. Not only is this level of impact *not* insignificant, it requires consultation under section 7 of the Endangered Species Act.

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NMFS Has Not Satisfied The Requirements of the ESA

The ESA provides that a permit applicant seeking to conduct research on endangered species must provide a report of all mortalities of animals under their control or utilized by applicant for preceding 5 years for animals that are endangered or taxonomically related within the Order to the species which is the subject of the application. They must also report the causes, numbers of deaths and steps taken to decrease mortality. 50CFR 222.308(b)(11). Although NMFS states in the EA that mortalities occurred for at least one applicant, specific information to address this legal requirement is not evident in the EA.

Moreover, the information that is provided on mortalities conflicts between and within applicants. We note that one applicant (Horning) included a chart (p. 18) that indicates that another applicant (ADFG) had at least 14 pup mortalities between the years of 2001-2003. That applicant (ADFG) states variously that 14 pups died and that a total of 17 animals died. These numbers are not reconciled and call into question the accuracy of the information reported and the actual impact on the stock(s). If NMFS has information on the number of animals from each stock that may have died as a result of proposed activities, or even similar information on mortality and morbidity from other species of sea lions that could elucidate mortality levels, it should be provided to reviewers in summary fashion so that a more thorough evaluation of potential impacts from various procedures and among the various applicants can be made.

One of the applicants (Gelatt) cites information in the recovery plan that acknowledges that certain types of research activities, including capturing animals and sampling them or attaching telemetry devices are intrusive and may cause disturbance but still recommends "including such studies in conjunction with other activities, evaluating the potential benefits" using the best available information at the time of the application. Further he cites that the Recovery Plan encourages the use of mitigation measures to minimize impacts and the recommendation of alternative, less intrusive techniques. While we would generally agree with this premise, the HSUS does not believe that this standard has been satisfied.

There are a number of techniques for assessing body fat and general condition; not all of them are invasive (e.g., portable untrasonography and photogrammetry). It is clear that the least invasive should be used when at all possible, yet most applicants choose the most invasive (e.g., biopsy sampling). Hot branding can be an important tool in satisfying the need to monitor survival across the range and in various cohorts, yet the remarkably large amount of branding that is proposed has not been justified in the EA. Telemetry is an important tool, yet it is not clear if it is necessary for four different permittees to use this tool or whether there is any coordination among researchers to assure that the animals being sampled are representative for obtaining the information that is necessary.

It is also not entirely clear why surgically implanted life history transmitters used by Alaska Sea Life Center and Dr. Horning are the best, least intrusive, or only means of collecting the information that is desired. Instead of providing assurance that the intrusive procedures that are proposed are necessary and proportional to the questions that need to be addressed, the NMFS has simply passed along each proposal ad hoc, with no attempt in the EA to address the necessity or scope of the research proposals or to assess cumulative effects on mortality and morbidity of individuals and any consequent range-wide or localized population level effects.

The ESA clearly requires that federal agencies consult under Section 7 when their actions may affect a listed species. As we have discussed above, it is clear that the cumulative impact of granting these permits is likely to have an adverse impact on the western stock of Steller sea lions and requires consultation under the ESA.

The Proposed Permits Violate the MMPA's Restrictions on Lethal Taking

The MMPA stipulates that research cannot result in the lethal take of a depleted stock unless the research fulfills a critically important research need. [12 U.S. C. 1374 (c)(3)(B)] As we have discussed above, the NMFS has never undertaken a review of the most efficacious means of answering the critical questions nor the number of animals minimally necessary to do so. Without such a review it cannot assure that all of the incidental lethal takes that will be authorized are in service of important conservation needs.

The MMPA also requires NMFS to consult with the Marine Mammal Commission. Because its previous consultations with the Commission yielded critical comments (see Appendix A of EA), that questioned the need for some of the research permits and the scope of the activities, we believe that NMFS has erred in its assertion that the research is justified.

The Proposed Permits Violate the MMPA's Requirement that Research be Humane

Research permits under the MMPA can be issued provided they meet all seven specified criteria (50 CFR 216.34). Among them are:

(1) The proposed activity is humane and does not present any unnecessary risks to the health and welfare of marine mammals; and

(3) The proposed activity, if it involves endangered or threatened marine mammals, will be conducted consistent with the purposes and policies set forth in section 2 of the ESA.

(4) The proposed activity by itself or in combination with other activities will not likely have a significant adverse impact on the species or stock.

As demonstrated above, the proposed research, in this case, is likely to significantly and adversely affect endangered species and that the permit applications do not comply with requirements of the ESA (conditions (3) and (4) above). The HSUS also believes that the research does not meet standards of humane treatment. As discussed below, researchers are proposing to use painful procedures and intrusive medical tests without anesthesia. Some are proposing activities that may detrimentally affect the health of nursing mothers and their pups.

Although a number of researchers (the proposals from Texas A&M most notably among them) have stated that they provided copies of their permit request to their institution's animal welfare/care committees for approval, the HSUS is not convinced that all of the research meets the mandates for humane treatment of research subjects. For example, while most researchers will use gas anesthesia to conduct branding, stating that it is necessary to properly immobilize the animal, assure that brands will be legible and assure that animals do not suffer unnecessarily; one of the proposals (Huber/NMML) will not use anesthesia and will instead rely entirely on the use of a "squeeze cage" for animals including juveniles and lactating females. Two others (ADFG and Gelatt/NMML) may opt to use squeeze cages instead of anesthesia. While it is true that greater mortality may be related to anesthesia, it appears inhumane to hot brand and invasively sample animals without the use of anesthesia. If sampling protocol is adequately designed for the stock, only a limited number of animals need to be anesthetized and thus mortality risk can be limited as well. Current proposals would cause needless suffering.

Furthermore, while some researchers have stipulated that they will not use certain drugs because of higher rates of mortality and morbidity, particularly among pregnant and lactating females, others have stated that they may be using these drugs. In the mitigation measures (p. 47), NMFS recommends use of isoflurane gas during branding, yet Huber/NMML proposes to use no anesthesia and others suggest the use of telezol darts and other sedative methods. Although literature indicates that capture-related myopathy (and mortality) often does not occur for seven to 14 days after capture (see Davis application p. 6), there is no protocol for monitoring animals to determine mortality or to monitor healing. This should be required, particularly in light of a statement made by Dr. Davis (p. 11) that "[t]here is no quantitative information on the rate of infection cause by hot branding SSL." We note, and the EA acknowledges, that research in New Zealand found large numbers of elephant seals with poorly healed brands and required researchers to halt use of this technique. The ODFW proposes to monitor longer term effects of branding. If indeed little is known about the post-branding effects, this research proposal should go forward and all other permits involving branding should be halted until infection rates and morbidity and mortality can be better understood.

Researchers from Texas A&M are proposing surgical implantation of tracking devices. These devices log data on the animal's survival and can be used to compare dive behavior of survivors and non-survivors. The surgically implanted devices are "extruded" when the animal dies, after noting information on the time of death relaying the information to a satellite. It is only with the death of the animal that the device can be retrieved. The application states that they are proposing to implant devices in 80 juvenile

Steller sea lions between the ages of 9 months and 4 years of age. They further state that the battery life is approximately 8 years, by which time they expect that they will have a 60-70 percent return of the data from these devices. This means that they expect that up to 70% of the juveniles will have died within 8 years. Life expectancy for Steller sea lions is approximately 18 years for males and up to 30 for females, who may not even give birth until age 9 (North Pacific University, 2005). Even if all devices were implanted in 4 year olds (the oldest age cohort involved), which is highly unlikely, that means that 70 percent of the animals are expected to die well before their life expectancy. The applicants do not explain why this might be; but this causes us some concern, particularly since the applicant projects that as many as 15 lethal takes may need to be authorized for their activities that will be implanting 80 tags in the 120 animals captured.

Of additional concern is the fact that very young animals will be captured and held for varying amounts of time. For example, permit applicants Gelatt, AKDFG, and Alaska Sea Life Center propose to capture and sample, tag and/or brand pups as young as 5 days old. Anesthesia will be used and animals held for a period of hours. There is no discussion as to how pups will be reunited with their mothers. The Alaska Sea Life Center will capture dependent, nursing pups and their mothers. Mothers will be darted with telazol (which has a 10% mortality rate according to Dr. Horning's application) and then mothers will be further sedated, sampled, branded and given oxytocin to sample their milk. Dependent pups may also have stomach lavage and enemas administered. There is an admission by Alaska Sea Life Center that telazol and other compounds cross the placental barrier and are contraindicated for a number of species but with unknown effects in sea lions. Furthermore, they acknowledge that a number of drugs can be excreted into the mother's milk though they "have never heard of any reports" of this type of anesthetic complications for sea lion pups. Mothers may be additionally fitted with devices to increase or decrease buoyancy and drag to simulate varying amounts of body fat and then re-sampled a month later along with their pup. This can potentially compromise their foraging success at a time when they are already sustaining a maximum energetic drain (lactation) and there is no justification provided for the need of this sort of procedure. These sorts of experiments on lactating females and newly born pups seem risky, and both legally and ethically questionable.

Additionally, the Alaska Sea Life Center (ASLC) has requested continual modifications of its permit to conduct experiments on captive animals, many of them adult females. It is not clear that either the procedures or the research design have been approved by any institutional animal welfare/care committee.

For all of these reasons, HSUS simply cannot countenance research of this magnitude with the potential for duplicative sampling, inhumane treatment and unproven conservation benefit.

Comments on Specific Permit Applications

In addition to these overarching concerns with the EA, the HSUS has a number of specific comments on each permit application, which we discuss in greater depth below.

Permit Application 103-1733 (Dr. Marcus Horning, Texas A&M)

This permit application is the most complete of all that we reviewed. It is clear that the applicant wished to provide reviewers with a fairly accurate description of the procedure and its risks. For that, he should be commended. Our concerns with this application are not so much with the qualifications of the investigators, or questioning the accuracy of information provided, but rather with the very fact that this is an extremely intrusive procedure with significant risk to animals and thus should be reviewed as part of a more thorough plan for research on Steller sea lions to assure that it is indeed the best (or only) way to gather the information. This application seeks to surgically implant data loggers as well as attaching satellite transmitters and collecting a variety of biological samples and hot branding the captured animals. They seek to capture up to 120 juvenile western stock Steller sea lions and implant up to 80 life history tags in juvenile animals aged 9 months to 4 years.

Unlike many of the applicants, this applicant conducted a power analysis to determine the minimum sample size necessary to accurately assess the information. We note that, although the applicant requests permission to surgically implant devices in 80 juveniles, they state on page 13 that "a minimum sample size of 72 dual LHX tag implanted juvenile[s] is required [to meet the objectives]" and on page 4 that "the desired minimum sample size for this study is 60 LHX tag implanted animals." While they explain the need to surgically implant more animals than necessary for statistical power in order to assure at least 2 weeks of monitoring by externally fixed satellite transmitters, there is no discussion of the discrepancy between 72 and 60 as a minimum sample size. There is no also discussion as to how they will view the fate of animals who have been surgically implanted but lose external transmitters prior to two weeks post-surgery. For example, are they considered dead? Is data from the implanted transmitter considered unusable or will the data still be available and usable at some future point when the animal dies and the LHX transmitter is "extruded?" Answers to these questions affect understanding both the level of mortality that is expected and whether or not more animals actually need to be implanted with tags than the minimum sample size of 60.

This application requests a maximum of seven incidental mortalities a year or a total of 15 mortalities over the life of the permit. The applicant requests that if NMFS decides that research projects have resulted in the deaths of 10 or more western stock Steller sea lions (as it proposed to do in the 2002 EA), then he wishes to be exempted from this moratorium in order that the sample size not be jeopardized. This seems unjustifiable given the applicant's own assurance that if *two* unintentional mortalities occur in this project, the procedures will be "revisited," and if more than 6 occur, then procedures will

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be suspended. If the applicants themselves worry that 6 mortalilties in a year is too many, then clearly NMFS would be justified in suspending all research, including this applicant's, if more than this number occur.

While the applicant assures that the surgical procedure is not likely to appreciably affect survival of animals, as we point out above, they assert that up to 70% of the animals will likely be dead before the expiration of the battery pack at 7-8 years. Given a life expectancy of 18 years for males and up to 30 years for females, this would seem to be expecting a high level of premature deaths that have not been explained. If it is due to an expected higher rate of natural juvenile mortality, then this needs to be discussed in a clear manner such that the high mortality rate appears reasonable and not a consequence of stress or compromise of the animal as a result of the various procedures to which it is subjected. The applicant states that this surgical procedure has been tested with great success and no mortality in California sea lions, a sympatric species, and it will be further assessed on captive animals prior to its use on free ranging animals. However, Appendix 3, which describes the results of these important studies, has been withheld from reviewers as "confidential." This seems inappropriate.

In its answers to the questions required under NEPA (p. 27) the applicant asserts that their permit will not have significant cumulative effect because they assure reviewers that all animals will be returned to the population. This seems to beg the question of reduced survivorship or reproductive capacity resulting from procedures; and it omits consideration of the applicant's high level of request for incidental mortality in the larger context of the high of mortality to which the population is already subject.

While we applaud the qualifications of the researchers working on this project and the generally thorough approach taken by this applicant, we believe that this and all other permit applications seeking takes for invasive/intrusive activities should be held in abeyance pending a through EIS, a consultation under Section 7 and an analysis of the scope and demographic and geographic parameters that need to be studied, the best techniques for answering key questions and a power analysis of the numbers of animals minimally necessary for invasive/intrusive studies.

Permit Application 782-1702 (Sue Moore, National Marine Mammal Lab/NMML)

In contrast to the previous permit, this permit provides minimal information and justification and, indeed the applicant has refused to answer key questions of the NMFS permit office. Thus we cannot support this permit application, which appears incomplete at best.

The permitee seeks to study animals of several species in Washington and Oregon and, as such, effects of the activities would be on the threatened eastern stock of Steller sea lions. The applicant seeks to capture up to 12 Steller sea lions of all ages and both sexes to "document movements and predation on endangered salmonids." This is not a

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recovery plan goal. These animals would be both tagged and branded to help identify individuals to determine predation rates on endangered salmonids. They would be sampled for genetic analysis, disease screening and instrumentation with either VHF, TDR or satellite tags to document movements. The applicant also seeks to "harass" up to 6,000 Steller sea lions during aerial, boat and ground surveys up to 30 times annually during capture and scat collection. Additionally they seek to "mark" 3 Steller sea lions with dye, bleach or a color coded dart tag fired from a CO_2 rifle, such that they may be later captured and permanently marked or instrumented. They may be re-captured up to with up to 3 takes/sea lion to remove instrumentation. The applicant also seeks to inject animals with tetracycline, to prevent infection from wounds made during sampling. They request one incidental mortality per year.

The HSUS is concerned about a great deal of what is proposed. The applicant proposes that up to one Steller sea lion out of 12 may die as a result of the procedures. This is a fatality rate well in excess of most other researchers and should be, but is not, explained. In previous work, 50% of the applicant's mortalities occurred in restrained animals but was not related to anesthesia. The applicant proposes that no anesthesia will be used and that "squeeze cages" will suffice to restrain animals sufficiently to achieve a readable brand. This appears to disregard humane considerations. We note that other researchers will be using anesthesia during branding, as is common practice world-wide. There is no apparent justification for subjecting animals to the pain stress of hot branding, tissue sampling and application of invasive instrumentation with no anesthesia. The applicant proposes to both flipper tag and brand animals. We note that the Horning application says that it is preferable to do one or the other and that both are not necessary. We also contrast the Horning application's discussion of placement and mitigation for tagging with the complete lack of discussion in this application. The applicant also states that although it will only take 20 minutes to "sample" each sea lion, they will be held for up to 3 hours "while other animals are being processed." This level of stress seems excessive and unnecessary. This applicant also disagrees with other applicants (see, for example Trites and Hegwer) as to the value of scat collection, insisting that invasive procedures are required even though other qualified researchers have determined that scat collection can answer basic questions and the Davis application states that pulling a vibrissa can provide information for stable isotope analysis to give insight into general trophic level over long periods. This applicant proposes to clip vibrissae instead; some thing that other researchers discount as reliable. While clipping is less invasive, if it cannot reliably answer the question being posed, then it should not be done. The NMFS should determine whether the desired information can be collected in a manner other than that proposed by the applicant.

We also question the need to recapture animals for tag removal given the state of technology that can allow remote retrieval of data and battery life of up to eight years. The applicant should either use this sort of technology or explain why it is not appropriate.

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Though the applicant requests permission to capture and sample and/or brand 12 Steller sea lions, they have no basis other than wild guessing as to the reason for this number. When asked by NMFS (3/12/05 cover) to justify this number, Harriet Huber of NMML stated that it was determined "arbitrarily—in 2003 we had funding to instrument up to six SSL." When questioned about the need to remotely tag 3 Steller sea lions and not more or less, she responded "[it] was arbitrarily chosen." This is inappropriate. If indeed the applicant wishes to address significant conservation needs of Steller sea lions, then they should sample all and only the number of animals necessary to answer the question, and that should be determined by a power analysis not chosen "arbitrarily."

The HSUS questions the conservation benefit of this proposal to the conservation needs of threatened eastern stock Steller sea lions. It seems dubious at best. The applicant states that to monitor the health of Puget sound, harbor seals are the species of choice to monitor, not Steller sea lions. No specific questions are raised with regard to Oregon. Studying Steller sea lions to determine their rates of predation on salmonids of various species is not for the benefit of sea lions but rather, the applicant states, to identify "nuisance" animals. The applicant is not clear as to why this in necessary. In fact, when the NMFS asked "what is the ultimate species recovery goal of identifying "nuisance" animals," Ms. Huber replied that the question would be intentionally unanswered because "we don't understand the question or why it is being asked." This is a shocking refusal, given the ESA and MMPA prohibition against stressful and invasive research that is not intended to address conservation and recovery goals.

Thus, this permit should be denied.

Permit 434-1669 (Robin Brown, Oregon Division of Fish and Wildlife--ODFW)

Like the Horning proposal, ODFW has conducted a power analysis to determine the appropriate sample size for the research being proposed. This is the sort of analysis one should expect of researchers studying ESA listed species. We note, however that the NMFS permit office asked questions in a 3/30/2004 query (cover memo) regarding the already permitted ODFW research. Many of these important questions appear unanswered, at least in the material that accompanied the draft EA. For example, the permit office asked for an explanation of assertions that pups responded to and recovered from anesthesia with "no unexpected responses;" and specific information on how long pups were monitored and what the "expected response" had been. We can find no answer to these questions in the material provided. The permits office also requested information on whether pups were reunited with mothers—a key factor in their survival—yet this appears unanswered. These questions should be answered prior to approval of additional work since they address issues of research-related mortality and morbidity to an ESA listed species.

The purpose of this permit modification is "to examine the effects of branding during the first few weeks and months post-handling including the documentation of any sustained injury, unusual mortality or immediate movements in response to marking." While this would seem a laudable goal, we question its timing. Hot branding has been conducted for three decades, with varying levels of success and mortality (the Horning application has a summary). Thus it would appear that this sort of study is unnecessary. If it is indeed necessary, then all other research involving hot branding should be suspended until results can be evaluated and disseminated.

Permit 1010-1641 (Cathy Hegwer—Aleutians East Borough).

This permit extension seeks approval for takes resulting from vessel and aerial surveys and scat collection in the Shumagin Islands. While we have fewer concerns with this non-injurious protocol, we reiterate our belief that NMFS needs to examine the area wide consequences of displacement of animals during close vessel approaches and while researchers enter a colony to collect scat. For example, has the applicant noted pup abandonment or other effects associated with disturbances at the rookery? It would be helpful to provide reviewers with a report of at least the previous year's studies to allow a better understanding of the adverse consequences of sampling.

Permit 715-1784 (Andrew Trites—University of British Columbia)

This application requests a five-year extension of activities. The permit requested behavioral observation from blinds, scat collection and bi-monthly aerial surveys in southeast Alaska and British Columbia. It requests recovery of automatically released instrumentation. The intent is to study animals from the eastern stock of Steller sea lions to compare critical intra-annual habitat use, prey and diet, energetics and stress hormone levels. It would be useful for NMFS (or for this or other researchers) to describe comparable research that is being conducted on the Western stock to assure that appropriate comparisons can be made. Methodology used by this researcher has some commonalities with others (e.g. scat collection, aerial surveys) but appears to have significant differences that are not likely to be replicated elsewhere that may make inter-stock comparisons difficult or impossible. For example, can his observation from blinds be compared to other researchers who will use remote video cameras? Are the behaviors being observed and the methods of sampling similar and comparable? These questions should be addressed.

Permit 800-1664 (Davis—Texas A&M)

Dr. Davis, like his colleague Dr. Horning of A&M, provides a great deal of information on his permit request. He proposes to use so-called "critter cams" to visualize underwater behavior over a period of weeks and satellite transmitters for monitoring of longer term movements. This is largely a continuation of currently permitted work. He takes care to reference the portions of the recovery plan to which his objectives relate.

The proposal would involve the capture of 45 individuals per year, and requests an incidental mortality of up to 13 individuals (30% of which may be female). All in all, this proposal is requesting a mortality rate as high as 29% of the sampled animals, many of which may be female, a segment of the population that is critical to recovery of the stock. This level of mortality is shocking. It is not clear why any animal care committee would approve this or how the ESA would permit it. If this applicant has experienced mortality in his already permitted research, we see no mention made of it in the EA. If he has *not* experienced mortalities, it is not clear why such a high percentage of the study population is being sought.

All of the captured adults (15) would be female, some of whom maybe pregnant or lactating and have pups that are dependent or near weaning. Capture of females with dependent pups is inappropriate, since these animals will be anesthetized, instrumented, subjected to branding and tissue sampling and electrical impedance (which involves the implantation of electrodes) and kept for up to 3 hours, and it is not clear whether or how reunion with the pup will be possible. If pups are separated from their mothers they may die or be killed. There is also no discussion of how or whether pups orphaned by the death of one of the females will be identified and either euthanized or removed for rehabilitation.

The application discusses the possible death of up to 65 animals "during research activities" in a five year period. They go on to speculate that they will not study pups but "accidental death could result from disturbance of the rookeries." It is not clear whether or how this will be determined and documented by researchers but these deaths should be counted against this permit and against a total of 10 mortalities across the western stock. While his colleague, Dr. Horning projects that it is not necessary to both brand and flipper tag animals that he will instrument, Dr. Davis proposes to do both. The difference is not justified. We also note that Dr. Davis proposes to insert electrodes behind the skull and two near the tail to do electrical impedance work to assess body composition. His colleague Dr. Horning simply says that electrodes are placed "around the body." The methodology should be reconciled and the methodology examined to determine whether photogrammetry or use of portable ultrasonic imaging (as is used with endangered right whales which need not be captured) may be sufficient to answer questions relating to body mass and general nutritional status without having to subject animals to this sort of procedure.

Dr. Davis states that animals may need to be re-captured up to three times to attach and remove instrumentation to replace batteries and video tape. Each time an animal is captures there is a risk of capture-related myopathy. The applicant does not explain why batteries with longer life cannot be used or why videotaping is necessary in these numbers each year. There is no provision a risk-benefit analysis such that the increased risk of repeated capture and anesthesia in a space of a few weeks is balanced against the value of data obtained by the video camera.

We are also curious about a statement made on Page 11 of this proposal that "although not a necessary part of our research, we will hot brand our animals at the request of the permit office." This indicates that researchers do not necessarily desire to hot brand animals, but are being required to do so by the permit office. Can NMFS explain this? Has NMFS done an analysis of the areas or numbers of animals that should be branded such that these 45 animals are necessary? Is this required so that if animals die subsequent to instrumentation they can be readily identified in a manner that no other tagging or marking will allow? These questions should be addressed. We reiterate our concerns which we raised regarding his 2002 application.

The applicant states that 10 pages are attached to the application with a justification for the age classes to be studied, but there was no such attachment to the copy that we received. The application appears incomplete.

We reiterate our comments of 2002, that this project seems questionable in terms of its cost-benefit ratio and its justification.

Permit 782-1768 (Tom Gelatt/John Bengston -- NMML)

We wish to note that this permit application relies on an substantially identical material to that used by Dr. Horning. Some of the similarities might suggest a degree of cooperation in approach that has been lacking from other proposals or it may simply indicate a lack of rigor in examining the unique aspects and impacts of this proposal. There are, however some discrepancies in information provided and the overarching goals that are attempted seem to ignore power analyses conducted by other researchers.

Among its differences, this proposal would anesthetize animals with telazol. As noted above and in other permit applications, this has a higher rate of complications in females who are pregnant and lactating, and NMFS has specified isoflurane as preferable. The use of another anesthesia should be justified.

The most notable aspect of this permit is that it proposes to sample large numbers of animals range wide. While it is possible that the sampling design will be done in conjunction with Alaska Department of Fish and Game (ADFG) although this has not been stipulated nor have any specific sampling areas been delineated. We are concerned that the large numbers that will be sampled range wide risk duplication of effort. The applicant (and any others proposing similar sampling) should provide specificity in where they will sample and the geographic and demographic parameters that will be examined.

Some of the activities may be harmful and the impacts underestimated. For example this proposal seeks to do pup counts each year that involve driving adults from the rookeries. This activity has been associated with increased pup loss and abandonment. Pup counts also caused an increase in the frequency of stampedes from rookeries in response to natural events for several days (see discussion in Dr. Horning's application - Appendix 8) that is unacknowledged in this application. Mitigation measures were suggested in the primary research (Lewis 1987) including conducting counts at times and tidal cycles when non-pup presence is lowest, not conducting counts when rookery is small to prevent pups from drowning in pools. These are not discussed in this application's mitigation

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measures. Furthermore, we note that juveniles and adults may or may not receive anesthesia but instead be restrained simply by use of a "squeeze cage." Withholding anesthesia has not been justified by the applicant. We note that there is no assurance by this applicant that veterinarians will be on hand to assure the proper use of medical procedures and anesthesia; the applicant simply states that "anesthesia will be administered and monitored only by personnel thoroughly trained in its application." The applicant is also vague as to the period of time during which post-procedure monitoring will occur. For example they state "pups are observed during the recovery and then released." There should be additional information provided in the application to assure adequate monitoring of animal fates.

The applicant states that "the range wide survey in 2006 will include *all rookeries in Alaska.*" If this is true, and if the applicant's sampling design is science-based, then there seems to be no need of any other hot branding being conducted since all rookeries will (or can) be sampled. This permit alone proposes to collect, sample and potentially brand 1,100 pups (50 per rookery) aged 5 days to 2 months; up to 120 juveniles aged 2 months through 3 years; and 60 juveniles and adults over aged 3. Considering the power analysis that was done by Dr. Horning, the number being sampled seems excessive.

It is not clear to us that this proposal has been considered in light of similar proposals by AKDFG and Dr. Horning to assure that it is not duplicative and that its methodologies are warranted. As we have previously stated, we believe that this and all other permit applications seeking takes for invasive/intrusive activities should be held in abeyance pending a through EIS, a consultation under Section 7 and an analysis of the scope and demographic and geographic parameters that need to be studied, the best techniques for answering key questions and a power analysis of the numbers of animals minimally necessary for invasive/intrusive studies.

Permit 358-1769 (Robus/Rea, Alaska Department of Fish and Game)

This permit application is virtually identical to that of 782-1768 (Gelatt), including identical verbiage in substantial sections. While this would seem to argue that the investigators are cooperating, it is not clear that the efforts, methodologies and impacts have been given adequate consideration by either applicant.

For example, we note that there are apparent discrepancies in the mortalities that this applicant reports. On page 7 the applicant states that "in the past 3 years except for one mortality of a juvenile female that died under anesthesia, all mortalities have been pups <2 months of age and occurred during moving of pups for branding." Yet on page 23, they state that "[d]uring four years of similar research under permit No. 358-1564, ADFG had 2 juvenile mortalities occur during a capture trip in 2004 (Table 6) and 15 pups died during branding operations." They then reference table 6 again. In fact table 6 does not exist in this application, but it does exist in the Gelatt/NMML application. In *this* application same the table is numbered 2b, and it covers ADFG's activities only in the years from 2001-2003, not 2004. Table 2b reports that ADFG had 14 mortalities in the

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eastern stock of Steller sea lions, though its activities were "Alaska wide." The reported mortality differs between pages 7 and 23 and the chart numbered 2b. Discrepancies of this sort call into question the accuracy of the reporting and thus the impacts on these ESA listed stocks.

This applicant seeks to capture, sample and potentially hot brand up to 700 pups aged 5 days to 2 months; as well as 300 sea lions aged 2 months to 3 years; and 30 Steller sea lions over 3 years of age. They propose similar sampling to the Gelatt application and our comments and concerns are thus identical.

We reiterate that we believe that this and all other permit applications seeking takes for invasive/intrusive activities should be held in abeyance pending a through EIS, a consultation under Section 7 and an analysis of the scope and demographic and geographic parameters that need to be studied, the best techniques for answering key questions and a power analysis of the numbers of animals minimally necessary for invasive/intrusive studies.

Permit 881-1668 (Calkins—Alaska Sea Life Center/ASLC)

This proposal is very troubling for a number of reasons. First of all, ASLC has requested six separate permit modifications just in the past 18 months. Thus it is almost impossible for reviewers to ascertain whether these modifications (many of which request additional sampling procedures) will affect the reliability of the information that is being gathered and/or whether synergistic effects of multiple sampling of both free ranging and captive animals and changes in sampling protocols for the same animals or comparable cohorts compromises the reliability or validity of data being collected.

Furthermore, many of these studies involve lactating females and their dependent pups. At this most energetically challenging time in a female's life she will be subjected to multiple captures and sampling in the span of a few months, the attachment of telemetry devices and devices designed to challenge her buoyancy and maneuverability in order to simulate nutritional stress/challenges. It is hard to justify this, since it can endanger the health of both the mother and her dependent pup. Effects of procedures and anesthesia on her and her pup are not discussed. In response to questions raised by NMFS regarding the effects of buoyancy/drag devices and their possible effect on pup health, predator avoidance, provisioning and other parameters, the applicant cites a study done on foraging Antarctic fur seals that found little adverse effect on pups. The material provided for review does not discuss the results of the study in fur seals (i.e, did it indicate that chances in drag and buoyancy that may be related to body condition affect survivorship or reproductive capability) such that it can be determined whether this research is necessary for Steller sea lions whether fur seals may serve as a surrogate; or whether the applicant wishes to conduct this research simply because it is possible to do. That research has been done on one species does not necessarily mean that it needs to be replicated on others, but there is no means of judging this from the information provided in the permit application(s) or the EA.

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Other procedures are similarly not justified by the material provided. We note, for example that on 12/3/03, the applicant requested a modification to "Task 3a" such that external data loggers would be made larger to allow for "temporary simulation of reduced prey availability." It is not clear whether or how this may relate to the study seeking to attach drag/buoyance devices and whether or to what extent they may be duplicative.

Similarly, the applicant proposes on page 3 of the December 7, 2003 amendment request to extract teeth from 80 adult females to allow age determination, although stating in the same paragraph that "prominent agencies such as ADFG and NMML" recognized "that these methods are inaccurate for older animals." If this is the case, then why is the applicant requesting permission for this invasive activity and why would NMFS grant it?

Though they (and Dr. Horning in his application) acknowledge that telozol has a higher rate of mortality and morbidity in lactating and pregnant females, they propose to use this chemical restraint with lactating females. They further state that they will use "squeeze cages" rather than gas anesthesia in some instances but not others, without explanation as to why this difference would occur or how the lack of anesthetic can be considered humane for animals undergoing significantly intrusive procedures and tag attachment (5/11/04 modification request). The applicant also makes no assurance that veterinarians will be used to perform anesthesia and invasive procedures, and simply assert that they "will only be performed by/under the direct supervision of *qualified and experienced* personnel." (emphasis added)

The ASLC proposes capture dependent, nursing pups (as young as a few days old) and their mothers. Mothers will be darted with telazol (which has a 10% mortality rate according to Dr. Horning's application) and then mothers will be further sedated, sampled, branded and given oxytocin to sample milk. Dependent pups may also have stomach lavage and enemas administered. There is no discussion of the effects of the drugs on pups who are dependent on milk from a mother who has been sedated multiple times (e.g., whether drugs may be transmitted to the pup and affect its viability) or how invasive sampling may impair survial. Mothers may be additionally fitted with devices to increase or decrease buoyancy and drag to simulate varying amounts of body fat and then re-sampled a month later along with their pup. This can potentially compromise their foraging success at a time (lactation) when they are already sustaining a maximum energetic drain.

These sorts of experiments that involve potential nutritional and physical affecting very young seem risky and both legally and ethically questionable. As noted above, we are concerned that drugs are being used with pregnant and lactating females that are known to pass the placental barrier and get excreted in the mother's milk. Though the applicant "has never heard of any reports" of complications, this does not provide sufficient assurance to risk the health of a nursing female and her developing or dependent pup. We are concerned that drug-related effects on fetuses and pups may be underestimated in light of information that drugs being used pass the placental barrier and can be excreted in the mother's mild. Though the applicant claims that they have "never heard of any reports" of complications, this does not provide sufficient assurance that the health and safety of mothers and pups is adequately safeguarded.

The NMFS raised questions (January 2005) questioning the need for both gastric lavage and enemas for young pups. The applicant's blithe answer was simply that it *was* necessary, though they provided no literature or information to bolster this assertion. The applicant then went on to say that they now realized that they had inadvertently omitted requesting this dual procedure for adult females as well so were now requesting it. Thus they had either been illegally conducting this research without authorization or had decided after the fact that they should have requested it and were now doing so without explaining the need or the benefit of adding this procedure to the long list of intrusive studies being performed.

The applicant has not provided any justification for increases that are requested in the number of animals that they wish to sample and or brand or the increase in the duration or frequency of captive research. We question whether these continual amendments that are requested with little or no supporting information or justification would meet the tests of the Animal Welfare Act or would pass the careful scrutiny of an independent animal welfare/care committee.

There is no accompanying chart to allow reviewers to view the morphing of the various "tasks" that are requested for modification, nor is there any discussion of why any particular modification is important or whether it has been tried elsewhere or is novel and how it may or may not compromise comparison and analysis of data obtained from animals not subjected to the protocols. Nor is there discussion of the synergistic or cumulative effect of the various sampling and tracking and device attachment. We are offended by the cavalier attitude taken by this applicant in continually amending the permit without significant justification and/or opportunity for public scrutiny.

Approval for invasive studies by this applicant should be suspended until NMFS can conduct a more comprehensive evaluation of range-wide research, its contribution to specific recovery plan needs and compliance with requirements of NEPA, the ESA, MMPA and Animal Welfare Act.

Summary

The information and analysis provided by NMFS so far entirely fails to demonstrate that these permits can be issued without violating NEPA, the ESA, and the MMPA. While we are concerned with impacts of harassment resulting from aerial and vessel-based surveys, carcass retrieval and scat collection; we are more concerned with impacts to the stock that result from capture and physical handling to obtain biological samples, and with invasive procedures and devices that may result in injury and death and unnecessarily disadvantage a declining endangered stock of animals. Some of this research appears to be unnecessarily invasive and lacking reasonable precaution to assure that animals are handled in a manner that is humane and minimizes suffering and harm.

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Accordingly, the HSUS must insist that the NMFS not issue any permits, permit extensions or permit modifications involving invasive research until such time as you have completed an Environmental Impact Statement that fully evaluates the individual and cumulative impacts of the proposed research and weighs its contribution to cumulative effects on the stocks from combined mortality and serious injury resulting from fisheries-related mortality and native harvest. The quality of analysis required by NEPA and by both the ESA and the MMPA is simply lacking at this time. Furthermore, we believe that NMFS has an obligation to consult under Section 7 of the ESA on the impacts that this activity will have on the western stock of Steller sea lions, particularly with regard to the additive effects of these permits along with those of native harvest mortality and incidental fisheries-related mortality.

The HSUS also suggests that NMFS sponsor a workshop to delineate the specific questions that need to be answered, the best means of addressing those questions and the minimum number of animals necessary for valid research results. While this should have preceded the dramatic increase in permit issuance, it is not too late to assure that this and future research will appropriately address the pressing conservation needs of the species without disadvantaging the stocks.

Although we support the need to conduct research to better understand the cause and extent of the decline and understand the biological and ecological factors that contribute to it, The HSUS cannot countenance the conduct of research that will not clearly contribute to the conservation of the species or is inhumane to the individual animals that are affected. Accordingly, should NMFS issue the proposed permits, The HSUS will have no choice but to consider all methods, including legal action, to ensure that NMFS adheres to the requirements of federal laws and regulations before authorizing scientific research on endangered and threatened species of marine mammals.

Sincerely,

Sharon B. Young
Marine Issues Field Director

Jonathan R. Lovvorn, Esq.
Vice President, Animal Protection Litigation,

Literature Cited:

Lewis, J. 1987. An evaluation of a census-related disturbance of Steller sea lions. M.S. Thesis, University of Alaska, Fairbanks. Cited in Permit Application 1034-1773.

North Pacific University. 2005. Report available at: http://www.marinemammal.org/steller_sea_lion/lifespan.php

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November 4, 2005

William Hogarth, Ph.D.
Assistant Administrator for Fisheries
NOAA Fisheries
1315 East West Highway
Silver Spring, Maryland 20910

Dear Bill:

We want to bring to your attention an extremely critical issue concerning our collective ability to conduct viable marine mammal research programs off Alaska: the difficulty of your Office of Protected Resources to timely process and approve permits required for new research.

As you are well aware, NOAA Fisheries is instrumental in resolving marine mammal-fisheries problems. The agency is uniquely responsible, on the one hand, for developing biological opinions and reasonable and prudent alternatives under the ESA, and on the other, for promulgating restrictive fisheries regulations under the MSFCMA. Decisions under both acts must be balanced and informed by current, scientific information on the status, migration, behavior, and feeding patterns of marine mammals, particularly as they may be impacted by fisheries. Examples of current, simmering marine mammal issues off Alaska include designation of critical habitat for Northern right whales, recovery of Steller sea lions, and potential fisheries impacts on northern fur seals.

The lack of information on those and other species of marine mammals likely may lead to excessively precautionary management and the attendant burden of overly restrictive regulations on the fisheries. It doesn't have to be that way. Let's not be forced down the same painful path that we all traveled to protect Steller sea lions when every scrap of information was challenged. We need robust marine mammal research and scientific information in advance, not at the time of crisis.

Our Alaska fisheries have been lauded by the U.S. Commission on Ocean Policy as well managed and sustainable. To continue these practices, especially as we move toward fishery ecosystems plans, more and better scientific information will be required. We must maintain the flow of such information if we are to be successful. We must be able to field large research programs now to provide information 3-5 years hence that will underpin resource management off Alaska.

We believe that a major impediment to achieving that understanding is developing in the Office of Protected Resources. We have always found the OPR staff to be highly professional and dedicated. However, despite their dedication, hard work and good intentions, we believe the office is woefully understaffed to timely process permits and unnecessarily conservative regarding the implementation of NEPA and ESA requirements. For example, we now are being informed that new permits for marine mammal research for several ESA listed species may be held in abeyance for two years or longer while a comprehensive EIS is being developed. This one-two punch has the potential to bring field research up here to a screeching halt.

This situation already is directly impeding marine mammal research supported by the North Pacific Research Board. Several projects cannot get started for lack of permits, or worse yet, may be delayed indefinitely while NEPA analyses are completed. Our legislative mandate requires us to provide information to address pressing fishery management issues or marine ecosystem information needs. And yet we are being placed in the awkward position of not being able to do the research needed to address either priority. This lack of permits also is impacting the ability of federal and state agencies, universities, and other research centers to do their research.

We urge you to take the actions necessary to (1) alleviate the situation within OPR that is delaying marine mammal research permits and (2) provide for ongoing and new field research programs while environmental analyses are being prepared under NEPA, if indeed you conclude that such analyses are necessary. We simply cannot hold critical marine mammal research in abeyance. Environmental analyses, biological opinions, and fisheries regulations all must be informed by the best available information on marine mammals and their interactions with fisheries. Management decisions under the ESA must be appropriately precautionary. Therefore, reducing uncertainty through research is a very important element in balancing the management of living marine resources in Alaska with the needs of coastal communities dependent on these resources. Resolving this issue is critical to the fishing industry, other marine industries, subsistence users, and everyone who is trying to manage for sustainable and healthy ecosystems off Alaska.

We request to meet with you at your earliest convenience to discuss the concerns raised above.

Sincerely,

Clarence Pautzke
Executive Director, North Pacific Research Board, and the Executive Committee of the North Pacific Research Board:

Tylan Schrock
Alaska SeaLife Center

Stephanie D. Madsen

Stephanie Madsen
North Pacific Fishery Management Council

Douglas DeMaster

Douglas DeMaster
Alaska Fisheries Science Center

Earl E. Krygier

Earl Krygier
Alaska Department of Fish and Game

Comments Received on 2002 Environmental Assessment on the Effects of NMFS Permitted Scientific Research Activities on Threatened and Endangered Steller Sea Lions

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THE HUMANE SOCIETY OF THE UNITED STATES

Chief
Permits, Conservation and Education Division
Office of Protected Resources
National Marine Fisheries Service
1315 East-West Highway, Room 13705
Silver Spring, Md. 20910

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29 July 2002

Dear Chief:

On behalf of the more than 7 million members and constituents of The Humane Society of the United States (HSUS), I wish to submit the following comments on the proposed issuance of permits for the study of Steller sea lions (*Eumetopias jubatus*) as announced in *67 FR 43283*.

The HSUS agrees that it is critical to develop a better understanding of the causative factors in the declines that have been noted in Alaska in order to determine what, if any, mitigation measures can be proposed. However, it is not clear that adequate coordination of these various research proposals has taken place and it is not clear that the proposals meet all of the conditions stipulated in the Marine Mammal Protection Act (MMPA or the Act). We offer the following general and specific comments on the proposals. While we do not feel that all options for issuing permits were not adequately considered, we support Alternative 3 which would limit the invasive research.

General Comments

The MMPA requires that a number of criteria be met prior to the issuance of research permits (50 CFR 216.34). Among them:
(1) The proposed activity is humane and does not present any unnecessary risks to the health and welfare of marine mammals; and
(2) The proposed activity, if it involves endangered or threatened marine mammals, will be conducted consistent with the purposes and policies set forth in section 2 of the Endangered Species Act (ESA); and

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(3) The proposed activity, by itself or in combination with other activities, will not likely have a significant adverse impact on the species or stock.

The Act further requires that research be bona fide, cannot be accomplished with stocks that are not listed under the ESA or MMPA, and are non-duplicative.

While individual permit applications may comply with some or all of these requirements, it is not clear that these proposals in sum can comply with all of them.

The National Marine Fisheries Service (NMFS) proposes that the appointment of a full-time coordinator will assure compliance; however it is not clear how this can be true when NMFS also states that it will only develop a monitoring plan after the permits have been issued and research is underway.

For example, NMFS acknowledges that some animals are likely to die as a result of the issuance of these permits. The Environmental Assessment (EA p.112) states that the status quo would be 10 accidental mortalities and that issuance of these permits would result in the NMFS raising this number to 51. Later in these comments we will question this number; however, even if we take this number at face value, NMFS further states that if all of this mortality were concentrated in the western stock, the impact would not be negligible. If more than 10 animals from the western stock were killed, then NMFS would require researchers to consult on how to reduce mortality so that it does not exceed 20 animals, which is10% of the PBR of 208. It is not clear from the EA whether such an assessment will be time-sensitive or whether consultation can take place before the number is exceeded when it appears that a monitoring plan is not currently in place.

The EA for these proposals states that permitees currently conduct 11 different invasive procedures on 2,400 sea lions range-wide and that the impact of this has been found to be insignificant on the populations. The proposed action of granting new permits would increase that number to 15 different procedures performed on 3,100 animals annually, with the assumption that this too will be insignificant (p. 112). However, the NMFS also states that it has insufficient information for a reliable evaluation of the synergistic effects of these repeated procedures on individual sea lions. Although virtually all of the permit applicants seek a 5-year permit, NMFS states that to mitigate possible synergistic effects it will restrict duration of any permits that allow handling animals to June 2005, during which time it will "work with to address [sic] concerns raised during review of the permit applications including development of a monitoring plan that can produce information to assess the impact of the research program more reliably over the long-term" (p.112). It is not clear whether or how a 5-year permit will be halted to allow evaluation of longer-term effects. More alarming, it is clear that such a plan to monitor lethal and sub-lethal effects is not in place at this time.

The HSUS believes that the time for developing a plan to monitor potential effects is *before* the research is undertaken, rather than after permits are granted and research is underway.

The limited discussion of the need for a monitoring plan only addresses concerns regarding synergistic effects of invasive procedures. It is not apparent that such a plan would consider the stress of the cumulative effects of being captured multiple times, and of being harassed during survey activities and scat collection in the rookeries. In the case of the Alaska Sea Life Center (ASLC) proposal, approximately 2,100 animals per year will be "disturbed" and 60 pups will be captured and "sampled" while under anesthesia in one of its "tasks." For another "task," 3,750 Steller sea lions will be "disturbed" and 150 juveniles "sampled" under anesthesia, with 60 of these animals fitted with surgically implanted transmitters and an additional 16 of them transported to a captive facility for up to 3 months, where they will be subjected to a variety of regular testing and tag implantation. Cumulative impacts are not addressed.

In fact, the number of animals that will be harassed/disturbed by the various projects is enormous. According to charts and data in the various applications, the proposal by the National Marine Mammal Lab projects 4,000 takes range-wide as a result of its activities; the Aleutians East Borough proposes to disturb 400 through scat collection and 400 through boat surveys (and an additional 7,000 animals via aerial survey); Texas A&M would harass 2,000 sea lions during its activities; the University of Washington proposes to sample up to 50 animals; the ASLC proposes 2,100 for one project and 3,750 for another; and Alaska Fish and Game proposes inadvertent harassment of 5,000 animals in aerial surveys, plus 15,000 during pup counts and 700 captures. Thus, the total number of animals that would potentially be harassed/disturbed/ sampled is approximately 40,400! If we assume that animals are only harassed once, this is approximately 62% of the combined population of Eastern and Western Stocks of Steller sea lions (NMFS 2001 Stock Assessment). It is, however, likely that some animals will be harassed/sampled multiple times in geographically overlapping research areas, such that some individuals will be stressed more than others. Harassing this large a number of an endangered or threatened species should not be taken lightly and disturbance may be considerable in certain areas.

In the section on effects of capture and restraint in his permit application, Dr. Randy Davis states that they "constitute one of the most stressful incidents in the life of an animal and intense or prolonged stimulation can induce detrimental responses" (p.3). If we look at the total number of animals to be captured, we see that Alaska Fish and Game proposes to capture at least 700 pups for sampling, plus 300 juveniles and 10 of any age (and 5 mortalities requested); the National Marine Mammal Lab proposes to capture at least 120 pups and juveniles (10 mortalities requested); University of Washington proposes to biopsy 40-50 animals; Texas A&M proposes capturing 225 animals (13 mortalities requested); Oregon Department of Fish and Game proposes to capture 200 pups and 30 older animals (10 mortalities requested); and ASLC proposes capturing 150 juveniles for sampling and 400 animals in trapping experiments (mortalities of 5 in the field and 3 in-house). This totals 2,185 Steller sea lions who will be subjected to "one of the most stressful incidents in life"! Of those animals who will be captured, applicants seek permission to have over 50 of them die as a result of their activities. This appears to be an unacceptably high level of stress and mortality for a stock that is already declining in many parts of its range. Please note that the chart on p. 69 of the EA listing accidental mortalities does not appear to agree with numbers provided in the various applications. This and other discrepancies between numbers in the various permit applications and numbers in summary charts, complicates understanding the true impact of these applications.

The NMFS has argued that forcing consultation among researchers will assure that no more than 20 animals are incidentally killed, and that this number is less than 10% of the PBR of 208 and is therefore negligible. The HSUS wishes to point out that while the mortality of 20 animals from the western stock may be considered the maximum that is negligible, these permit applicants would not be the only source of lethal takes in the stock. In fact, more than a negligible number is already being killed by the multiple sources that are interacting with the stock, and the deaths of 20 more animals is therefore *not* negligible. Mean native harvest mortality is 353 animals, with 171 killed in 1998 - the year with the most recent harvest data. Fisheries related mortality is estimated at ≥ 28 animals per year. The most conservative estimate yields an estimated mortality of at least 199 per year from this stock, a number that is only 9 less than the entire PBR. If scientific permit-related mortalities in the Western stock reach 10 (the number that merely triggers consultation), then the entire PBR will have been exceeded by all sources. This is unacceptable. The MMPA did not intend for each user to have access to the entire PBR (nor one assumes the entire number defining the uppermost bound of negligible impact) such that the cumulative impact is well over the PBR. In fact, PBR is stated to be the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population." [16 U.S.C. 1362. Sec. 3 (20)] Clearly this level of harassment and mortality does *not* meet the conditions specified for issuance of permits under the MMPA to assure that impacts will not have a significant impact. On that basis, all of the permits cannot be granted.

The MMPA also requires that permits must ensure that the proposed activity is humane and does not present any unnecessary risks to the health and welfare of marine mammals. In our comments on individual proposals, we question whether this assurance can be given for all of the proposals.

Specific Comments

Alaska Department of Fish and Game (ADFG) permit #358-1564-01

This represents a continuation of an existing permit, with all activities having undergone previous public comment. Its activities are Alaska-wide and likely, therefore, to overlap with other proposed permitees, permitting multiple sampling of animals unless there is strict coordination. Up to 600 pups will be captured and hot branded. In addition, three hundred older animals will be captured, anesthetized with gas and subjected to having teeth pulled, swabs taken, and being intubated with a stomach tube. It is proposed that up to 5 may be incidentally killed. On page 52 and 53 of the EA, there is a summary of the pros and cons of freeze branding versus hot branding. It states that "...there has been insufficient re-sight effort of the more than 15,000 sea lions branded by ADF&G and NMML since 1975 to validate the merits of hot-branding versus the potential for adverse impacts to individual sea lions. The applicants state that there is no evidence suggesting increased mortality of pups after branding. The absence of such evidence cannot be interpreted as evidence of no effect because there has not been sufficient post-activity monitoring to determine whether hot branding or other research activities in rookeries has contributed to increased mortality of pups." The HSUS suggests that the ADFG may wish to spend more effort trying to re-sight animals and analyze the information from re-sighting, rather than continuing to brand additional animals. If continued or additional branding is authorized, the applicant must be required to monitor post-branding effects and provide evidence of little or no effect of their various activities on rookeries. Additionally, we feel that insufficient attention was given to consideration of post-capture myopathy. We note that although NMFS states in the EA on p. 69 that ADFG proposes 10 accidental mortalities per year, the chart on p. 9 of the applications stipulates 5 per year.

National Marine Mammal Lab (NMML) Permit #782-1532-00

We wish to reiterate our concern, expressed above, about the effects of hot branding, specifically on pups. Additionally, we wish to point to the EA discussion on pp. 47-49 of the effects of chemical immobilization. The EA points to dangers of telazol darting and also states that with the use of gas anesthesia, captive animals appeared to recover fully within 8 hours, a period of time that is longer than animals will be observed under this permit. Without post-release monitoring, their fate, if released prior to 8 hours will apparently not be known. We reiterate our concern, expressed above that the applicant should institute a post-capture monitoring program and assessment of condition.

Aleutians East Borough - File #1010-1641

We have no specific concerns with this permit application at this time.

University of Washington - File #1016-1651

This proposal would utilize a crossbow to collect biopsy samples to obtain fatty acid signatures of potential prey consumed by Steller sea lions. It states that "whenever possible" this will be done in conjunction with NMFS or ADFG. This should be made mandatory to avoid duplicative sampling of animals.

Texas A&M - Randall Davis-File # 800-1664

It is not entirely clear why Dr. Davis, who is receiving funding from two other permit applicants (NMFS and ASLC) cannot conduct his activities under the auspices of their permits rather than seeking separate take authorizations. Effort should be made to avoid duplicative sampling or harassment wherever possible. Having said that, we have grave concerns with this proposal. The EA states on p. 69 that Dr. Davis proposes 13 accidental mortalities annually (more than any other applicant), including 3 pup mortalities as a consequence of harassment in the rookeries. According to the chart on p. 4 of his application, Dr. Davis proposes to capture each animal he tags with video systems or other transmitters up to three times. Of the 15 adult animals he proposes to capture in each of the 5 years of his permit, up to 3 may die. This is a mortality rate of approximately 20%. This seems unacceptably high. He projects that 5 of the 30 juveniles he captures may die. This translates to approximately 17% mortality. Although he provides no explanation for this different survival rate for juveniles, this is also an extremely high level of mortality. While underwater videotaping may be interesting, we do not believe it is critical to understanding the foraging issues facing Steller sea lions. There may be some justification for some of the ancillary tagging, though the explanation of why this is not duplicative of information already in hand is not clear. Particularly in light of these extremely high mortality rates, we do not see that the justification for this permit outweighs the potential risk to animals, as would be required by the MMPA and ESA.

This permit should be denied.

<u>Oregon Division of Fish and Game (ODFG) - file #434-1669</u>

This is a request to renew a permit but to change the lead agency. While it is not clear why this is necessary, we do not oppose this change. The agency has demonstrated that they are the sole research group studying this population. In light of discussion in the EA, The HSUS believes that the NMFS should request post-capture monitoring of survival and re-sighting to fill apparent gaps in understanding this sort of information.

<u>Alaska Sea Life Center (ASLC) - file #881-1668</u>

The HSUS has some grave concerns regarding this proposal. We support the portion of this proposal that seeks to demonstrate efficacy of a trap that could be used as an alternative to chemical immobilization. We also support the remote videotaping. We do not support the portion that relates to capturing and holding animals for testing.

According to the charts on pp. 32 and 33 of its application, the ASLC proposes to capture 60 pups each year for sampling under anesthesia. We reiterate our concerns, expressed above, with the use of anesthesia. An additional 150 juveniles will be "sampled" each year under anesthesia, with 60 of these 150 animals fitted with surgically implanted transmitters. These transmitters will store and transmit data for up to 8 years. The proponents speculate that they will get up to a 70% return of data. They discuss survival impacts of wearing subcutaneous tags versus external tags, but do not speculate about capture myopathy or death associated with anesthesia.

In addition to these 60 animals of the 150 juveniles captured, 16 of them will be transported to a captive facility for up to 3 months, where they will be subjected to a variety of regular (at least weekly) testing that includes, for some animals, a 2-week fast to measure stress and other bodily effects of fasting. Four animals will also be subjected to adrenocorticotropic hormone "challenges," which require blood sampling every fifteen minutes for 2 hours. We question the value of some of the information gained from live captured animals that are caged in either 12' or 20' diameter pens and subjected to constant testing with regard to making reasonable conclusions about wild animals. We note that the applicant proposes for the first 2 years to hold all 16 animals in either a 12' or 20' diameter pen, but plans to construct four additional 12' diameter pens to house animals during the last 3 years. Given the different conditions under which they will be kept in the various years of the five-year permit (e.g., space constraints and number of conspecifics in the cage), are we to assume that their stress responses will be the same and that data collection will not be compromised? We also believe that it is disingenuous to claim that "all efforts will be taken to minimize exposure to humans," when animals are being subjected to continual sampling and at least 8 of the animals will be subjected to highly stressful fasting or hormone "challenges."

The HSUS notes that the applicant requests 8 mortalities per year (p. 33), whereas the chart on p. 69 states that they are only requesting 5 accidental mortalities. It is not clear that these mortalities are warranted, particularly the 3 that are reserved for animals captured and held at the ASLC. This represents a 3-month death rate of 18%, which is unacceptably high for animals in a captive facility. This level is far from humane and far from negligible for the number in captivity. This portion of the permit should be denied.

Summary

Only three alternatives are provided: (1) status quo (2 permit recipients), (2) granting all of these permits, and (3) reallocating intrusive research so that only the Eastern portion of the stock would be affected unless a project was directly related to conservation or management needs of the Western stock. Of these three alternatives, we favor Alternative 3.

We must state, however that it is imperative that the NMFS give serious consideration to denying all or part of two permits which appear to impose unacceptable levels of inhumane treatment or/and mortality risk. In our review of the various proposals and the summary of possible adverse impacts that is provided in the EA, we find that there is apparent duplication of sampling area; that some of the projects do not appear humane; and that the finding of negligible impacts, particularly for the Western stock, are not well founded.

Thank you for the opportunity to comment on these proposals.

Sincerely,

Sharon B. Young
Marine Issues Field Director
Wildlife and Habitat Protection

Cc: Robert H. Mattlin, Ph.D., Executive Director, Marine Mammal Commission

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Number of Pages Sent (including cover page): 8

TO: Chief, Permits, Conservation & Education Div. Fax: (301 713-0376
Attn: Tammy Adams

FROM: Jack K. Sterne, on behalf of Greenpeace, et al.

DATE: July 29, 2002

RE: Comments on NMFS Environmental Assessment for Steller Sea Lion Research Initiative Permit Applications, 67 FR 433283 (June 27, 2002)

Message: Please call Joanna Parker at ext. 102 if you do not receive all the pages to this fax.

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JUL 29 2002

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29 July 2002

To: Chief, Permits, Conservation and Education Division
Office of Protected Resources
NOAA Fisheries (F/PR1)
1315 East-West Highway
Silver Spring, MD 20910-3226

CC: William T. Hogarth
Assistant Administrator for Fisheries
National Marine Fisheries Service
1315 East West Highway
Silver Spring, MD 20910

RE: NMFS Environmental Assessment for Steller Sea Lion Research Initiative Permit Applications, 67 FR 433283 (June 27, 2002)

To the Chief of Permits:

An unprecedented $80 million Congressional appropriation has been made available under the Steller Sea Lion Research Initiative (SSLRI) to collect information on the biology and ecology of threatened and endangered Steller sea lions, as well as other features of their marine environment. We wish to state at the outset that we support legitimate research into the causes of the decline of endangered Steller sea lions. In order to insure the survival and recovery of this species, it is vital that we act in a precautionary manner while gathering data that will contribute to our understanding of its life history and the role that various factors have played, or are playing, in the decline. At the same time, because of the scope of this research initiative and the anticipated impacts on great numbers of animals in threatened and endangered populations, it is essential that all direct, indirect and cumulative impacts of the research program are carefully evaluated and all projects are shown to be essential for the conservation of the species.

General Concerns Regarding The Analysis In The EA

The Marine Mammal Protection Act (MMPA) and Endangered Species Act (ESA) prohibit takes of threatened and endangered species of marine mammals, with limited exceptions for subsistence harvests, incidental mortality in fishing operations, and research. On June 27, 2002, National Marine Fisheries Service (NMFS) published a Federal Register notice announcing the receipt of permit applications and availability of an Environmental Assessment (EA) for five major projects within the SSLRI, acknowledging that the magnitude of proposed research effects are sufficient to merit an analysis under the National Environmental Policy Act (NEPA). The proposed action would authorize substantially increased disturbance and takes of threatened and endangered Steller sea lions for activities

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associated with the research, and four of the five projects would receive the special exception to the prohibition on takes for the maximum period allowed (five years).

Previously there has been no assessment of the direct, indirect, or cumulative effects of Steller sea lion research. Some of the proposed research entails extensive disturbance affecting thousands of animals at multiple times of the year as well as highly intrusive procedures directly affecting hundreds of individual animals every year, particularly those young animals whose survival is thought to be most at risk. Other proposed projects entail the use of techniques or experimental procedures whose efficacy is not demonstrated in this EA. The level of disturbance at particular rookeries and haulouts will increase substantially, as will the number of animals affected by research and number of mortalities on the endangered stock, although direct and indirect mortalities attributable to research are poorly assessed or difficult to quantify.

While our organizations continue to acknowledge the need for appropriate research and better information, permitted research projects must be shown to contribute significantly to fulfillment of objectives for understanding the management actions needed to recover Steller sea lions, using techniques without significant adverse impacts to the species (EA, p. 11). The permitting criteria require that applicants for research must demonstrate compliance with all other relevant regulatory criteria as well (EA, pp. 16-17). NMFS has not demonstrated that the impacts of the proposed action will be insignificant or satisfy all permitting criteria. In fact, we are concerned that substantial direct, indirect, and cumulative effects of the proposed action in Alternative 2 may result in further jeopardy to the species.

We do not think NMFS has shown that all projects and procedures in the proposed action are necessary and essential to the conservation of Steller sea lions – a concern also voiced by the Marine Mammal Commission (MMC) in comments on proposed requests for amendments to NMML and ADF&G permits (EA, Appendix A). There are specific research proposals (such as the capture and long-term retention of wild animals as proposed by ASLC for surgical implantation of devices) that should not be permitted as described. While NMFS is not proposing to authorize the implant of tags and temporary captivity at this time, we emphasize that experimental and unvalidated research techniques of this type are inappropriate for threatened and endangered species as described. In addition, we have major concerns about the efficacy of the experimental protocols, sampling regimes, and statistical power to detect effects, as well as the ability of NMFS to coordinate and synthesize the data generated by such a large research program involving many different agencies and institutions as well as hundreds of scientists.

Another feature of the research program not addressed by this EA is the absolute need for an accompanying monitoring program to assess the effects of research on the threatened and endangered populations, as recommended by the Marine Mammal Commission in a letter dated 27 July 2001 addressing the proposed amendments to the NMML and ADF&G permits (EA, Appendix A). The projects in the proposed action (Alternative 2) entail extensive harassment and disturbance affecting virtually the entire endangered population of Steller sea lions at some time of the year, utilizing a wide array of intrusive techniques and procedures. An adequate monitoring program should enable NMFS to suspend permits if subsequent information indicates that the research impacts are unacceptable or are exceeding the number of mortalities and injuries authorized under the permit.

As noted by NMFS at EA, p. 11, the Marine Mammal Commission has previously expressed concerns that (1) not all the planned research may be essential, and (2) the combined and cumulative effects on the threatened and endangered populations may outweigh the benefits of the information to be gained from the proposed research, particularly where depleted rookery and haulout populations are already vulnerable to stress and disturbance. We concur with this broad assessment of the projects and we conclude that the EA analysis is not adequate to distinguish between projects that merit permitting and those that are unnecessary, duplicative, inhumane or in violation of other established permitting criteria.

Furthermore, it appears that analysis of the various research activities is being piecemealed, rather than considered in a single NEPA document. We therefore have concerns about the scope of the analysis in the EA. The direct, indirect and cumulative effects of all research activities should be analyzed in a single NEPA document.

In addition, the cumulative effects analysis the EA does contain is internally confused and appears to be inadequate. For instance, at pp.106-108, NMFS says it considered both human controlled events (fisheries, shooting & subsistence harvest, and other anthropogenic effects, e.g., pollution) and natural events (climate effects and trophic interactions, e.g., predation, competition, and changes in community structure). At p.108, however, NMFS said it only evaluated two sources of direct effects (accidental mortality during research and incidental mortality in fisheries) and three sources of indirect effects (synergistic effects of intrusive research and disturbance). The cumulative effects analysis needs to consider the effects of research stress being added to nutritional stress.

Specific Concerns About Research Procedures, Experimental Protocols, Sample Sizes, Etc.

In addition to general comments on the permitting process and the insufficiency of the FONSI for this proposed action, we have specific concerns about the proposed research program that have not been adequately addressed in this EA.

Extensive and highly intrusive on-site research will entail capture, restraint, immobilization with drugs, administering of anesthesia, blood collection, tooth extraction, skin, blubber and muscle biopsies, enemas, attachment of flipper tags or telemetry tracking instruments, and hot-branding of great numbers of young animals, among other things. One project entails the capture and retention of wild juvenile sea lions for up to 3 months, during which time "life-history transmitters" would be surgically implanted in the animals – a highly experimental and unvalidated technique. Using captive animals from the endangered population as guinea pigs to test the viability of the surgical implantation technique is not an appropriate form of research, and we agree with the decision of NMFS that this portion of the ASLC project should not be considered or permitted at this time. Generally speaking, however, the proposed action does not appear to provide NMFS the flexibility to deny permits for individual projects or procedures of this type, or to suspend a permit if further review shows that action results in unnecessary or unacceptable impacts.

Even commonly practiced techniques such as tooth extraction and the attachment of flipper tags may result directly or indirectly in increased mortality due to infection, illness, reduced foraging success or increased predation, yet the rationale and need for either procedure is not evaluated in detail. For instance, Gentry (1970) noted that cattle ear tags attached to the flippers of Steller sea lion pups caused large wounds that had not healed 1-2 years after tagging. Gentry further speculated that tagging may increase natural predation (e.g., by sharks) on these animals. Yet the cursory EA discussion of the effects of flipper tagging (pp. 51, 53-54) barely acknowledges that physical wounds and infections may result, much less that there is a risk of increased predation on test subjects. Since these flipper tags commonly fall out or become too faded to be useful as identifying markers in subsequent observations, the rationale for mass flipper-tagging of young animals as a standard practice is not at all clear in this EA. Similarly, the effect of extracting a tooth sample with pliers from captured animals is summarily dismissed in one sentence: "The procedure may result in more than temporary pain, which could interfere with foraging, at least temporarily" (EA, p. 50). No studies have been conducted that would allow the agency to conclude that the effects of these practices are insignificant or benign. NMFS is frequently arguing from the absence of evidence of harm (due to an inability to measure it or a failure to try) to an assumption of no harmful effects.

Similarly, the preferred technique of hot-branding large numbers of pups and young juveniles may lead to substantial mortalities (EA, p. 53), raising questions about the degree to which vital rates information gleaned from branded animals may be biased by the experiment itself. Conceivably the potential for harm from such techniques may be outweighed by the benefits to be gained from the ability to identify animals across multiple years, but only if there is a long-term commitment to monitor the status of branded animals. For instance, branding may provide vital information on survival and pregnancy rates within the endangered and threatened stocks if accompanied by long-term observation and resighting of branded animals. Yet the EA indicates that such commitment has not been forthcoming for the 15,000+ animals already branded in past research, raising serious doubts about the usefulness of additional branding in the absence of a long-term monitoring/resighting component to the proposed branding projects:

> "*The practicality of hot-branding as a means of permanently marking pinnipeds in the wild has been demonstrated in several studies. However, there has been insufficient resight effort of the more than 15,000 sea lions branded by ADF&G and NMML since 1975 to validate the merits of hot-branding versus the potential for adverse impacts to individual animals*" (EA, pp. 52-53).

Given the endangered and declining status of the western stock of Steller sea lions and concerns about the potential for increased killer whale predation on sea lions in Alaska, NMFS should more carefully evaluate the extent to which research procedures may increase the incidence of infection, disease and/or predation on test animals that are subjected to repeated stress and disturbance, immobilizing drugs, anesthesia, tooth extractions, biopsies, branding, attachment of instruments, or even long-term (up to 3 months) captivity and surgical implantation of experimental monitoring devices. That analysis and consideration is largely absent from the EA and adverse effects are largely dismissed based on a lack of evidence or lack of study.

We also underscore the concerns expressed previously by the Steller Sea Lion Recovery Team's (SSLRT) peer-review workshops on behavior, telemetry, physiology and foraging ecology, which noted a lack of integrated research, poor coordination of existing research projects, as well as serious limitations in experimental protocols, sample sizes, and statistical power to detect effects. For instance, the Recovery Team's Physiology Workshop review (1999) identified serious limitations to comparisons between Southeast Alaska and western Alaska animals, based on the existing rookery research protocols:

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- The SSLRT Physiology Workshop Peer Review (1999) concluded that, "*Logistical constraints resulted in sample sizes that were so small in most physiological studies that few conclusions can be drawn.*"

- Differences in the bathymetry and width of continental shelf area around western and eastern rookery sites in the comparison studies may have accounted for differences in average foraging trip distance and time at sea. The SSLRT Physiology Workshop Peer Review (1999) concluded that comparisons between rookeries in the western and eastern stocks "*should have included more than one site in declining and stable areas to avoid the confounding effects of site variability and ensure that observed differences were really a product of the 'experimental' variable.*"

- Test subjects were selected non-randomly among healthy survivors on the rookeries, and did not include weaned juveniles or adult females without pups that may not have been on the rookeries. Lack of prior information on test animals made it impossible to know if lactating test subjects were representative of their area and small sample sizes allowed few conclusions to be drawn.

- Research programs are not likely to find differences using measurements of successful survivors and their young on rookeries during the earliest period of lactation. The SSLRT Physiology Workshop (1999) recommended that future research should focus on times and places that may be important *later* in the nursing period, as pups move beyond the buffering influence of their mothers. There is a need for more focus on non-summer and year-round observation and sampling.

The EA should have addressed these concerns and evaluated the degree to which proposed action will or will not remedy the limitations and shortcomings identified by peer reviewers of the existing research program.

NMFS Should Have Issued The EA For Public Comment Before Signing A FONSI

As a matter of NEPA process, we are quite concerned that NMFS issued the Final EA and signed the FONSI on this project without any involvement by the public. It is well settled that "[c]itizen participation is a vital ingredient in the success of NEPA" and that the "opportunity for local citizens or other interested parties to participate in the preparation of the environmental analysis is mandatory under NEPA." Colony Federal Savings & Loan Ass'n v. Harris, 482 F. Supp. 296, 304 (W.D. Pa. 1980) (emphasis in original). Indeed, even before the CEQ regulations were promulgated, courts made clear that federal agencies could not exclude from their decisionmaking process those persons who would be most likely to object on environmental grounds. The seminal case for this proposition is Hanley v. Kleindienst, 471 F.2d 823, 836 (2nd Cir. 1972), which held that before a preliminary or threshold determination of significance is made the responsible agency must give notice to the public of the proposed major federal action and an opportunity to submit relevant facts which might bear upon the agency's threshold decision. Id. (emphasis added); Cross-Sound Ferry Serv. v. United States, 573 F.2d 725, 731 (2nd Cir. 1978).

The CEQ regulations also highlight the vital importance of public involvement in the NEPA process. Thus, the very first section of the regulations provides that "NEPA procedures must ensure that environmental information is available to the public officials and citizens before decisions are made and before actions are taken," and, furthermore, that "public scrutiny [is] essential to implementing NEPA." 40 C.F.R. § 1500.1(b) (emphasis added). The CEQ regulations further state that "Federal agencies shall to the fullest extent possible . . . encourage and facilitate public involvement in decisions which affect the quality of the human environment." Id. at § 1500.2(c) (emphasis added).

Similarly, the CEQ regulations specifically mandate that agencies preparing NEPA documents "shall involve environmental agencies, applicants, and the public, to the extent practicable, in preparing assessments . . . ." Id. at § 1501.4(b)(emphasis added). CEQ has further explained this requirement, and how it intersects with other CEQ requirements, as follows:

> Section 1506.6 requires agencies to involve the public in implementing their NEPA procedures, and this includes public involvement in the preparation of EAs and FONSIs. These are public "environmental documents" under section 1506.6(b), and, therefore, agencies must give public notice of their availability. . . . The objective, however, is to notify all interested or affected parties.

CEQ, Forty Most Asked Questions Concerning CEQ's NEPA Regulations, 46 Fed. Reg. 18026 (1981). Indeed, several courts have found violations of NEPA where a federal agency has failed to adhere to the public participation requirements set forth in the CEQ regulations. See, e.g., Save Our Ecosystems v. Clark, 747 F.2d 1240, 1247 (9th Cir. 1984) (five-day public comment period on an Environmental Assessment was inadequate); Friends of Walker Creek Wetlands v. BLM, 19 ELR 20852, 20854 (D.Or. 1988) (agency "did not adequately provide for public participation to the extent practicable" and ordering 45 day public comment period on an EA). Accordingly, we urge NMFS to withdraw the FONSI and to issue a revised EA or EIS that takes into account the comments received on this document.

Conclusion: Withhold New Or Amended Permits Pending Further Evaluation Of The Research Program In A Substantially Expanded EA Or An Environmental Impact Statement And Consultation With The Steller Sea Lion Recovery Team

Again, we express our support for legitimate, coordinated research that is focused on gathering information that will contribute to our understanding of the causes of decline of Steller sea lions. However, based on our analysis of the proposed action, we are concerned that there is real risk that some of this research will simply cause unnecessary disturbance and increase mortality on the endangered stock without contributing significantly to the conservation of Steller sea lions – a key consideration when determining whether or not to permit the proposed research activities:

> *"An important consideration in determining whether to authorize these proposed research activities by permit, is whether the information expected to be gained will contribute to fulfilling a research need or objective identified in the Final Recovery Plan for Steller sea lions or will contribute significantly to identifying, evaluating, or resolving conservation problems for Steller sea lions"* (EA, p.19).

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The EA fails to demonstrate that all the projects and procedures in the proposed action are essential and will accomplish the stated research objectives, as currently designed. Nor has NMFS demonstrated that the entire package of research projects in the proposed action will comply with all the criteria for acceptable research, including the requirement to avoid significant adverse impacts that further threaten or jeopardize the species.

A more prudent course of action for the immediate future would be to continue the long-term population monitoring and other previously permitted projects, so as not to disrupt ongoing research unduly, while withholding approval of new permits or amendments to the existing permits until such time as NMFS has (1) fully evaluated the impacts of existing and proposed research in a substantially expanded EA or in an Environmental Impact Statement that involves the public and considers their comments, (2) consulted with the newly appointed Recovery Team to address the shortcomings of field research that were identified in previous Recovery Team workshops, and (3) prioritized new research needs.

Sincerely,

for

Charlotte De Fontaubert, Ph.D
Oceans Campaign Director
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for

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for

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MARINE MAMMAL COMMISSION
4340 EAST-WEST HIGHWAY, ROOM 905
BETHESDA, MD 20814-4447

2 August 2002

RECEIVED
AUG 1 2 2002

Mr. Eugene T. Nitta
Acting Chief, Permits Division
Office of Protected Resources
National Marine Fisheries Service, NOAA
1315 East-West Highway
Silver Spring, MD 20910

Re: Review of Permit Application Nos. 800-1664 (Randall W. Davis, Ph.D.), 1016-1641 (Glenn R. VanBlaricom, Ph.D.), 434-1669 (Oregon Department of Fish and Wildlife), and 881-1668 (Alaska SeaLife Center), and the Environmental Assessment on the Effects of National Marine Fisheries Service Permitted Scientific Research Activities on Threatened and Endangered Steller Sea Lions

Dear Mr. Nitta:

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors on Marine Mammals, has reviewed the above-referenced permit applications with regard to the goals, policies, and requirements of the Marine Mammal Protection Act. The Commission also has reviewed the environmental assessment prepared by the Service, which evaluates the impacts of the issuance of these and other requested permits and authorizations on the human environment, i.e., permit application no. 1010-1641 (Aleutians East Borough) and requests for amendments to permit nos. 358-1564-00 (Alaska Department of Fish and Game) and 782-1532 (National Marine Mammal Laboratory, NMFS). The Commission has previously commented on those requests (see letters of 5 September 2001 and 27 July 2001, enclosed).

The applicants are seeking authorization to conduct research for the purpose of obtaining information on the ecology and biology of threatened and endangered Steller sea lions to better understand the cause(s) of the decline of those populations. Such information is needed to enable the Service to develop effective management strategies to promote the species' recovery and to make informed decisions related to fishery management and other human activities within the species' range. The Commission notes that recent increases in funding available for research related to Steller sea lions provide an important opportunity to investigate the species' decline and the factors that may be contributing to the decline. However, we are concerned that, given the number of projects authorized and proposed, many of which are invasive in nature, they may cumulatively operate to the disadvantage of the western Steller sea lion population. Based on the information provided in the applications and in the environmental assessment, the Commission is unable to adequately determine if this will be the case, and additional steps may be necessary to ensure that there will not be a significant impact. Among other things, the Commission is unable to determine (1) the likelihood that the objectives of some of the proposed research projects will

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be achieved; (2) whether, and to what extent, attempts will be made to monitor the short- and long-term adverse effects of the research efforts; and (3) the extent to which the various research activities will be coordinated. In addition, as noted in our comments later in this letter on the Service's environmental assessment, the Commission remains concerned that the cumulative effects of the proposed research, in combination with other factors that are affecting the western population of Steller sea lions, could have significant adverse impacts on the population. We note that such information is particularly important for assessing the effects on and benefits to a species listed as endangered under the Endangered Species Act.

We first provide specific comments on each of the subject permit applications and then offer general comments pertaining to the applications and the associated environmental assessment.

Permit Application No. 800-1664 (Randall W. Davis, Ph.D.)

The applicant is requesting authorization over a five-year period to capture, anesthetize, measure, weigh, blood and tissue sample, tag, hot brand, and release up to 45 Steller sea lions (15 adult females and 30 juveniles of either sex) annually and to harass incidental to the capture and tagging activities up to 2,000 Steller sea lions (1,000 adults of either sex and 1,000 juveniles and pups of either sex). Individual animals could be captured up to three times over the five-year research period. Each year, up to 13 animals could be accidentally killed during the research activities. Research would be conducted in the Gulf of Alaska and the Aleutian Islands.

In reviewing the application, the Commission notes that animals may be anesthetized for up to three hours for tagging, branding, and sampling. Although the time estimated appears to be longer than necessary to carry out these procedures, it is perhaps based on a need for flexibility in the event that anesthetized animals have adverse reaction(s) to the anesthesia or associated tagging, branding, and sampling activities, or that it incorporates holding time for recovery from the anesthesia. Nonetheless, the Marine Mammal Commission recommends that clarification of the basis for the three-hour time frame be provided by the applicant, including the length of time that animals will be held after concluding the research procedures to ensure that they have recovered sufficiently from the effects of the anesthesia. We also note that, although the application states that a veterinarian will be present to monitor anesthetized animals, a curriculum vitae for the veterinarian(s) who would be involved has not been, but should be, provided.

Darting adult female sea lions with Telazol, as proposed, involves a high risk of mortality, either from their reaction to the drug or from drowning if they enter the water before the drug takes full effect. Although darting with Telazol apparently is the only method currently available for capturing adult female Steller sea lions, the Marine Mammal Commission recommends that every precaution be taken to avoid sea lion mortality and that only veterinarians and biologists with significant experience in darting marine mammals be authorized to conduct the activity.

The investigators describe the attachment of a number of instruments to animals, but do not provide complete information on the size and weight of the instruments. Although large animals may be unaffected by such instruments, this is not necessarily the case for smaller animals, and information on dimensions and weight should be provided as well as an assessment of possible effects.

It is unclear whether the research activities and associated taking proposed in the applicant's Alaska SeaLife Center's 2001 Steller Sea Lion Research Plan have been included in the take table on page 4 of the application. For example, although the table states that 75 adult females (15 annually) and 150 juveniles (30 annually) will be captured and tagged over the five-year period, page 2 of the Alaska SeaLife Center 2001 Research Plan states that up to 20 Steller sea lions of both sexes and all age classes older than pups would be tagged with location-only satellite-linked transmitters in the first year of the study. Further, the table makes no reference to the use of location-only satellite-linked transmitters as is indicated in the text of the application. Clarification of these points should be provided by the applicant.

Justification should also be provided for the requested authorization of up to 13 mortalities per year out of 45 animals to be captured. This would be a mortality rate of almost 30 percent of animals handled, which, if it actually occurred, would be unacceptably high.

Permit Application No. 1016-1651 (Glenn R. VanBlaricom, Ph.D.)

The applicant is requesting authorization to take biopsy samples from up to 200 adult and juvenile Steller sea lions annually (100 each from both the western and eastern populations) at no fewer than two sites for each population over a three-year period, and to harass incidental to biopsy sampling up to 1,000 Steller sea lions (500 from the western stock and 500 from the eastern stock), up to 1,000 northern fur seals, and up to 1,000 harbor seals over the duration of the research. Biopsy samples would be exported to Canada for analysis.

The investigators state that "the primary objective of [their] work is to obtain an assessment of the presence of fatty acid signatures from ephemeral, high-quality prey in free-ranging Steller sea lion blubber for both the western and eastern populations, and evaluate the relative contribution of such prey to blubber stores and diet." They expect to test the null hypothesis that "there is no difference in the use of ephemeral high-quality prey between the western and eastern populations of Steller sea lions by measuring the quantitative contribution of fatty acid signatures from prey species in sea lion blubber stores." However, it is not clear that the research design is sufficient to test this hypothesis and to characterize any differences in the use of forage fish by sea lions in the two populations. The approach appears to rest on the assumption that the samples taken from two (or possibly more but as yet undetermined) locations west of Cape Suckling will be representative of the western population and those taken from two or more other (also undetermined) locations east of Cape Suckling will be representative of the eastern population. However, it seems questionable that samples taken from sea lions at two sites per population will be representative of the larger populations for several reasons: these populations span huge regions; forage fish and other prey are not evenly distributed throughout these regions; and foraging patterns of sea lions may vary considerably by season, available prey species, and region. Importantly, the assumption that the samples are representative also is questionable because the sites where the samples are to be taken will be determined based on the availability of spawning forage fish. Thus, the nature of the data collected will be unavoidably influenced by the selection of sample sites. The simple recognition that forage fish availability varies by site suggests that a more complicated sampling regime will likely be necessary to compare in a meaningful way the foraging patterns and the significance of forage fish to the two populations of sea lions.

The description of the methods for this study indicates that animals may be taken by biopsy-darting when they are in the water. For the most part, only the head and necks of immersed sea lions are visible at the surface, and attempts to take biopsies by shooting darts at these targets pose an unacceptable risk of striking an animal in the head and causing serious injury. In addition, we note that biopsy darting would be conducted using a crossbow. Crossbows have been used with apparent success and safety to biopsy-sample certain otariid species, and we understand that there apparently have been no problems with controlling the depth of the dart penetration using this system. However, inasmuch as this technique has not been used previously to collect biopsy samples from Steller sea lions, the technique and equipment should first be tested on carcasses. In addition, the individual(s) who will be darting the animals should be thoroughly trained and experienced in using the technique prior to employing this method in the field, and animals in the water should not be darted.

A second study described in this application involves aerial surveys to test for correlations between the use of haul-out sites by sea lions and the occurrence of spawning aggregations of forage fish. Again, it is not clear that the design described will be sufficient to accomplish its purpose. The design appears to involve only a single flight during each spring period when spawning may occur. A single flight seems a questionable basis for characterizing the potentially complex spatial and temporal variation of spawning events of forage fish in the region to be surveyed and for correlating the distribution of those events to the distribution of sea lion haulouts, which also may be shifting in response to prey availability or other seasonal events such as the onset of the reproductive period. It is also not clear why this study is not being coordinated with other aerial surveys proposed for southeastern Alaska.

In light of the above questions and concerns, the potential utility of these studies is not clear and seems, at best, questionable. Without additional information on these studies, it does not seem possible to confirm that they will achieve the stated research objectives or will contribute to the conservation and recovery effort for Steller sea lions.

Permit Application No. 434-1669 (Oregon Department of Fish and Wildlife)

The applicant is requesting authority to harass annually up to 3,800 Steller sea lions during pup counts on selected rookeries in Oregon and northern California during June and July and, of these 3,800 animals, to capture, anesthetize, weigh, measure, sample (blood, tissue, swabs), and hot-brand up to 200 pups of both sexes under 1½ months of age. Authorization is also requested to capture on or adjacent to rookeries and haulouts during all months of the year and to anesthetize, weigh, measure, sample (blood, tissue, swabs, enemas), flipper-tag, radio/satellite-tag (10 animals only), and hot-brand up to 30 juvenile sea lions (including pups of the year greater than 4 months of age). Up to 10,000 Steller sea lions would be incidentally harassed each year during the proposed research activities. The applicant also is requesting authorization for the accidental death of up to 10 animals annually or a total of 30 animals over the five-year research period. Authorization is also requested to harass up to 1,000 northern fur seals and up to 1,000 harbor seals incidental to the proposed research activities on Steller sea lions.

The Commission notes that the applicant requests authorization to capture and brand pups under 1½ months of age, noting, on page 10 of the application, that "[p]ups that are very young or in poor physical condition will not be branded." Clarification should be requested as to the minimum age and size of pups that will be hot-branded. The applicant also requests authority for the "optional" use of gas anesthesia to reduce stress on pups during branding, but does not explain the basis upon which decisions to use anesthesia will be made or why anesthesia will not be used all cases.

The application implies that a veterinarian will be present to monitor anesthetized animals and to supervise other research personnel directly, but it is not clear that this will be the case. The Commission requests clarification of this point. Further, a curriculum vitae for the veterinarian(s) who would be involved in the research has not been, but should be, provided. Also, the applicant has not, but should, describe the sizes and weights of the instrument packages that will be placed on the animals. Finally, the applicant has not, but should, explain why such a high number of research-related mortalities (10) are needed on an annual basis.

Permit Application No. 881-1668 (Alaska SeaLife Center)

The applicant is requesting authority to capture up to 610 Steller sea lions annually for various research procedures, of which up to 16 juveniles would be maintained in captivity at the applicant's facility for up to three months. Authorization is also requested to take by harassment up to 5,850 Steller sea lions incidental to the proposed research activities. Research would be conducted throughout the Alaska range of the Steller sea lion and at the applicant's facility. The applicant is requesting authorization for the accidental death of up to five sea lions annually in the field and up to three mortalities annually for animals maintained in captivity at the Alaska SeaLife Center. The proposed research consists of five projects, the objectives of which are to obtain data on juvenile survival, population dynamics, immunology, epidemiology, endocrinology, viral serology, physiology, ontogenetic and annual body condition cycles, foraging behavior, and habitat use.

The Commission notes that the applicant does not, but should, provide an estimate of the length of time that animals may be anesthetized. The applicant should also be asked to describe any potential consequences of repeatedly anesthetizing animals (i.e., on a weekly basis). Although the application implies that a veterinarian will be present to monitor anesthetized animals and to supervise personnel directly, it is not clear that this will be the case. The Marine Mammal Commission recommends that clarification of this point be provided.

In addition, the Commission notes the following:

- At the bottom of page 12 of the application, six activities are listed that would be facilitated by the use of a blind/platform. It is not clear if the applicants are providing these as examples of activities that could conceivably be attempted using a blind or whether they are requesting permission to conduct these activities

- (page 12) Task 3. Although the anticipated period of captivity is described as being "short-term," it is nevertheless accompanied by some level of risk to the animals brought into captivity and to the wild population when those animals are released. The permit application indicates that rigorous criteria have been developed to screen animals to be released. As a precaution, it would be useful to compare the criteria developed by the Alaska SeaLife Center with similar criteria being developed by the Service for releasing captive marine mammals to the wild to ensure that the Center's list of criteria is comprehensive

- (page 30) Task 1. The application states that 60 pups will be captured and sampled with an associated disturbance of 150 animals per capture for a total of 2,100 animals disturbed. As the disturbance of 150 new animals for each of 60 captures would result in a total disturbance of 9,000 animals, it is not clear how the applicant determined that the total number of disturbed animals would be only 2,100, unless they are assuming that multiple captures would result in the incidental disturbance of the same animals at the same time. Clarification of this statement would be useful

- (page 31) Task 5. Permission is requested to capture more animals than will be sampled. It is not clear why some animals that are captured would not be sampled

- (page 33) Task 3.3. Table 1 includes an entry pertaining to adrenocorticotropic hormone challenge. This activity is not further explained and no rationale for such a study is provided. Thus, it is not clear why it is included here, how it might contribute to recovery efforts for Steller sea lions, or why permission for this activity is being requested. Such information should be provided before authorization of this activity is considered

- (page 36) End of first paragraph. The application states that "An emergency kit... *should* be readily available." (Emphasis added). An emergency kit should be *required* if this activity is permitted

- (page 41). Task 2. The application does not include branding in the list of requested take activities, and it is not clear if these animals would be branded

- (page 42). Task 3.a. The application states that it is possible to determine if an animal is weaned by looking at the size, eruption, and wear patterns of the teeth. This information implies an understanding of weaning patterns that seems inconsistent with the uncertainty about Steller sea lions and their life history patterns. If information exists that demonstrates that tooth size and wear patterns can be used to determine if an animal is weaned, the applicant should be asked to provide or reference such information. If such information is not available, then the applicant should recognize this and be prepared to handle some animals that may not yet be weaned

- (page 45). Task 3.3.a. This section again refers to injections of adrenocorticotropic hormone to "challenge" juveniles. The purpose and utility of such tests are not clear, and the applicant should provide a rationale and research protocol for them; and

- (page 48). Task 5.b. The list of sampling activities does not include branding. It would be useful if the applicant would clarify whether these animals would be branded prior to release.

Other questions identified by the Commission include:

- what is the minimum age at which pups may be captured?
- what are the weights of the transmitter devices that will be implanted in juvenile animals and the animals themselves? how does one determine the maximum size (dimensions, size) of instruments than can be implanted safely into the animals?
- what precisely will be done in terms of "re-evaluating the process" (as noted on page 44 of the application) if more than three captive animals are deemed to be non-releasable within the period of one year? and
- under what circumstances would animals deemed non-releasable be euthanized?

General Comments on the Permit Applications

Research power and sampling designs

The utility of the proposed research depends largely on the power of the projects to describe important factors and processes (e.g., weaning of sea lion pups) and detect significant effects (e.g., competition with fisheries) if they occur. The power of the research depends on, among other things, the sampling protocol used, which should ensure that important effects are detected if they occur and faulty conclusions of no-effect are avoided. This being the case, it is essential that the samples collected during the course of research should be representative of the sea lion populations from which they were taken and should be pertinent to identification of the causes of the decline or steps that can be taken to facilitate the species' recovery. The permit applications under review often do not provide sufficient information on their research sampling design and thus it is not always possible to determine if they will meet their stated objectives. In the following paragraphs, we provide some examples of how the lack of information confounds the evaluation of the merit of the proposed studies.

The locations where and times when studies would be conducted often have a significant bearing on the potential utility and merit of the proposed studies. Nevertheless, several proposals either fail to describe where the studies would occur or provide incomplete information. As a result, it is not clear that these studies will be adequately dispersed to assess potentially important spatial variation in the factors being assessed. For example, if studies are concentrated in the Gulf of Alaska or along the Alaskan Peninsula, it is not clear that their results will be pertinent to or representative of sea lions in the western Aleutian Islands. Similarly, the temporal distribution of sampling is also important, and this generally was not described in sufficient detail for the reader to determine if the research results would reliably answer the research question. If, for example, changes in juvenile growth, condition, and survival are most likely to occur during winter months (as has long been suspected) and research sampling occurs primarily in the summer months, then the research design may not be adequate for detecting important potential effects. The lack of information on the area and time during which research activities would occur also makes it impossible to determine if the research is being suitably coordinated to provide the best scientific information with the least practicable adverse effects on the animals resulting from handling and disturbance.

Another important element of sampling is selection of the animals to be included in the research. Some previous studies of Steller sea lions have been limited to very small sample sizes of animals selected on the basis of criteria that may have reduced the difficulty of the study or avoided related risks (i.e., animals at the edge of the rookery, animals appearing to be in excellent or good condition, or animals of sufficient age or size), but selection by such criteria may introduce bias that raises questions as to whether those animals are truly representative of all the animals at a particular site or all the animals in the population. For example, comparison of the condition of animals at different sites may not be meaningful if animals are chosen for sampling on the basis of their apparent good health. Because the reliability and utility of the results often depend on the assumption that the animals sampled are representative of the larger population of concern, the issue of sample selection is important to research success. In some cases, the applications do not describe how the animals would be selected and it is therefore not possible to determine if the sampling scheme is adequate to allow reliable interpretation of results.

Further, the value of studies to investigate survival and reproductive rates using marked animals depends largely on the nature and extent of resighting efforts. More than 15,000 sea lions have been branded since 1975 (p. 53 of the environmental assessment), but few estimates of survival or reproduction have been forthcoming from these animals due to limited resighting effort, and those estimates that have been produced are of limited use. Branding poses risks associated with capture, handling, the infliction of burn wounds that may become infected, and the disruption to rookeries. The permit applications (and the environmental assessment) do not discuss these concerns in sufficient detail and have not provided the requisite level of assurance that resighting efforts will be adequate to yield meaningful results. If such efforts are not adequate, then the studies proposed will not achieve their stated objectives, the animals involved will be exposed to unnecessary risks, and the research will not contribute to the recovery and conservation of the Steller sea lion.

Incidental effects of research

Research activities may pose significant risks to a study population if they cause reductions in survival or reproduction. Such effects can result directly (e.g., animals that die in the course of sampling or experimentation) or indirectly (e.g., animals that are disturbed by research activities and abandon important habitat or dependent pups). Although such effects are not intentional, they may be of sufficient magnitude that, either by themselves or in combination with other human-related effects, they result in significant adverse effects on the study population. The costs and benefits of such research can only be weighed if such effects are adequately identified, monitored, and assessed.

As noted above, the lack of information on the location and time of research activities precludes an evaluation of how proposed activities and their incidental effects may overlap or be concentrated. As noted below, the lack of a monitoring plan will preclude an analysis of the effects of the proposed research, both while it is in progress and after it has been completed.

The lack of information on incidental mortality also could confound research results and, if not accounted for, could undermine the ability of the projects to produce information that can be expected to contribute to the recovery and conservation of the Steller sea lion. Also, if animals are branded for the purpose of assessing survival, and some of the animals die from branding or its complications, then the resulting estimates of survival will be biased unless the effect of branding is somehow quantified and accounted for in the final analysis of survival.

General Comments on the Environmental Assessment

The studies proposed in the permit applications are part of the largest research effort ever undertaken to investigate the factors contributing to the decline of a single marine mammal population. In 2002 funding for research related to Steller sea lions exceeded $40 million, an amount roughly equivalent to research funding for all other marine mammal species in waters under U.S. jurisdiction. Because of the considerable increase in funding for Steller sea lion research and the limited time for developing effective research programs, and because even the most well-intentioned research may have undesirable effects, it is important to evaluate the research activities thoroughly to ensure that they do not, either by themselves or in combination with other activities, have significant adverse impacts on the subject populations or their recovery.

The environmental assessment for the subject permit applications and other ongoing and proposed research activities determined that they would have no significant adverse impact on the Steller sea lion. The environmental assessment based that conclusion on the presumed beneficial effects of proposed mitigation measures, the development of a monitoring plan, efforts to limit accidental mortality, and research coordination. The first of these factors, proposed mitigation measures, is based largely on "best practices" that should help prevent the potentially detrimental effects of the research from occurring.

The second factor, the development of a monitoring plan will not contribute to the reduction of significant effects that may result from the proposed research until a plan is completed and implemented. Although such a plan is needed, it is not expected to be in place for some time, and therefore will be of no use in describing incidental effects during the first years of this research. This apparent oversight is particularly significant because large numbers of animals will be captured or otherwise subjected to research activities that may have significant effects.

The third factor, efforts to limit accidental mortality by using the best practices approach, should help to reduce the potential for adverse effects. However, the number of accidental mortalities requested in the permit applications does not appear to be consistent with the finding of no significant adverse impact. Combined, the permit applications request permission for a total accidental mortality of 51 sea lions per year, at least 41 of which may be from the western population. This number is considerably larger than allowed in past years (10). In the absence of effective monitoring, it is possible, if not likely, that the number of observed deaths will constitute only a minimum estimate of the actual number of animals that die as a result of the research effort. Although the environmental assessment determined that this minimum number would not constitute a significant adverse impact, it did so partly on the basis of comparisons with the species' potential biological removal level, which is one standard used to characterize a species' or stock's tolerance for human-related mortality. A stock's potential biological removal level is defined in section 2 of the Marine Mammal Protection Act as "the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population." In the 2001 stock assessment report for the western population of Steller sea lions, its potential biological removal level is calculated to be 208 animals, the direct take in fisheries is estimated at about 28 animals, and mortality from subsistence taking is estimated at 353 animals. If an additional 41 animals from the western population are taken during the course of research, then known human-related take would be about twice the potential biological removal level. It is not clear how such a level can be considered insignificant.

The fourth factor is research coordination. It is not possible to determine from the permit applications how such coordination will be accomplished. In particular, we are concerned that the lack of information on the spatial and temporal distribution of the different research efforts precludes an analysis of overlap of research by different agencies and organizations, which would seem to be essential for adequate coordination.

In addition, the environmental assessment includes a cumulative effects analysis that fails to consider the effects of the proposed research together with the effects of all of the other factors that are, or may be, affecting sea lions. For example, the indirect effects of fisheries were not considered in the analysis in a meaningful way, despite the fact that indirect fisheries effects have been at the center of a significant controversy involving the Alaska groundfish fisheries and have formed the basis of several section 7 jeopardy findings under the Endangered Species Act. Therefore, the cumulative effects analysis is incomplete and, in the absence of such an analysis, the conclusion of no significant adverse impact seems unfounded.

In light of the considerable increase in research activities (including a number that would employ invasive techniques that pose risks to the sea lions involved), the potential for disturbance of animals at rookeries and haulouts, the lack of a monitoring plan to assess incidental impacts, the lack of an adequate cumulative effects analysis, and the ongoing decline of the western population of Steller sea lions, significant adverse effects resulting from the proposed and ongoing research activities cannot be ruled out. In such cases, the National Environmental Policy Act directs federal agencies to prepare an environmental impact statement that considers alternatives to the proposed actions that would achieve the stated goals in a way that has fewer adverse environmental impacts. The overall research approach being taken for investigation of the decline of Steller sea lions is largely a reductionist approach that requires identification and description of the mechanisms linking potential causes to the sea lion decline. The large increase in funding for this research reflects a concern about the effects of fisheries on Steller sea lions, and such effects may be difficult to describe if the research conducted lacks the investigative power to describe the mechanisms of interaction in detail. For that reason, alternative research approaches should be considered. One alternative empirical approach that should be reflected in the Service's NEPA analysis would be to prohibit fishing in areas large enough to ensure that fishing has no effect on prey availability and then observe sea lion population trends to determine whether they do, in fact, respond. The advantage of this more direct approach would be that it could address the hypothesis more directly, and perhaps more quickly, and pose less risk to sea lions and their recovery. Because of the problems identified above, the Marine Mammal Commission recommends that the Service reconsider the finding of no significant impact set forth in the environmental assessment and either (1) do a better job of explaining its rationale for such a finding, (2) scale back those research projects that have the highest potential to result in sea lion mortalities and other adverse impacts such that a finding of no significant impact is more defensible, or (3) prepare an environmental impact statement on the proposed action.

Conditions

In view of the above comments, the Marine Mammal Commission recommends that the Service defer final action on the permit applications pending (1) receipt and review, in consultation with the Commission, of supplemental information that addresses the issues discussed above; and (2) clarification, in response to the Commission's comments, of the basis for the Service's finding that the proposed activities, if authorized, would not result in a significant impact to Steller sea lions. Upon resolution of these questions and concerns, the Marine Mammal Commission recommends that the Service grant approval of the requested activities, subject to the following conditions:

-- the researchers take steps to minimize disturbance of the subject animals by exercising caution when approaching animals, particularly mother-pup pairs, and halt an approach if there is evidence that the activity may be interfering with pair bonding, nursing, reproduction, feeding, or other vital functions;

-- all branding activities be accompanied by effective programs to monitor their short- and long-term effects;

-- whenever possible, new invasive research procedures be tested on non-listed otariid species and on captive Steller sea lions before they are used on sea lions in the wild to ensure that the proposed techniques can be employed safely;

-- surgical implants of instruments be performed by experienced marine mammal veterinarians, and the animals be fully recovered from the anesthesia and exhibiting no ill effects of the surgery prior to release;

-- an experienced marine mammal veterinarian be present in the field to carry out or to provide direct on-site supervision of all activities involving anesthesia of animals;

-- surgical implantation of instruments be immediately suspended, until reauthorized by the Service, in the event that two animals die or are injured during or following the surgery and the mortality or injury can reasonably be attributed to that activity;

-- the Service, in consultation with the applicants, review the basis for the numbers of accidental mortalities requested and provide reasonable justification for the number that can occur annually before research activities must be suspended. It may be useful, as part of such review, to examine the data concerning the number of accidental mortalities authorized and the number of animals actually killed during permitted Steller sea lion research over the past five years. On a related matter, in the event that a lactating female is killed or seriously injured as a result of the activities, the female's orphaned pup should be humanely provided for (i.e., salvaged and cared for, or if salvage is not possible, euthanized);

-- inasmuch as the use of a crossbow for biopsy sampling has not been previously used on Steller sea lions, the Service be satisfied that the individual(s) carrying out the biopsy sampling are sufficiently experienced and the technique and equipment have been adequately tested prior to authorizing the activity on animals in the field;

-- the proposed studies have been reviewed by the permittee's Institutional Animal Care and Use Committees in accordance with § 2.31 of the Animal and Plant Health Inspection Service's regulations governing the humane handling, care, treatment, and transportation of marine mammals;

-- the Service ensure that activities to be conducted under these permits and those of other permit holders who might be carrying out research on the same species in the same areas are coordinated and, as possible, data are shared to avoid unnecessary duplication of research and disturbance of animals; and

-- as appropriate, the applicants obtain the necessary permits under the Convention on International Trade in Endangered Species of Wild Fauna and Flora prior to importing or exporting tissue samples into or from the United States.

Please contact me if you have any questions concerning these recommendations and comments.

Sincerely,

Rob Mattlin

Robert H. Mattlin
Executive Director

Enclosures

MARINE MAMMAL COMMISSION
4340 EAST-WEST HIGHWAY, ROOM 905
BETHESDA, MD 20814

27 July 2001

Ms. Ann D. Terbush
Chief, Permits Division
Office of Protected Resources
National Marine Fisheries Service, NOAA
1315 East-West Highway
Silver Spring, MD 20910

Re: Requests for Amendment of Permit Nos. 782-1532 (National Marine Mammal Laboratory, National Marine Fisheries Service) and 358-1564 (Alaska Department of Fish and Game)

Dear Ms. Terbush:

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors on Marine Mammals, has reviewed the above-referenced requests for permit amendments with regard to the goals, policies, and requirements of the Marine Mammal Protection Act.

Permit No. 782-1532 authorizes the permittee to (1) capture, anesthesize, sample, tag, brand, release, and conduct aerial and vessel surveys of Steller sea lions of both sexes and all ages over a five-year period (through 31 December 2004) in Alaska waters; and (2) harass northern fur seals and harbor seals incidental to research on Steller sea lions. Importation of blood and tissue samples collected from Steller sea lions outside United States territorial waters is also authorized.

The permittee is requesting that Permit No. 782-1532 be amended to authorize the harassment of additional numbers of Steller sea lions during scat collection; and conduct of additional procedures (*i.e.*, gas anesthesia, branding, administration of Evans blue dye and deuterated water, muscle biopsies, noninvasive bioelectric impedance analysis, increasing blood sample volume, tooth extractions, vibrissae sampling, and instrumentation with newly available Underwater Timed Picture Recorders) on animals currently authorized to be taken under the permit.

Permit No. 358-1564 authorizes the permittee to capture, anesthesize, sample, tag, brand, release, and conduct aerial and land-based surveys of Steller sea lions of both sexes and all ages over a five-year period (through 30 June 2005) in Alaska waters. Importation of blood and tissue samples collected from Steller sea lions outside United States territorial waters is also authorized.

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The permittee is requesting that Permit No. 35801564 be amended to authorize the administration of Evans blue dye to, the collection of additional blood and tissue samples from, the attachment of instruments to, and the conduct of additional recaptures of Steller sea lions already authorized to be captured and handled, and the conduct of additional aerial surveys of the population.

The Commission has no objection to the permittee's research authorized under the subject permits, nor the Service amending the permits to provide for the conduct of new or additional activities of a benign nature involving minimal risk of cumulative impacts on individual animals or populations. The Commission realizes an essential need for research on the Steller sea lion to determine the nature of its ongoing decline.

However, as discussed below, we are concerned that the proposed multi-year activities could have adverse effects on both individual Steller seal lions and sea lion populations. Due to increased funding, many projects are being planned and a number of those require invasive procedures on animals as well as associated disturbance of rookeries. The potential adverse effects of research on Steller sea lions have long been a matter of concern, as discussed in the recovery plan for this species. It is conceivable that the extensive research described in the existing permits, together with the additional research requested in the proposed amendments, and other research, may become a significant factor affecting the status of the species.

It is not clear that all of the planned research is essential, and that the potential merits outweigh the cumulative or combined risks. Some of the activities described have the potential to adversely affect individual animals, and all of the activities combined may also have the potential to affect populations of animals. Rookery and haulout populations are low and may be particularly vulnerable to disturbance. To ensure that such adverse effects do not occur and become a significant factor in the decline, the Service should develop a monitoring program to assess the effects of research that may affect individuals or populations.

In addition, research should be carried out under the guidance provided by the recovery plan and the recovery team. The plan is currently outdated and, to our knowledge, the recovery team has not been helping to coordinate the overall research effort. The Commission believes that the recovery plan should be updated and the recovery team should be more effectively incorporated into research planning. Among other things, the updated plan should describe for all participating management and research agencies and the public (1) the overall research direction, (2) the parties responsible for coordinating and conducting the resulting research, (3) the mechanisms for monitoring the adverse effects of such research, (4) a realistic research budget and schedule, and (5) an analysis of the benefits and risks associated with each major research activity. An updated Recovery Plan is necessary to ensure that the research effort underway is carried out effectively without adding unnecessary adverse effects to what is already a very difficult and complex problem.

Please contact me if you have any questions concerning this recommendation.

Sincerely,

Rob Mattlin

Robert H. Mattlin, Ph.D.
Executive Director

Appendix D

Requirements for Obtaining a Grant or Permit for Research on Protected Species

Permit Process

ACRONYMS AND ABBREVIATIONS

AMNWR	Alaska Maritime National Wildlife Refuge
APHIS	Animal and Plant Health Inspection Service
CE	Categorical Exclusion
CFR	Code of Federal Regulations
EA	Environmental Assessment
EIS	Environmental Impact Statement
ESA	Endangered Species Act
F/PR1	NMFS Permits Division, Office of Protected Resources
IACUC	Institutional Animal Care and Use Committee
MMC	Marine Mammal Commission
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
U.S.	United States

Permitting Process Summary

The permit process is a regulatory process. The Endangered Species Act (ESA), and the Marine Mammal Protection Act (MMPA) established moratoria on "taking" marine mammals and threatened or endangered species. Both statutes provide some exemptions and exceptions to these moratoria. Scientific research permits under the MMPA and recovery permits under the ESA are two of the most commonly used exemptions. The MMPA and ESA specify a limited range of circumstances under which the National Marine Fisheries Service (NMFS) Permits Division, Office of Protected Resources (F/PR1) may decide to grant an exemption through issuance of a permit. F/PR1 has promulgated regulations to implement these provisions of the MMPA and ESA. A summary of these and other applicable statutes and regulations are included as Attachment A.

An applicant requesting an exemption to a take moratorium must demonstrate that permit issuance would not be detrimental to protected species (i.e., will not disadvantage, jeopardize, or otherwise adversely affect a protected species). Accordingly, the MMPA, ESA, and NMFS implementing regulations establish information requirements for permit applicants.

Detailed information regarding what types of activities require permits and who may apply for permits, as well as instructions specific to the different types of marine mammal permits and authorizations are available from the F/PR1 website: http://www.nmfs.noaa.gov/pr/. In summary, applicants seeking a special exemption permit for scientific research must submit a properly formatted and signed application to the Office Director. The applicant must describe the species to be taken, the manner and duration of the takes, the qualifications of the researchers to conduct the proposed activities, and the justification for such taking. The applicant must also provide sufficient information about the activity to allow NMFS to determine whether permit issuance would comply with all applicable statutory and regulatory issuance criteria and to assess the potential environmental impacts of permit issuance. An application that satisfies some but not all of the applicable criteria for permit issuance will be returned without prejudice to the applicant with an explanation of the deficiencies. F/PR1 provides an opportunity for the applicant to supply the deficient information. The permit process cannot proceed further until F/PR1 has a complete application. If an applicant currently holds a permit to take marine mammals, or has held a permit in the past, the new application will not be processed until all reports required to date under such permits have been submitted.

The Office Director makes an initial determination regarding the appropriate level of review for the complete application required under National Environmental Policy Act (NEPA). NEPA requires federal agencies to integrate environmental values into their decision making processes by considering the environmental impacts of their proposed actions and reasonable alternatives to those actions. To meet this requirement, federal agencies must either prepare a detailed statement (known as an Environmental Assessment [EA] or Environmental Impact

Statement [EIS]) or classify the action as categorically excluded from the requirements of NEPA. A Categorical Exclusion (CE) is defined as:

> *a category of actions which do not individually or cumulatively have a significant effect on the human environment and which have been found to have no such effect in procedures adopted by a Federal agency in adoption of these procedures (Section 1507.3) and for which, therefore, neither an environmental assessment nor an environmental impact statement is required* (40 CFR 1508.4).

If the proposed action qualifies for a Categorical Exclusion under rules implementing NEPA, the application process continues with the next step. If the Office Director determines that an EA or an EIS is required, the appropriate document must be completed before the application process continues. Additionally, if the permit application directly involves a threatened or endangered species or may indirectly affect a species listed under ESA, there will be additional environmental analysis required including a Section 7 consultation and the preparation of a biological opinion (NMFS 2006d).

The next two steps occur simultaneously: F/PR1 sends the application out for scientific review and publishes a Notice of Receipt in the *Federal Register* to begin a mandatory 30-day public review and comment period. The Office Director may extend this comment period and hold public hearings on the application at his/her discretion. The application is distributed to several reviewers, who may include the Marine Mammal Commission (MMC) and its Committee of Scientific Advisors on Marine Mammals, National Oceanic and Atmospheric Administration (NOAA) Fisheries Office of Law Enforcement, and appropriate NMFS scientists and federal agencies. The application may also be sent to appropriate independent experts at the discretion of the Office Director (NMFS 2006d). For permits involving ESA-listed species, NMFS Endangered Species Division will also receive a copy of the application. The reviewers have a period of at least 45 days or longer (as established by the Office Director) to submit their comments on the application. If no comments are received in that time, it is assumed that there are no objections to issuance of the permit.

After considering the comments and recommendations of all reviewers, the Office Director will reassess the level of NEPA review required by the proposed project. If that determination requires a more extensive environmental assessment than was indicated in the initial NEPA review (i.e., from a CE to an EA or from an EA with a finding of no significant impact to an EIS), the new NEPA review must be completed before the permit process can continue. If no new NEPA analysis is required, the process continues.

Within 30 days of the close of the public hearing or, if no public hearing is held, within 30 days of the close of the public comment period, the Office Director will issue or deny a special exception permit. The decision to issue or deny a permit will be based upon:

- All relevant issuance criteria set forth in 50 CFR 216.41
- All purpose-specific issuance criteria as appropriate set forth in 50 CFR 216.41-43
- All comments received or views solicited on the permit application
- Any other information or data that the Office Director deems relevant

If the permit is issued, a *Federal Register* Notice of Decision is published within 10 days, and the holder must date and sign the permit and return a copy of the original to the Office Director. The permit shall be effective upon the permit holder's signing of the permit. In signing the permit, the holder agrees to abide by all terms and conditions set forth in the permit and acknowledges that the authority to conduct certain activities specified in the permit is conditional and subject to authorization by the Office Director. If the permit is denied, the Office Director shall provide the applicant with an explanation for the denial. The applicant or any party opposed to a permit may seek judicial review of the terms and conditions of such permit or of a decision to deny such permit. Review may be obtained by filing a petition for review with the appropriate United States (U.S.) District Court as provided for by law. Attachment B provides an example of a typical permit to take protected species for scientific and/or enhancement purposes.

Permit Amendments

Scientific research permits may be amended by the Office Director. Requests for amendments to permits should be submitted in writing to the Chief of NMFS F/PR1, and should address all applicable sections of these instructions, including a detailed description of the proposed changes. Amendment requests involving an increase in number, changes of location or species, or more intrusive activities are subject to a 30-day public review and are granted or denied at the discretion of the Office Director. Amendment requests must be endorsed and signed by the principal investigator named in the permit. Less intrusive activity or minor changes not involving numbers, species, or locations may be authorized at the discretion of the Office Director without public review.

Other Permits Needed for Research

Researchers may also need to obtain special use permits for working on and near state, federal, and Native lands in addition to obtaining research permits from F/PR1. NMFS requires research applicants to obtain and abide by all applicable permits as a condition of permitting research and receiving grants. The following is a partial list of permits that may be required, depending on the nature and location of research activities:

- Under the Animal Welfare Act, the U.S. Department of Agriculture, Animal and Plant Health Inspection Service (APHIS) has jurisdiction over captive warm-blooded animals, including marine mammals. APHIS has established regulations and standards for animal care of which 9 CFR 3.100 Subpart E: Specifications for the Humane Handling, Care, Treatment, and Transportation of Marine Mammals is particularly applicable. Most U.S. facilities maintaining marine mammals are required to be licensed or registered by APHIS.
- The Native village governments of St. Paul and St. George control access to the rookeries and haulouts on the Pribilof Islands. Many other Alaska coastline areas are owned by Native corporations or have been claimed for conveyance under the Alaska National Interest Lands Conservation Act. Research taking place on Native land typically requires a special use permit from one or more Native organizations.
- Military clearance (U.S. Navy) is required for access to Adak, Shemya, Amchitka, and Attu Islands in the Aleutian Chain.
- U.S. Coast Guard permits are required for operating marine vessels in U.S. waters, with certification for types of use and numbers of passengers on a vessel specific basis. They also issue permits for working around lighthouses that they maintain.
- A Special Use Permit is required from the U.S. Fish and Wildlife Service for work in national wildlife refuges, including the Alaska Maritime National Wildlife Refuge (AMNWR).
- The Alaska Department of Natural Resources, Division of Mining, Land, and Water requires a Land Use Permit for working and/or camping on State lands longer than 14 days or if more substantial structures are erected.
- A permit might be required by the Alaska Department of Fish and Game if the use will take place in a state game refuge or special use area, tidelands and submerged lands adjacent to national parks, refuges, and reserves, such as AMNWR, Kenai Fjords National Park coastline, Resurrection Bay, Lake Clark National Park coastline, Marmot Island (eastern half), and the Togiak coastline.
- The National Park Service has a national research permit and reporting system that is park specific and project specific.
- The respective departments of state lands and parks for Washington, Oregon, and California also have special land use permits that may apply on their lands. These state agency land-use permits are oriented toward reviewing consumptive uses rather than temporary camps in remote places. All are project and area specific.

REFERENCES

NMFS (2006d) for "National Marine Fisheries Service. 2006 FAQs – Marine mammal Permits for Directed Take. Retrieved December 10 from: http://www.nmfs.noaa.gov/pr/permits/faq_mmpermits.htm"

Attachment A

Summary of Statutory and Regulatory Requirements for Research, Enhancement, and Recovery Permit Issuance

Summary of Statutory and Regulatory Requirements for Research, Enhancement, and Recovery Permit Issuance

Prepared by
National Marine Fisheries Service
Office of Protected Resources
Permits Division

2006

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Specific federal statutes and regulations related to research on marine mammals and threatened and endangered species under the jurisdiction of the National Marine Fisheries Service

NMFS has authority, delegated from the Secretary of Commerce, to issue permits for research and enhancement activities under Section 104 of the Marine Mammal Protection Act (MMPA; 16 U.S.C. 1361 *et seq.*) and section 10(a)(1)(A) of the Endangered Species Act (ESA; 16 U.S.C. 1531 *et seq*.).

Permits to take <u>non-marine mammal endangered or threatened species</u> are governed by the ESA and NMFS implementing regulations at 50 CFR §222.301-309. Where coordination with the US Fish and Wildlife Service is required regarding sea turtles, permits are also subject to NMFS regulatory criteria at 50 CFR §222.309.

Permits to take <u>marine mammal species that are not listed as endangered or threatened</u> are governed by the MMPA and NMFS implementing regulations at 50 CFR §216.31-41. Note that when issuance of these permits may affect species listed under the ESA, issuance of permits is subject to additional review pursuant to section 7 of the ESA.

Permits to take <u>marine mammals that are listed as endangered or threatened</u> are governed by the ESA and MMPA, and all applicable criteria under NMFS implementing regulations at 50 CFR §222.301-309 and 50 CFR §216.31-41. Note that if such an application does not satisfy all applicable ESA criteria, it should not be considered further under the MMPA, and vice versa.

Other applicable federal statutes and regulations

As a federal agency, issuance of permits by NMFS is governed by the procedural requirements and provisions of the Administrative Procedure Act and the National Environmental Policy Act.

The **Administrative Procedure Act (APA; 5 U.S.C. 551 *et seq.*)** is the law under which federal regulatory agencies, including NMFS, create the rules and regulations necessary to implement and enforce major legislative acts such as the MMPA and ESA. Under the APA, NMFS is required to publish in the *Federal Register* descriptions of rules of procedure, substantive rules of general applicability, and make available to the public statements of policy and interpretation, administrative staff manuals and instructions. The APA also contains procedures for judicial review of agency decisions and for finding agency actions and conclusions unlawful. Under the APA courts may set aside agency actions as arbitrary and capricious, an abuse of discretion, unconstitutional, beyond statutory authority, unsupported by substantial evidence or unwarranted by the facts.

The written record of the information and process relied upon by NMFS in deciding to issue or deny a permit is the agency's only defense in the case of such judicial review under the APA. For this reason, NMFS needs to maintain a thorough written record documenting the information reviewed and relied upon in making its conclusions as well as a written record of the process by which the information was used.

The **National Environmental Policy Act (NEPA; 42 U.S.C. 4321 *et seq.*)** requires federal agencies to integrate environmental values into their decision making processes by considering the environmental impacts of their proposed actions and reasonable alternatives to those actions. To meet this requirement, federal agencies must either prepare a detailed statement (known as an Environmental Assessment (EA) or Environmental Impact Statement (EIS)) or classify the action as categorically excluded from the requirements of NEPA to prepare such statements. The requirement of NEPA apply to NMFS "decision-making process" for issuance of permits.

NOAA Administrative Order No. 216-6 (NAO 216-6), Environmental Review Procedures for Implementing the National Environmental Policy Act, is an agency guidance document for applying the requirements of NEPA to agency actions, including permit issuance. With regard to permits issued pursuant to the ESA, Section 6 of NAO 216-6 specifies:

> *In general, permits for scientific purposes or to enhance the propagation or survival of listed species issued pursuant to sec 10(a)(1)(A) of the ESA qualify for a CE (except for permits covered in section*

6.03e.2.(c)). The factors listed in Section 5.05b of this Order must be considered in all CE determinations on permits. The RPM must also consider the cumulative impact on the listed species from the total amount of permits issued with CEs, and take into account any population shifts with the subject species.

For permits issued pursuant to the MMPA, NAO 216-6 specifies that:

In general, scientific research, enhancement, photography, and public display permits issued under section 101(a)(1) and 104 of the MMPA, and letters of confirmation for activities conducted under the General Authorization for Scientific Research established under section 104 of the MMPA, qualify for a CE. The factors listed in Section 5.05b of this Order must be considered in all CE determinations on permits. The RPM must also consider the cumulative impact on the protected species from the total amount of permits issued with CEs, and take into account any population shifts with the subject species. Research activities conducted under the General Authorization for Scientific Research will be reviewed periodically for cumulative impact.

With regard to Exceptions for Categorical Exclusions, Section 5.05c. of the Order specifies:

The preparation of an EA or EIS will be required for proposed actions that would otherwise be categorically excluded if they involve a geographic area with unique characteristics, are subject of public controversy based on potential environmental consequences, have uncertain environmental impacts or unique or unknown risks, establish a precedent or decision in principle about future proposals, may result in cumulatively significant impacts, or may have any adverse effects upon endangered or threatened species or their habitats.

Given the last phrase in section 5.05c, GCF has determined that issuance of permits for takes of threatened and endangered species is not categorically excluded from preparation of an EA or EIS. Thus, a minimum of an EA is prepared prior to issuance of permits pursuant to section 10(a)(1)(A) of the ESA.

Other substantive statutes

In addition to compliance with the MMPA and ESA, issuance of permits by NMFS cannot violate other substantive federal, state, or local statutes or regulations. [Other federal statutes that are most often relevant to activities under NMFS permits include the Animal Welfare Act (AWA), the National Marine Sanctuaries Act, the Magnuson-Stevens Act, the Convention on International Trade in Endangered Species of Flora and Fauna (CITES), Coastal Zone Management Act, etc.] This means that NMFS cannot issue permits pursuant to its authority under section 104 of the MMPA and section 10(a)(1)(A) of the ESA for activities that, when exercised under the NMFS permit, would be in violation of these other federal, state or local laws.

For example, NMFS cannot issue permits for activities with marine mammals that would not be consistent with the AWA requirements for humane handling, care, and treatment of animals. Similarly, NMFS cannot authorize by permit an un-licensed person to conduct activities in a state where conduct of such activities requires State license.

To ensure that activities permitted by NMFS would comply with other applicable federal, state, and local statutes and regulations, NMFS provides copies of applications to and consults with other federal and state agencies where appropriate and incorporates their recommendations into permit conditions.

PERMITS FOR THREATENED AND ENDANGERED SPECIES

ESA Statutory Permit Issuance Criteria (16 U.S.C. 1539 Sec. 10 (a)(1)(A) and 10(d))

The Secretary may permit, under such terms and conditions as he shall prescribe – (A) any act otherwise prohibited by section 9 for scientific purposes or to enhance the propagation or survival of the affected species, including, but not limited to, acts necessary for the establishment and maintenance of experimental populations pursuant to subsection (j).

The Secretary may grant exceptions under subsections (a)(1)(A) and (b) of this section only if he finds and publishes his finding in the Federal Register that (1) such exceptions were applied for in good faith, (2) if granted and exercised will not operate to the disadvantage of such endangered species, and (3) will be consistent with the purposes and policy set forth in section 2 of this Act.

Section 2 of the ESA sets forth the purposes and policy of the Act. The purposes of the ESA are to provide a means whereby the ecosystems upon which endangered and threatened species depend may be **conserved**, to provide a program for the **conservation** of such endangered species and threatened species, and to take such steps as may be appropriate to achieve the purposes of the treaties and conventions set forth in section 2(a) of the ESA.

The policy of the ESA is that all Federal departments and agencies shall seek to **conserve** endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of the ESA. The ESA defines “conserve” and “conservation” as (emphasis added):

> to use and the use of all methods and procedures which are necessary **to bring any endangered species or threatened species to the point at which the measures provided pursuant to [the ESA] are no longer necessary**. Such methods and procedures include, but are not limited to, all activities associated with scientific resources management such as research, census, law enforcement, habitat acquisition and maintenance, propagation, live trapping, and transplantation, and, in the extraordinary case where population pressures within a given ecosystem cannot be otherwise relieved, may include regulated taking.

ESA Regulatory Permit Issuance Criteria (50 CFR §222.308(c))

The Assistant Administrator, in determining whether to issue permits and amendments to take endangered and threatened species must consider the following 12 criteria at 50 CFR §222.308(c). Note that the first three criteria are a reiteration of the requirements under Section 10(d) of the ESA.

(1) Whether the permit was applied for in good faith;
(2) Whether the permit, if granted and exercised, will not operate to the disadvantage of the endangered species;
(3) Whether the permit would be consistent with the purposes and policy set forth in section 2 of the ESA;
(4) Whether the permit would further a bona fide and necessary or desirable scientific purpose or enhance the propagation or survival of the endangered species, taking into account the benefits anticipated to be derived on behalf of the endangered species;
(5) The status of the population of the requested species and the effects of the proposed action on the population, both direct and indirect;
(6) If a live animal is to be taken, transported, or held in captivity, the applicant’s qualifications for the proper care and maintenance of the species and the adequacy of the applicant’s facilities;
(7) Whether alternative non-endangered species or population stocks can and should be used;
(8) Whether the animal was born in captivity or was (or will be) taken from the wild;
(9) Provision for disposition of the species if and when the applicant’s project or program terminates;

(10) *How the applicant's needs, program, and facilities compare and relate to proposed and ongoing projects and programs;*
(11) *Whether the expertise, facilities, or other resources available to the applicant appear adequate to successfully accomplish the objectives stated in the application;*
(12) *Opinions or views of scientists or other persons or organizations knowledgeable about the species which is the subject of the application or of other matters germane to the application;*

PERMITS FOR MARINE MAMMALS

MMPA Statutory Permit Issuance Criteria (16 U.S.C. 1374 Sec. 104)

Section 104 of the MMPA specifies when and how a permit may be issued for taking marine mammals for public display, research (including the General Authorization), enhancement, and commercial or educational photography. This section of the MMPA also specifies criteria related to permits for public display or for commercial or educational photography. However, those types of permits are not discussed here.

Imposition; Exceptions (16 U.S.C. 1374 Sec. 101(b)): *Consistent with the provisions of section 104, permits may be issued by the Secretary for taking, and importation purposes of scientific research, public display, photography for educational or commercial purposes, or enhancing the survival of recovery of a species or stock ….Such permits … may be issued if the taking or importation proposed to be made is first reviewed by the Marine Mammal Commission and the Committee of Scientific Advisors on Marine Mammals established under title II. The Commission and Committee shall recommend any proposed taking or importation … which is consistent with the purposes and policies of section 2 of this Act.*

Section 2 is very long but some of the main points made are (1) marine mammals should not be permitted to diminish beyond the point at which they cease to be a significant functioning element in the ecosystem; (2) efforts should be made to protect essential habitats, including the rookeries, mating grounds, and areas of similar significance for each species; and (3) they should be protected and encouraged to develop to the greatest extent feasible commensurate with sound policies of resource management and that the primary objective of their management should be to maintain the health and stability of the marine ecosystem. (16 U.S.C. 1361 Sec. 2)

Requisite Provisions (16 U.S.C. 1374 Sec. 104(b)): *Any permit issued under this section shall –*
(1) *be consistent with any applicable regulation established by the Secretary under section 103 of this title, and*
(2) *specify –*
(A) the number and kind of animals which are authorized to be taken or imported,
(B) the location and manner (which manner must be determined by the Secretary to be humane) in which they may be taken, or from which they may be imported,
(C) the period during which the permit is valid, and
(D) any other terms or conditions which the Secretary deems appropriate.

The MMPA defines "humane" in the context of taking a marine mammal as "that method of taking which involves the least possible degree of pain and suffering practicable to the mammal involved." (16 U.S.C. 1362 Section 3)

<u>Bona fide science (16 U.S.C. 1374 Sec. 104(c)(3)(A)):</u> *The Secretary may issue a permit under this paragraph for scientific research purposes to an applicant which submits with its permit application information indicating that the taking is required to further a bona fide scientific purpose.*

The MMPA defines "bona fide research" as (16 U.S.C. 1362 Section 3):

scientific research on marine mammals, the results of which –

(A) likely would be accepted for publication in a refereed scientific journal;

(B) are likely to contribute to the basic knowledge of marine mammal biology or ecology; or

(C) are likely to identify, evaluate or resolve conservation problems.

<u>Lethal taking(16 U.S.C. 1374 Sec. 104(c)(3)(B))</u>

No permit issued for purposes of scientific research shall authorize the lethal taking of a marine mammal unless the applicant demonstrates that a nonlethal method of conducting the research is not feasible. The Secretary shall not issue a permit for research which involves lethal taking of a marine mammal from a species or stock that is depleted, unless the Secretary determines that the results of such research will directly benefit that species or stock, or that such research fulfills a critically important research need.

<u>General Authorization (16 U.S.C. 1374 Sec. 104(c)(3)(C))</u>

This section of the MMPA allows "bona fide scientific research that may result only in taking by level B harassment of a marine mammal." NMFS has promulgated regulations at 50 CFR 216.45 to implement this provision of the MMPA. As a matter of policy, NMFS does not consider applications for takes of pinnipeds on rookeries (except aerial surveys at altitudes greater than 1,000 feet) as appropriate under the GA because of the potential for the disturbance to result in separation of mother-pup pairs or mortality of pups.

The MMPA requires persons wishing to work under the GA to submit a letter of intent containing the following:

(i) The species or stocks of marine mammals which may be harassed.

(ii) The geographic location of the research.

(iii) The period of time over which the research will be conducted.

(iv) The purpose of the research, including a description of how the definition of bona fide research as established in this Act would apply.

(v) Methods to be used to conduct the research.

<u>Enhancement (16 U.S.C. 1374 Sec. 104(c)(4)(A))</u>

A permit may be issued for enhancing the survival or recovery of a species or stock only with respect to a species or stock for which the Secretary, after consultation with the Marine Mammal Commission and after notice and opportunity for public comment, has first determined that –

(i) taking or importation is likely to contribute significantly to maintaining or increasing distribution or numbers necessary to ensure the survival or recovery of the species or stock; and

(ii) taking or importation is consistent (I) with any conservation plan adopted by the Secretary under section 115(b) of this title or any recovery plan developed under section 4(f) of the Endangered Species Act of 1973 for the species or stock, or (II) if there is no conservation plan in place, with the Secretary's evaluation of actions required to enhance the survival or recovery of the species or stock in light of the factors that would be addressed in a conservation plan or a recovery plan.

<u>Captive Maintenance (16 U.S.C. 1374 Sec. 104(c)(4)(B))</u>

A permit issued in accordance with this paragraph may allow the captive maintenance of a marine mammal from a depleted species or stock only of the Secretary –

(i) determines that the captive maintenance is likely to contribute to the survival or recovery of the species or stock by maintaining a viable gene pool, increasing productivity, providing biological information, or establishing animal reserves;

(ii) determines that the expected benefit to the affected species or stock outweighs the expected benefit of alternatives which do not require removal of animals from the wild; and

(iii) requires that the marine mammal or its progeny be returned to the natural habitat of the species or stock as soon as feasible, consistent with the objectives of any applicable conservation plan or recovery plan, or of any evaluation by the Secretary under subparagraph (A).

The Secretary may allow public display of such a marine mammal only if the Secretary determines that such display is incidental to the authorized maintenance and will not interfere with the attainment of the survival or recovery objectives.

MMPA Regulatory Permit Issuance Criteria (50 CFR ''216.34 and 216.41)

(a) For the Office Director to issue any permit under this subpart, the applicant must demonstrate that:

(1) The proposed activity is humane and does not present any unnecessary risks to the health and welfare of marine mammals

> The MMPA defines "humane" in the context of taking a marine mammal as "that method of taking which involves the least possible degree of pain and suffering practicable to the mammal involved." (16 U.S.C. 1362 Section 3)

(2) The proposed activity is consistent with all restrictions set forth at '216.35 and any purpose-specific restrictions as appropriate set forth at '216.41, '216.42, and '216.43;

(3) The proposed activity, if it involves endangered or threatened marine mammals, will be conducted consistent with the purposes and policies set forth in section 2 of the ESA;

(4) The proposed activity by itself or in combination with other activities, will not likely have a significant adverse impact on the species or stock;

(5) Whether the applicant's expertise, facilities, and resources are adequate to accomplish successfully the objectives and activities stated in the application;

(6) If a live animal will be held captive or transported, the applicant's qualifications, facilities, and resources are adequate for the proper care and maintenance of the marine mammal; and

(7) Any requested import or export will not likely result in the taking of marine mammals or marine mammal parts beyond those authorized by the permit.

(b) The opinions or views of scientists or other persons or organizations knowledgeable of the marine mammals that are the subject of the application or of other matters germane to the application will be considered.

Permits for scientific research and enhancement (50 CFR 216.41)

In addition to the requirements under §§216.33 through 216.38, permits for scientific research and enhancement are governed by the following requirements:

> Note: §216.33 = Permit application submission, review, and decision procedures; §216.34 = Issuance criteria; §216.35 = Permit restrictions; §216.37 = Marine mammal parts; §216.38 = Reporting]

(b) Issuance Criteria. For the Office Director to issue any scientific research or enhancement permit, the applicant must demonstrate that:

(1) The proposed activity furthers a bona fide scientific or enhancement purpose;

(2) If the lethal taking of marine mammals is proposed:

(i) Non-lethal methods for conducting the research are not feasible; and

(ii) For depleted, endangered, or threatened species, the results will directly benefit that species or stock or will fulfill a critically important research need.

(3) Any permanent removal of a marine mammal from the wild is consistent with any applicable quota established by the Office Director.

(4) The proposed research will not likely have significant adverse effects on any other component of the marine ecosystem of which the affected species or stock is a part.

(5) For species or stocks designated or proposed to be designated as depleted, or listed or proposed to be listed as endangered or threatened:

(i) The proposed research cannot be accomplished using a species or stock that is not depleted or proposed to be designated as depleted, or listed or proposed to be listed as threatened or endangered;

(ii) The proposed research, by itself or in combination with other activities will not likely have a long-term direct or indirect adverse impact on the species or stock;

(iii) The proposed research will either:

(A) Contribute to fulfilling a research need or objective identified in a species recovery or conservation plan, or if there is no conservation or recovery plan in place, a research need or objective identified by the Office Director in stock assessments established under section 117 of the MMA;

(B) Contribute significantly to understanding the basic biology or ecology of the species or stock, or to identifying, evaluating, or resolving conservation problems for the species or stock; or

(C) Contribute significantly to fulfilling a critically important research need.

(6) For proposed enhancement activities:

(i) Only living marine mammals and marine mammal parts necessary for enhancement of the survival, recovery, or propagation of the affected species or stock may be taken, imported, exported, or otherwise affected under the authority of an enhancement permit. Marine mammal parts would include in this regard clinical specimens or other biological samples required for the conduct of breeding programs or the diagnosis or treatment of disease.

(ii) The activity will likely contribute significantly to maintaining or increasing distribution or abundance, enhancing the health or welfare of the species or stock, or ensuring the survival or recovery of the affected species or stock in the wild.

(iii) The activity is consistent with:

(A) An approved conservation plan developed under section 115(b) of the MMPA or recovery plan developed under section 4(f) of the ESA for the species or stock; or

(B) If there is no conservation or recovery plan, with the Office Director's evaluation of the actions required to enhance the survival or recovery of the species or stock in light of the factors that would be addressed in a conservation or recovery plan.

(iv) An enhancement permit may authorize the captive maintenance of a marine mammal from a threatened, endangered, or depleted species or stock only if the Office Director determines that:

(A) The proposed captive maintenance will likely contribute directly to the survival or recovery of the species or stock by maintaining a viable gene pool, increasing productivity, providing necessary biological information, or establishing animal reserves required to support directly these objectives; and

(B) The expected benefit to the species or stock outweighs the expected benefits of alternatives that do not require removal of marine mammals from the wild.

(v) The Office Director may authorize the public display of marine mammals held under the authority of an enhancement permit only if:

(A) The public display is incidental to the authorized captive maintenance;

(B) The public display will not interfere with the attainment of the survival or recovery objectives;

(C) The marine mammals will be held consistent with all requirements and standards that are applicable to marine mammals held under the authority of the Acts and the Animal Welfare Act, unless the Office Director determines that an exception is necessary to implement an essential enhancement activity; and

(D) The marine mammals will be excluded from any interactive program and will not be trained for performance.

(vi) The Office Director may authorize non-intrusive scientific research to be conducted while a marine mammal is held under the authority of an enhancement permit, only if such scientific research:

(A) Is incidental to the permitted enhancement activities; and

(B) Will not interfere with the attainment of the survival or recovery objectives.

(c)Restrictions: (1) The following restrictions apply to all scientific research permits issued under this subpart

(i) Research activities must be conducted in the manner authorized in the permit.

(ii) Research results shall be published or otherwise made available to the scientific community in a reasonable period of time.

(iii) Research activities must be conducted under the direct supervision of the principal investigator or a co-investigator identified in the permit.

(iv) Personnel involved in research activities shall be reasonable in number and limited to:

(A) Individuals who perform a function directly supportive of and necessary to the permitted research activity; and

(B) Support personnel included for the purpose of training or as backup personnel for persons described in paragraph (c)(1)(iv)(A).

(v) Any marine mammal part imported under the authority of a scientific research permit must not have been obtained as the result of a lethal taking that would be inconsistent with the Acts, unless authorized by the Office Director.

(vi) Marine mammals held under a permit for scientific research shall not be placed on public display, included in an interactive program or activity, or trained for performance unless such activities:

(A) Are necessary to address scientific research objectives and have been specifically authorized by the Office Director under the scientific research permit; and

(B) Are conducted incidental to and do not in any way interfere with the permitted scientific research; and

(C) Are conducted in a manner consistent with provisions applicable to public display, unless exceptions are specifically authorized by the Office Director.

(vii) Any activity conducted incidental to the authorized scientific research activity must not involve any taking of marine mammals beyond what is necessary to conduct the research (i.e., educational and commercial photography).

(2) Any marine mammal or progeny held in captive maintenance under an enhancement permit shall be returned to its natural habitat as soon as feasible, consistent with the terms of the enhancement permit and the objectives of an approved conservation or recovery plan. In accordance with section 10(j) of the ESA, the Office Director may authorize the release of any population of an endangered or threatened species outside the current range of such species if the Office Director determines that such release will further the conservation of such species.

MMPA Regulatory Permit Restrictions (50 CFR §216.35)

The following restrictions shall apply to all permits issued under this subpart:

(a) The taking, importation, export, or other permitted activity involving marine mammals and marine mammal parts shall comply with the regulations of this subpart.

(b) The maximum period of any special exception permit issued, or any major amendment granted, is five years from the effective date of the permit or major amendment. In accordance with the provisions of Sec. 216.39, the period of a permit may be extended by a minor amendment up to 12 months beyond that established in the original permit.

(c) Except as provided for in Sec. 216.41(c)(1)(v), marine mammals or marine mammal parts imported under the authority of a permit must be taken or imported in a humane manner, and in compliance with the Acts and any applicable foreign law. Importation of marine mammals and marine mammal parts is subject to the provisions of 50 CFR part 14.

(d) The permit holder shall not take from the wild any marine mammal which at the time of taking is

either unweaned or less than eight months old, or is a part of a mother-calf/pup pair, unless such take is specifically authorized in the conditions of the special exception permit. Additionally, the permit holder shall not import any marine mammal that is pregnant or lactating at the time of taking or import, or is unweaned or less than eight months old unless such import is specifically authorized in the conditions of the special exception permit.

(e) Captive marine mammals shall not be released into the wild unless specifically authorized by the Office Director under a scientific research or enhancement permit.

(f) The permit holder is responsible for all activities of any individual who is operating under the authority of the permit;

(g) Individuals conducting activities authorized under the permit must possess qualifications commensurate with their duties and responsibilities, or must be under the direct supervision of a person with such qualifications;

(h) Persons who require state or Federal licenses to conduct activities authorized under the permit must be duly licensed when undertaking such activities;

(i) Special exception permits are not transferable or assignable to any other person, and a permit holder may not require any direct or indirect compensation from another person in return for requesting authorization for such person to conduct the taking, import, or export activities authorized under the subject permit;

(j) The permit holder or designated agent shall possess a copy of the permit when engaged in a permitted activity, when the marine mammal is in transit incidental to such activity, and whenever marine mammals or marine mammal parts are in the possession of the permit holder or agent. A copy of the permit shall be affixed to any container, package, enclosure, or other means of containment, in which the marine mammals or marine mammal parts are placed for purposes of transit, supervision, or care. For marine mammals held captive and marine mammal parts in storage, a copy of the permit shall be kept on file in the holding or storage facility.

MMPA Regulatory Permit Conditions (50 CFR §216.36)

(a) Specific conditions. (1) Permits issued under this subpart shall contain specific terms and conditions deemed appropriate by the Office Director, including, but not limited to:

(i) The number and species of marine mammals that are authorized to be taken, imported, exported, or otherwise affected;

(ii) The manner in which marine mammals may be taken according to type of take;

(iii) The location(s) in which the marine mammals may be taken, from which they may be imported, or to which they may be exported, as applicable, and, for endangered or threatened marine mammal species to be imported or exported, the port of entry or export;

(iv) The period during which the permit is valid.

(b) Other conditions. In addition to the specific conditions imposed pursuant to paragraph (a) of this section, the Office Director shall specify any other permit conditions deemed appropriate.

MMPA Regulatory Requirements for Permit Amendments (50 CFR §216.39)

(a) General. Special exception permits may be amended by the Office Director. Major and minor amendments may be made to permits in response to, or independent of, a request from the permit holder. Amendments must be consistent with the Acts and comply with the applicable provisions of this subpart.

(1) A major amendment means any change to the permit specific conditions under §216.36(a) regarding:

(i) The number and species of marine mammals that are authorized to be taken, imported, exported, or otherwise affected;

(ii) The manner in which these marine mammals may be taken, imported, exported, or otherwise affected, if the proposed change may result in an increased level of take or risk of adverse impact;

(iii) The location(s) in which the marine mammals may be taken, from which they may be imported, and to which they may be exported, as applicable; and

(iv) The duration of the permit, if the proposed extension would extend the duration of the permit more than 12 months beyond that established in the original permit.

(2) A minor amendment means any amendment that does not constitute a major amendment.

(b) Amendment requests and proposals.

(1) Requests by a permit holder for an amendment must be submitted in writing and include the following:

(i) The purpose and nature of the amendment;

(ii) Information, not previously submitted as part of the permit application or subsequent reports, necessary to determine whether the amendment satisfies all issuance criteria set forth at §216.34, and, as appropriate, §216.41, §216.42, and §216.43.

(iii) Any additional information required by the Office Director for purposes of reviewing the proposed amendment.

(2) If an amendment is proposed by the Office Director, the permit holder will be notified of the proposed amendment, together with an explanation.

(c) Review of proposed amendments.

(1) Major amendments. The provisions of §216.33(d) and (e) governing notice of receipt, review and decision shall apply to all proposed major amendments.

(2) Minor amendments.

(i) After reviewing all appropriate information, the Office Director will provide the permit holder with written notice of the decision on a proposed or requested amendment, together with an explanation for the decision.

(ii) If the minor amendment extends the duration of the permit 12 months or less from that established in the original permit, notice of the minor amendment will be published in the Federal Register within 10 days from the date of the Office Director's decision.

(iii) A minor amendment will be effective upon a final decision by the Office Director.

Attachment B

Example of Permit to Take Protected Species for Scientific and/or Enhancement Purposes

Permit No. xxxx-xxxx-xx
Expiration Date: month dd, yyyy
Reports Due: month dd, annually

PERMIT TO TAKE PROTECTED SPECIES[1] FOR SCIENTIFIC AND/OR ENHANCEMENT PURPOSES

I. Authorization

This permit is issued to Name of Permit Holder (hereinafter "Permit Holder"), Affiliation, address, [Responsible Party: Name], pursuant to the provisions of the Marine Mammal Protection Act of 1972 as amended (MMPA; 16 U.S.C 1361 et seq.*); the regulations governing the taking and importing of marine mammals (50 CFR Part 216); the Endangered Species Act of 1973 (ESA; 16 U.S.C. 1531* et seq.*); the regulations governing the taking, importing, and exporting of endangered and threatened species (50 CFR Parts 222-226); and the Fur Seal Act of 1966 (16 U.S.C. 1151* et seq.*).*

II. Abstract

The objective(s) of the permitted activity, as described in the application, is/are to [briefly summarize objectives from application. Note: it is not necessary to list or summarize the research methods or activities here (that's what the Take Tables are for), just the objectives of the study.].

III. Terms and Conditions

The activities authorized herein must occur by the means, in the areas, and for the purposes set forth in the permit application, and as limited by the Terms and Conditions specified in this permit, including all attachments and appendices. Any permit noncompliance constitutes a violation and is grounds for permit modification, suspension, or revocation, and for enforcement action.

A. Duration of Permit

1. Personnel listed in Condition C.1 of this permit (hereinafter "Researchers") may conduct activities authorized by this permit through month dd, yyyy. This permit expires on the date indicated and is non-renewable. This permit may be extended by the Director, NMFS Office of Protected Resources, pursuant to applicable regulations and the requirements of the MMPA and ESA.

2. Researchers must suspend all permitted activities in the event serious injury[2] or mortality[3] of protected species occurs / reaches that specified in Table(s) X of Section B.1. The Permit Holder must contact the Chief, NMFS Permits, Conservation and Education Division (hereinafter "Permits Division") by phone (301-713-2289) within two business days. The Permit Holder must also submit a written incident report as described in Condition E.2. The Permits Division may grant authorization to resume permitted activities based on review of the incident report and in consideration of the Terms and Conditions of this permit.

[1] "Protected species" include species listed as threatened or endangered under the ESA, and marine mammals.
[2] A serious injury is defined by regulation as any injury that will likely result in mortality.
[3] This permit allows for /does not allow for unintentional serious injury and mortality caused by the presence or actions of researchers up to the limit in Table X. This includes, but is not limited to; deaths of dependant young by starvation following research-related death of a lactating female; deaths resulting from infections related to sampling procedures; and deaths or injuries sustained by animals during capture and handling, or while attempting to avoid researchers or escape capture.

3. If authorized take[4] is exceeded, Researchers must cease all permitted activities and notify the Chief, NMFS Permits, Conservation and Education Division (hereinafter "Permits Division") by phone (301-713-2289) as soon as possible, but no later than within two business days. The Permit Holder must also submit a written incident report as described in Condition E.2. The Permits Division may grant authorization to resume permitted activities based on review of the incident report and in consideration of the Terms and Conditions of this permit.

4. The Permit Holder must terminate all research activities under this permit at the end of each permit year/field season (*i.e.*, December 31) and request authorization to resume research for each succeeding year. Re-authorization of permitted activities will be based primarily on the Permits Division's evaluation of the annual report required pursuant to Condition E.3. Reauthorization of this permit may be denied or delayed if the annual report has not been received or approved. Authorization of each year's research does not guarantee or imply that NMFS will authorize subsequent years' activities.

B. Number and Kind(s) of Protected Species, Location(s) and Manner of Taking

1. The table(s) in Appendix 1 outline(s) the number of protected species, by species and stock, authorized to be taken, and the locations, manner, and time period in which they may be taken.

2. Researchers working under this permit may collect visual images (*i.e.*, any form of still photographs and motion pictures) as needed to document the permitted activities, provided the collection of such images does not result in takes of protected species.

   a. The Permit Holder may use these images in printed materials (including commercial or scientific publications) and presentations provided the images are accompanied by a statement indicating that the activity depicted was conducted pursuant to Permit No. xxx-xxxx. This statement must accompany the images in all subsequent uses or sales.
   b. Annual reports required pursuant to Condition E.3 must note such incidental scientific, educational, or commercial uses of the images.

3. Upon written request from the Permit Holder, approval for photography, filming, or audio recording activities not essential to achieving the objectives of the permitted activities, including allowing personnel not essential to the research (e.g. a documentary film crew) to be present, may be granted by the Chief, Permits Division.

   a. Where such non-essential photography, filming, or recording activities are authorized they must not influence the conduct of permitted activities in any way or result in takes of protected species.
   b. Personnel authorized to accompany the Researchers during permitted activities for the purpose of non-essential photography, filming, or recording activities are not allowed to participate in the permitted activities.
   c. Annual reports required pursuant to Condition E.3 must note such non-essential activities.
   d. The Permit Holder and Researchers cannot require or accept compensation in return for allowing non-essential personnel to accompany Researchers to conduct non-essential photography, filming, or recording activities.

[4] By regulation, a take under the MMPA means to harass, hunt, capture, collect, or kill, or attempt to harass, hunt, capture, collect, or kill any marine mammal. This includes, without limitation, any of the following: The collection of dead animals, or parts thereof; the restraint or detention of a marine mammal, no matter how temporary; tagging a marine mammal; the negligent or intentional operation of an aircraft or vessel, or the doing of any other negligent or intentional act which results in disturbing or molesting a marine mammal; and feeding or attempting to feed a marine mammal in the wild. Under the ESA, a take means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to do any of the preceding.

4. Researchers must comply with the following conditions related to the manner of taking:

   a. Insert here an alphabetized list of any other restrictions on time, location, manner, etc., as appropriate for specific activity, location, and taxa. See "pinniped research conditions," "cetacean research conditions," "sea turtle research conditions," "sturgeon and sawfish research conditions," "abalone research conditions," and "enhancement conditions" in templates folder

5. The Permit Holder must comply with all provisions specified in Attachment 1 of this permit for biological samples collected, obtained, imported or exported under authority of this permit.

6. Researchers must comply with the following conditions related to methods of capture, supervision, care, and transportation

   a. Insert here an alphabetized list of "captive conditions"

C. <u>Qualifications, Responsibilities, and Designation of Personnel</u>

1. The following Researchers may participate in the conduct of the permitted activities in accordance with their qualifications and the limitations specified herein:

   a. Principal Investigator – [name];
   b. Co-Investigator(s) – [names];
   c. Research Assistants – any personnel identified by the Permit Holder or Principal Investigator and qualified to act pursuant to Conditions C.2, C.3, and C.4 of this permit; and
   d. Permit Holder – [name].

2. Individuals conducting permitted activities must possess qualifications commensurate with their roles and responsibilities. The roles and responsibilities of personnel operating under this permit are as follows:

   a. The Permit Holder is ultimately responsible for all activities of any individual who is operating under the authority of this permit. Where the Permit Holder is an institution/facility, the Responsible Party is the person at the institution/facility who is responsible for the supervision of the Principal Investigator.
   b. The Principal Investigator (PI) is the individual primarily responsible for the taking, import, export and any related activities conducted under the permit. The PI must be on site during any activities conducted under this permit unless a Co-Investigator named in Condition C.1 is present to act in place of the PI.
   c. Co-Investigators (CIs) are individuals who are qualified to conduct activities authorized by the permit without the on-site supervision of the PI. CIs assume the role and responsibility of the PI in the PI's absence.
   d. Research Assistants (RAs) are individuals who work under the direct and on-site supervision of the PI or a CI. RAs cannot conduct permitted activities in the absence of the PI or a CI.

3. Personnel involved in permitted activities must be reasonable in number and essential to conduct of the permitted activities. Essential personnel are limited to:

   a. Individuals who perform a function directly supportive of and necessary to the permitted activity (including operation of any vessels or aircraft essential to conduct of the activity);
   b. Individuals included as backup for those personnel essential to the conduct of the permitted activity; and
   c. Individuals included for training purposes.

4. Persons who require state or Federal licenses to conduct activities authorized under the permit (e.g., veterinarians, pilots) must be duly licensed when undertaking such activities.

5. Permitted activities may be conducted aboard vessels or aircraft, or in cooperation with individuals or organizations, engaged in commercial activities, provided the commercial activities are not conducted simultaneously with the permitted activities, except with written approval pursuant to Condition B.4 or as specifically provided for in an Incidental Take Statement or Incidental Take Permit for the specific commercial activity.

6. The Permit Holder may request authorization from the Chief, Permits Division to add personnel to this permit as indicated below. The Permit Holder cannot require or receive any direct or indirect compensation in return for requesting authorization for such person to act as a PI, CI, or RA under the permit.

   a. The Permit Holder or PI may add or remove CIs from the permit by submitting a written request to the Chief, Permits Division. Where the Permit Holder is an institution/facility, the Responsible Party may request a change of PI. Requests to change the PI or add CIs must include a description of the individual's qualifications to conduct and oversee the activities authorized under this permit.

      The Permit Holder or PI may designate additional CIs provided that a copy of the letter designating the individual, and a copy of the individual's curriculum vitae, is provided to the Permits Division by facsimile on the day of designation and confirmed by mail. The Responsible Party may request a change of PI by submitting a written request for personnel change to the Chief, Permits Division. The request must include a description of the individual's qualifications to conduct and oversee the activities authorized under this permit.

   b. The Permit Holder must request written approval from the Permits Division for additional RAs. The Permit Holder must also provide the names of all RAs to the NMFS Regional Administrator at the address indicated in Condition F.1.

D. Possession of Permit

1. This permit cannot be transferred or assigned to any other person.

2. The Permit Holder and all other persons operating under the authority of this permit must possess a copy of this permit: when engaged in a permitted activity; when a protected species is in transit incidental to a permitted activity; and during any other time when any protected species taken or imported under such permit is in the possession of such persons.

3. A duplicate copy of this permit must be attached to the container, package, enclosure, or other means of containment in which a protected species or protected species part is placed for purposes of storage, transit, supervision or care.

E. Reports

1. *The Permit Holder must submit annual, final, and incident reports, and any papers or publications resulting from the research authorized herein to the Chief, Permits Division, Office of Protected Resources, NMFS, 1315 East-West Highway, Suite 13705, Silver Spring, MD 20910; phone (301) 713-2289; fax (301) 427-2521.*

2. *Written incident reports related to serious injury and mortality events or to exceeding authorized takes, must be submitted to the Chief, Permits Division within two weeks of the incident. The incident report must include a complete description of the events and identification of steps that will be taken to reduce the potential for additional research-related mortality or exceedence of authorized take.*

3. An annual report must be submitted to the Chief, Permits Division by [insert date here and at top of first page] for each year the permit is valid. The annual report describing activities conducted during the previous permit year must follow the format in Appendix 3.

4. A final report must be submitted to the Chief, Permits Division within 180 days after expiration of the permit (insert date 180 days post expiration), or, if the research concludes prior to permit expiration, within 180 days of completion of the research. The final report must follow the format in Appendix 3.

5. Research results must be published or otherwise made available to the scientific community in a reasonable period of time.

F. Notification and Coordination

1. The Permit Holder must provide written notification of planned field work to the appropriate Assistant Regional Administrator(s) for Protected Resources at the address(es) listed below. Such notification must be made at least two weeks prior to initiation of any field trip/season and must include the locations of the intended field study and/or survey routes, estimated dates of research, and names and roles of participants (i.e., all CIs and Research Assistants).

   Alaska Region, NMFS, P.O. Box 21668, Juneau, AK 99802-1668; phone (907) 586-7235; fax (907) 586-7012;

   Northwest Region, NMFS, 7600 Sand Point Way NE, BIN C15700, Bldg. 1, Seattle, WA 98115-0700; phone (206) 526-6150; fax (206) 526-6426;

   Southwest Region, NMFS, 501 West Ocean Blvd., Suite 4200, Long Beach, CA 90802-4213; phone (562) 980-4020; fax (562) 980-4027;

   Pacific Islands Region, NMFS, 1601 Kapiolani Blvd., Suite 1110, Honolulu, HI 96814-4700; phone (808) 973-2935; fax (808) 973-2941;

   Southeast Region, NMFS, 263 13th Ave South , St. Petersburg, FL 33701; phone (727) 824-5312; fax (727) 824-5309; and

   Northeast Region, NMFS, One Blackburn Drive, Gloucester, MA 01930-2298; phone (978) 281-9300; fax (987) 281-9394.

2. To the maximum extent practical, the Permit Holder must coordinate permitted activities with activities of other Permit Holders conducting the same or similar activities on the same species, in the same locations, or at the same times of year to avoid unnecessary disturbance of animals. The appropriate Regional Office may be contacted at the address listed above for information about coordinating with other Permit Holders.

G. Observers and Inspections

1. NMFS may review activities conducted pursuant to this permit. At the request of NMFS, the Permit Holder must cooperate with any such review by:

   a. Allowing any employee of NOAA or any other person designated by the Director, NMFS Office of Protected Resources to observe permitted activities; and
   b. Providing any documents or other information relating to the permitted activities.

H. Modification, Suspension, and Revocation

1. All permits are subject to suspension, revocation, modification, and denial in accordance with the provisions of subpart D [Permit Sanctions and Denials] of 15 CFR part 904.

2. The Director, NMFS Office of Protected Resources may modify, suspend, or revoke this permit in whole or in part:

   a. In order to make the permit consistent with any change made after the date of permit issuance with respect to any applicable regulation prescribed under section 103 of the MMPA and section 4 of the ESA;
   b. In any case in which a violation of the terms and conditions of the permit is found;
   c. In response to a written request5 from the Permit Holder;
   d. If NMFS determines that the application or other information pertaining to the permitted activities (including, but not limited to, reports pursuant to Section E of this permit and information provided to NOAA personnel pursuant to Section G of this permit) includes false information; and
   e. If NMFS determines that the authorized activities will operate to the disadvantage of threatened or endangered species or are otherwise no longer consistent with the purposes and policy in Section 2 of the ESA.

3. Issuance of this permit does not guarantee or imply that NMFS will issue or approve subsequent permits or amendments for the same or similar activities requested by the Permit Holder, including those of a continuing nature.

I. Penalties and Permit Sanctions

1. Any person who violates any provision of this permit, the MMPA, ESA, or the regulations at 50 CFR 216 and 50 CFR 222-226 is subject to civil and criminal penalties, permit sanctions, and forfeiture as authorized under the MMPA, ESA, and 15 CFR part 904.

2. NMFS shall be the sole arbiter of whether a given activity is within the scope and bounds of the authorization granted in this permit. The Permit Holder must contact the Permits Division for verification before conducting the activity if they are unsure whether an activity is within the scope of the permit. Failure to verify, where NMFS subsequently determines that an activity was outside the scope of the permit, may be used as evidence of a violation of the permit, the MMPA, the ESA, and applicable regulations in any enforcement actions.

J. Acceptance of Permit

1. In signing this permit, the Permit Holder and Principal Investigator:

   a. Agrees to abide by all terms and conditions set forth in the permit, all restrictions and relevant regulations under 50 CFR Parts 216, and 222-226, and all restrictions and requirements under the MMPA, and the ESA;
   b. Acknowledges that the authority to conduct certain activities specified in the permit is conditional and subject to authorization by the Office Director; and
   c. Acknowledges that this permit does not relieve the Permit Holder of the responsibility to obtain any other permits, or comply with any other Federal, State, local, or international laws or regulations.

[5] The Permit Holder may request changes to the permit related to: the objectives or purposes of the permitted activities; the species or number of animals taken; and the location, time, or manner of taking or importing protected species. Such requests must be submitted in writing to the Chief, Permits Division in the format specified in the application instructions.

James H. Lecky Director, Office of Protected Resources National Marine Fisheries Service	Date
[name of Permit Holder or Responsible Party] [permit holder's/RP's title and institution] Permit Holder/Responsible Party	Date
[name of Principal Investigator] [PI's title and institution] Principal Investigator	Date

Appendix 1: Tables Specifying the Kind(s) of Protected Species, Location(s), and Manner of Taking

Attachment 1: Requirements for disposition of biological samples

Appendix 2: Format for submitting annual and final reports

Grant Process

ACRONYMS AND ABBREVIATIONS

CFR	Code of Federal Regulations
EA	Environmental Assessment
EIS	Environmental Impact Statement
ESA	Endangered Species Act
IACUC	Institutional Animal Care and Use Committee
MMPA	Marine Mammal Protection Act
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NFS	Northern fur seal
SSL	Steller sea lion
U.S.C.	United States Code

Grant Application Process Summary

NMFS administers a broad range of financial assistance and program partnership activities directed at supporting the core mission of National Marine Fisheries Service (NMFS). Grant programs are competitive and awards are made to universities, state agencies, and public or private sector non-profit organizations to fund activities pertaining to the research and management of fisheries, marine mammals, and habitat conservation. Some grant awards are discretionary, based upon compliance with existing defined NMFS program goals and objectives. Other grant awards are directed by Congress, with grant funds "earmarked" in the federal budget for specific activities.

Funding for research activities on Steller sea lions (SSLs) and northern fur seals (NFSs) has been derived from a variety of sources over the years, including federal, state, and private institutions. Prior to their listing under the Endangered Species Act (ESA) in 1990 and for most of the 1990s, federal funding for SSL research through NMFS was less than 1 million dollars per year, with a majority of funds supporting census work (Ferrero and Fritz 2002). As the population continued to decline into the late 1990s, a series of legal and scientific challenges led NMFS to place restrictions on the commercial fishing industry to help alleviate the population decline even though there was no scientific consensus on how effective such restrictions would be as conservation measures. In response, the U.S. Congress dramatically increased funding for SSL research in 2001 and directed NMFS to disburse funds for a diversity of research projects through several research agencies plus a new federal grants program, the Steller Sea Lion Research Initiative, administered through NMFS Alaska Region Office in Juneau (Ferrero and Fritz 2002).

Detailed instructive information for grant program application from NMFS is available on the National Oceanic and Atmospheric Administration (NOAA) Grants Program website: http://www.ago.noaa.gov/grants/pdf/. This site includes links to numerous forms that may be applicable to different research projects. Additional information on the types of research grants that are currently available can also be found on the Alaska Region Grants Office website: http://www.fakr.noaa.gov/omi/grants/

Grant programs affected by this EIS that are currently administered by NMFS and NOAA include:

- Regional Fishery Management Councils
- Unallied Science Program
- Marine Mammal Data Program
- Marine Mammal Health and Stranding Response Program (NMFS 2005d, NMFS 2006c)

Announcement of Federal Funding Opportunity

When funds become available for research on marine mammals NMFS, NOAA, and the Department of Commerce publicly announce federal funding opportunities for to marine mammal research. At a minimum, each funding opportunity announcement includes information detailing the following:

- Program Objectives
- Program Priorities
- Funding Availability
- Project/Award Period
- Permits and Approvals
- Eligible Applicants
- Cost Sharing or Matching Requirements
- Application and Submission Requirements
- Application Review Information
- Award Administration Information

Each grant program has specific program objectives and priorities that determine the types of research that will be granted funding. Priorities are typically categorized by national and regional priorities, with regional priorities further sorted by northeast, northwest, southeast, southwest, Pacific Islands, and Alaska regions if appropriate for the program.

A grant program announcement discloses the total amount of funding available for distribution, individual grant amount maximums, and details explaining the maximum duration of projects considered. All federal, state, and local government permits and approvals for research are the responsibility of the applicant. In most cases, the applicant is required to include in the proposal package either: 1) an application cover letter from the applicant to the authorizing entity requesting permits or approvals, or 2) a copy of the final permit or approval. Specifically, if the research activities the applicant is requesting funding for are within the jurisdiction of a facility's Institutional Animal Care and Use Committee (IACUC), the applicant must have requested or obtained approval from IACUC prior to application for funding as required by the Animal Welfare Act, 9 Code of Federal Regulations (CFR) 2.30-2.31. If proposed activities involve intrusive research (50 CFR 216.27(c)(6)) or if animals must be held after rehabilitation has been completed, the applicant must also obtain a Marine Mammal Protection Act (MMPA)/ESA scientific research and enhancement permit prior to submitting the funding proposal. The announcement will typically remind the applicant of possible permits and authorizations; however, it is the applicant's responsibility to comply with applicable laws and regulations.

All proposals for federal assistance through NOAA or NMFS are subject to governing regulations detailed in the National Environmental Policy Act (NEPA) (42 U.S.C. 4321 *et seq*.). NEPA requires federal agencies to integrate environmental values into their decision making processes by considering the environmental impacts of their proposed actions and reasonable alternatives to those actions. To meet this requirement, federal agencies must either prepare a detailed statement (known as an Environmental Assessment (EA) or Environmental Impact Statement (EIS) or classify the action as categorically excluded from the requirements of NEPA. A Categorical Exclusion (CE) is defined as:

> *a category of actions which do not individually or cumulatively have a significant effect on the human environment and which have been found to have no such effect in procedures adopted by a Federal agency in adoption of these procedures (Section 1507.3) and for which, therefore, neither an environmental assessment nor an environmental impact statement is required* (40 CFR 1508.4).

All grant proposals are reviewed using the Grants NEPA Checklist (Attachment A). This checklist assists the NMFS responsible program managers in determining if the proposed grant(s) qualifies for categorical exclusion under NEPA. In many cases, grants qualify for a CE from NEPA requirements; however, some grant proposals may require the preparation of an EA or EIS. An EA or EIS are prepared when 1) a grant program is new; 2) proposed actions may have a significant environmental impact; or 3) potential impacts associated with the grant are highly controversial. Applicants will be requested to assist in the preparation of an EA or EIS by providing all necessary information to complete the assessment. Failure to obtain permits, approvals, letters of agreement, or failure to provide environmental analyses where necessary will delay in the award of funds.

All grant programs require that proposals must be received by the published due date or they will not be considered for funding. Required forms differ based on the grant program and type of proposal and a grant program announcement will outline which forms are required. At a minimum, the applicant will need to complete the Application for Federal Assistance: SF-424 (Attachment B), and Certifications Regarding Debarment, Suspension, and other Responsibility Matters: Drug Free Workplace Environment: CD-511 (Attachment C). Similarly, the content and form of application will vary depending on the grant program. However, all grant programs require that proposals:

- should be submitted online through the grants.gov website
- must adhere to the provisions and requirements set forth in the announcement of federal funding opportunity
- must include total project costs and a budget narrative, project summary, project description, organizational summary
- must include supporting documentation that illustrates:
    - proof of eligibility
    - necessary permits and authorizations
    - any applicable completed environmental analyses
    - results of previous grant awards
    - abbreviated Curriculum Vitae for all named investigators
    - letters of cooperation from all named co-investigators and cooperators
    - IRS documentation if applying as a 501(c)(3) organization
    - indirect cost rate agreement
    - any other required federal forms

A grant program announcement will also disclose the application review information including evaluation criteria, the review and selection process, and selection factors. Evaluation criteria are weighted and often require five key components be established in a proposal including:

- The importance and/or relevance and applicability of the proposed project to the grant program goals
- Technical and scientific merit
- Overall qualifications of the applicants
- Project costs
- Outreach and education

The review and selection process typically occurs in four steps including initial screening, peer review, merit review, and final selection by the selecting official (i.e. Director, NMFS Office of Protected Resources). The initial technical evaluation of the applicants ensures that the proposals relate to the grant program requirements and goals, funding priorities, and applicants meet eligibility requirements. Next, each proposal undergoes a peer review of at least three individuals. Peer reviewers are asked to evaluate proposals based on grant program goals or funding priorities identified by the applicant and the review criteria. After this step in the evaluation process, a merit review is completed. Merit reviewers use peer review comments, application materials, other applicable information, and the number of applications received in making recommendations regarding equitable distribution of funds among regions in order to rank proposals for funding. The selecting official makes the final decision about which proposals will receive funding based on recommendations from the merit review team, as well as policy considerations such as costs, geographical distribution, financial need, duplication with other federally funded projects, and equitable distribution of funds among the regions.

Award notices are the final step in the application process. The exact amount of funding, scope of work, and terms and conditions of a successful award are determined in pre-award negotiations between the applicant and NOAA/NMFS representatives. Awardees are responsible for the terms and conditions set forth in the final award letter and must remain in good standing to be eligible for distribution of funds and future funding.

REFERENCES

Ferrero, R.C. and L.W. Fritz (2002). Steller Sea Lion Research and Coordination: A Brief History and Summary of Recent Progress. NOAA Technical Memorandum NMFS-AFSC-129. NOAA Fisheries Service and Alaska Fisheries Science Center. Seattle, WA.

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Attachment A

Categorical Exclusion Checklist for
NOAA/NMFS Grants

Categorical Exclusion Checklist for
National Oceanic and Atmospheric Administration
National Marine Fisheries Service Grants

The purpose of this checklist is to assist National Marine Fisheries Service (NMFS) responsible program managers (RPMs) in determining if the grant(s) they are proposing qualifies for categorical exclusion status under NOAA's National Environmental Policy Act (NEPA) guidelines. Normally, NMFS grants qualify for categorical exclusion from NEPA requirements when the environmental effects are minor or negligible. However, as stated in NOAA's guidelines for implementing NEPA (NAO 216-6; http://www.rdc.noaa.gov/~nao/216-6.html) at 5.05.c, under certain conditions, preparation of an Environmental Assessment (EA) or an Environmental Impact Statement (EIS) is required for proposed grants when 1) a grant program is entirely new; 2) under extraordinary circumstances in which normally excluded actions may have a significant environmental impact; or 3) potential impacts associated with the grant are highly controversial. By answering the questions in this checklist, the RPM can determine whether the effects of the grant qualify for categorical exclusion, or require further NEPA documentation in the form of an EA or an EIS. This checklist should be filled out for a grant which is not automatically determined to require an EA or EIS in order to establish compliance with administrative record requirements regarding categorical exclusions (CEs).

---

1. Identify the NMFS Grant Project and Program:______________________________

   ____.

2. Attach a brief, but specific project description, including: the grant/award recipient, geographical location, and the scope of project(s). Does the grant involve any federal permits, or other federal agency direct involvement, activity, oversight, or funding?
   Yes ( ) No ( )

3. Is this an entirely new NMFS grant program? Yes ( ) No ( )

4. Will this NMFS grant establish a precedent or represent a decision in principle about future grant and award actions with potentially significant environmental effects?
   Yes ( ) No ( )

5. Have a number of similar grant actions been considered? Yes ( ) No ( )

   If yes, although the proposed action's effects may be individually insignificant, will its addition to existing and reasonably foreseeable actions result in cumulatively significant impacts? Yes ( ) No ( )

6. Could this NMFS grant have significant effects on public health or safety? Yes ( ) No ( )

Will the proposed action:

- Create high levels of noise for an extended period of time? Yes ( ) No ( )

- Have long or short term aesthetic effects, e.g., visual effects or effects on scenery? Yes ( ) No ( )

- Require large amounts of outdoor lighting or create any unusual odors? Yes ( ) No ( )

- Require large amounts of water or electricity for an extended period or time? Yes ( ) No ( )

- Have long or short term effects on the transportation infrastructure, or create a significant increase in local traffic? Yes ( ) No ( )

7. Could this NMFS grant have significant adverse impacts on any geographic area(s) with unique characteristics? Areas to consider include coral reefs, marine protected areas, marine sanctuaries, essential fish habitat, historic or cultural resources, park or refuge lands, wild or scenic rivers, wetlands, or ecologically significant or critical areas, including those listed on the National Register of Natural Landmarks, or listed or eligible for listing on the National Register of Historic Places. Yes ( ) No ( )

Will the proposed action:

- Degrade or disturb coral reefs? Yes ( ) No ( )

- Degrade or disturb previously undisturbed areas? Yes ( ) No ( )

- Affect any areas such as wetlands and flood plains? Yes ( ) No ( )

- Disturb archaeological or historic resources? Yes ( ) No ( )

8. Could this NMFS grant have highly uncertain and potentially significant environmental effects or involve unique or unknown risks? Yes ( ) No ( )

Will the proposed action:

- Potentially result in the introduction or spread of a nonindigenous species? Yes ( ) No ( )

- Involve aquaculture activities that could result in the introduction or spread of invasive or non-indigenous species? Yes ( ) No ( )
- Significantly impact water resources such as surface or groundwater? Yes ( ) No ( )

- Significantly contribute to water degradation or impairment? Yes ( ) No ( )

- Generate large amounts of hazardous waste or any toxic waste? Yes ( ) No ( )

- Emit dangerous levels of ionizing or nonionizing radiation? Yes ( ) No ( )

- Result (directly or indirectly) in the generation of large amounts of air pollution?
Yes ( ) No ( )

9. Could this NMFS grant have adverse effects on species listed or proposed to be listed as Endangered or Threatened, or have adverse effects on designated critical habitats?
Yes ( ) No ( )

10. Will this grant threaten to violate a Federal state, local, or tribal law imposed for the protection of the environment? Yes ( ) No ( )

11. Will this NMFS grant have highly controversial environmental effects (i.e, are the effects likely to be subject to serious scientific dispute)? Yes ( ) No ( )

IF YES WAS CHECKED FOR ANY OF THE ITEMS ABOVE: Please list the item number, provide additional information about anticipated effects, and contact the NEPA Coordinator at NOAA's Office of Strategic Planning (202- 482-5181) as soon as possible to discuss alternatives for providing NEPA documentation.

IF NO WAS CHECKED FOR ALL OF THE ITEMS ABOVE: The grant activity may qualify for a Categorical Exclusion (CE). Please review the categories for CEs below and select the applicable category. If none apply, or if you have any questions about the applicability of the CE, please contact the NEPA Coordinator in the Office of Strategic Planning, (202) 482-5181.

APPLICABLE? YES/NO	CATEGORY	DESCRIPTION
	Research NAO 216-6 6.03.c.3(a)	Programs or projects of limited size and magnitude or with only short-term effects on the environment and for which any cumulative effects are negligible. Examples include natural resource inventories and environmental monitoring programs conducted with a variety of gear (satellite and ground based sensors, fish nets, etc.) in water, air, or land environs. Such projects may be conducted in a wide geographic area without need for an environmental document provided related environmental consequences are limited or short-term.
	Financial and Planning Grants NAO 216-6 6.03.c.3(b)	Financial support services and programs, such as federal or state loans or grants, (e.g., Saltsonstall-Kennedy grant, a fishery loan or grant disbursement under the Fishermen's Contingency Fund or Fisheries Obligation Guarantee Program), where the environmental effects are minor or negligible, and no environmental consequences are anticipated beyond those already analyzed in establishing such programs, laws or regulations. New financial support services and programs should undergo an environmental analysis at the time of conception to determine if a CE could apply to subsequent actions.

	Minor Project Activities NAO 216-6 6.03.c.3(c)	Projects where the proposal is for a minor amelioration action such as planting dune grass or for minor project changes or minor improvements to an existing site (e.g., fences, roads, picnic facilities, etc.), unless the project's impacts in conjunction with past, present or reasonably foreseeable future actions may result in a significant impact the human environment (40 CFR 1508.7).
	Pre-Proposal Actions 40 CFR 1508.23	Planning actions before a proposal exists do not require NEPA analysis. A "proposal" exists at that stage in the development of an action when a NOAA organization has a goal and begins its decision-making process, including consideration of environmental impacts, toward realization of that goal.
	Administrative or Programmatic Functions NAO 216-6 6.03.c.3(d)	The following NOAA programmatic functions that hold no potential for significant environmental impacts qualify for a CE: • Program planning and budgeting • Mapping, charting and surveying services • Ship support, ship and aircraft operations • Fishery financial support services • Grants for fishery data collection activities • Basic and applied research and research grants, except as provided in Section 6.03.b of NAO 216-6 • Enforcement operations • Basic environmental services and monitoring, such as weather observations, communications, analyses, and predictions • Environmental satellite services • Environmental data and information services • Air quality observations and analysis • Support of national and international atmospheric and Great Lakes research programs • Executive direction • Administrative services • Administrative support advisory bodies
	Regulations Implementing Projects or Plans NAO 216-6 6.03.c.3(i)	Routine operations and routine maintenance, preparation of regulations, Orders, manuals, or other guidance that implement, but do not substantially change these documents, or other guidance; policy directives, regulations and guidelines of an administrative, financial, legal, technical or procedural nature, or the environmental effects of which are too broad, speculative or conjectural to lend themselves to meaningful analysis and will be subject later to the NEPA process, either collectively or case-by-case; activities which are educational, informational, advisory or consultative to other agencies, public and private entities, visitors, individuals or the general public; actions with short term effects, or actions of limited size or magnitude.

	Listing Actions Under Sec. 4(a) of ESA NAO 216-6 6.03.e.3	The following actions may be appropriate for CE: • Preparation of recovery plans pursuant to Section 4(f)(1), because such plans are only advisory documents that provide consultative and technical assistance in recovery planning. However, implementation of specific tasks themselves identified in recovery plans may require an EA or EIS depending on the significance of the action (see NAO 216-6 Section 6.03e.2(b) for guidance on NEPA compliance for implementation of recovery actions). • Permits for scientific research or to enhance the propagation or survival of listed species pursuant to Section 10(a)(1)(a) of the ESA (except for permits covered in NAO 6.03e.2(c)). The RPM must also consider the cumulative impact on the listed species from the total amount of permits issued with CEs, and take into account any population shifts with the subject species. • Critical habitat designations where a designation overlaps with listing protections and is unlikely to have a significant effect on the human environment. CEs will not apply for critical habitat designations that include habitat outside the current occupied range of a listed species, the potential for economic and/or other impacts over and above those resulting from the listing exists. • "Low effect" incidental take permits under Section 10(a)(1)(B) of ESA that individually or cumulatively have a minor or negligible effect on the species covered in the habitat conservation plan.
	MMPA NAO 216-6 6.03.f.2	In general, scientific research, enhancement, photography, and public display permits issued under Section 101(a)(1) and 104 of the MMPA, and letters of confirmation for activities conducted under the General Authorization for Scientific Research established under Section 104 of the MMPA qualify for a CE. The RPM must also consider the cumulative impact on the protected species from the total amount of permits issued with CEs, and take into account any population shifts with the subject species. Small take incidental harassment authorizations under Section 101(a)(5)(d), tiered from a programmatic environmental review, are categorically excluded from further review. If such an authorization does not tier from a programmatic environmental review, that action may require an EIS, EA, or CE, based on a case-by-case review.

	Restoration Actions NAO 216-6 6.03.b.2	Restoration actions that do not individually or cumulatively have significant impacts on the human environment (e.g., actions with limited degree, geographic extent, and duration) may be eligible for CE (40 CFR 1508.4), provided such actions meet all of the following criteria: • Are intended to restore an ecosystem, habitat, biotic community, or population of living resources to a determinable pre-impact condition; • Use for transplant only organisms currently or formerly present at the site or in its immediate vicinity; • Do not require substantial dredging, excavation, or placement of fill; and • Do not involve a significant added risk of human or environmental exposure to toxic or hazardous substances.
	NAO 216-6 6.03.b.3	Examples of restoration actions likely to meet all of the above criteria include: • On-site, in-kind restoration actions in response to a specific injury (e.g., revegetation of habitats or topographic features such as restoration of seagrass meadows, salt marshes, or wetland areas; restoration of submerged, riparian intertidal or wetland substrates; replacement or restoration of shellfish beds through transplant or restocking; or structural or biological repair or restoration of coral reefs • Actions to restore historic habitat hydrology, where increased risk of flood or adverse fishery impacts are not significant (e.g., restoration, rehabilitation, or repair of fish passageways or spawning areas; restoration of tidal or non-tidal wetland inundation • Actions to enhance the natural recovery processes of living resources or systems affected by anthropogenic impact (e.g., use of exclusion methods such as fencing to protect stream corridors, riparian areas or other sensitive habitat; actions to stabilize dunes, marsh edges, or other mobile shoreline features

	Fisheries Management Plans and Plan Amendments NAO 216-6 6.03.d.4	Fisheries management actions may qualify for a CE pursuant to Section 9.03a.3. of NAO 216-6 if the actions individually and cumulatively do not have the potential to pose significant effect to the quality of the human environment. Actions that may receive a CE include: • Ongoing or recurring fisheries actions of a routine administrative nature when the action will not have any impacts not already assessed or the RPM finds they do not have the potential to pose significant effects to the quality of the human environment such as: reallocations of yield within the scope of a previously published fisheries management plan (FMP), or fishery regulation, combining management units in related FMP, and extension or change of the period of effectiveness of an FMP or regulation; and • Minor technical additions, corrections, or changes to an FMP. CE determinations for FMPs and FMP amendments require specific documentation. Refer to NAO 216-6 at 6.03c.3d.4 for further instructions.

Attachment B
Application for Federal Assistance: SF-424

Version 7/03

APPLICATION FOR FEDERAL ASSISTANCE

1. TYPE OF SUBMISSION: Application ☐ **Construction** ☐ **Non-Construction**	Pre-application ☐ **Construction** ☐ **Non-Construction**	**2. DATE SUBMITTED**	Applicant Identifier
		3. DATE RECEIVED BY STATE	State Application Identifier
		4. DATE RECEIVED BY FEDERAL AGENCY	Federal Identifier

5. APPLICANT INFORMATION

Legal Name:	**Organizational Unit**: Department:
Organizational DUNS:	Division:
Address: Street:	**Name and telephone number of person to be contacted on matters involving this application (give area code)** Prefix: First Name:
City:	Middle Name
County:	Last Name
State: Zip Code	Suffix:
Country:	Email:
6. EMPLOYER IDENTIFICATION NUMBER *(EIN)*: ☐☐-☐☐☐☐☐☐☐	Phone Number (give area code) / Fax Number (give area code)
8. TYPE OF APPLICATION: ☐ **New** ☐ **Continuation** ☐ **Revision** If Revision, enter appropriate letter(s) in box(es) (See back of form for description of letters.) ☐ ☐ Other (specify)	**7. TYPE OF APPLICANT: (**See back of form for Application Types) Other (specify) **9. NAME OF FEDERAL AGENCY:**
10. CATALOG OF FEDERAL DOMESTIC ASSISTANCE NUMBER: ☐☐-☐☐☐ TITLE (Name of Program): **12. AREAS AFFECTED BY PROJECT** *(Cities, Counties, States, etc.)*:	**11. DESCRIPTIVE TITLE OF APPLICANT'S PROJECT:**
13. PROPOSED PROJECT Start Date: Ending Date:	**14. CONGRESSIONAL DISTRICTS OF:** a. Applicant b. Project

15. ESTIMATED FUNDING:		**16. IS APPLICATION SUBJECT TO REVIEW BY STATE EXECUTIVE ORDER 12372 PROCESS?**
a. Federal	$ .00	a. Yes. ☐ THIS PREAPPLICATION/APPLICATION WAS MADE AVAILABLE TO THE STATE EXECUTIVE ORDER 12372 PROCESS FOR REVIEW ON
b. Applicant	$ .00	
c. State	$ .00	DATE:
d. Local	$ .00	b. No. ☐ PROGRAM IS NOT COVERED BY E. O. 12372
e. Other	$ .00	☐ OR PROGRAM HAS NOT BEEN SELECTED BY STATE FOR REVIEW
f. Program Income	$ .00	**17. IS THE APPLICANT DELINQUENT ON ANY FEDERAL DEBT?**
g. TOTAL	$ .00	☐ Yes If "Yes" attach an explanation. ☐ No

18. TO THE BEST OF MY KNOWLEDGE AND BELIEF, ALL DATA IN THIS APPLICATION/PREAPPLICATION ARE TRUE AND CORRECT. THE DOCUMENT HAS BEEN DULY AUTHORIZED BY THE GOVERNING BODY OF THE APPLICANT AND THE APPLICANT WILL COMPLY WITH THE ATTACHED ASSURANCES IF THE ASSISTANCE IS AWARDED.

a. Authorized Representative

Prefix	First Name	Middle Name
Last Name		Suffix
b. Title		c. Telephone Number (give area code)
d. Signature of Authorized Representative		e. Date Signed

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Standard Form 424 (Rev.9-2003)
Prescribed by OMB Circular A-102

Reset Form

INSTRUCTIONS FOR THE SF-424

Public reporting burden for this collection of information is estimated to average 45 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Office of Management and Budget, Paperwork Reduction Project (0348-0043), Washington, DC 20503.

PLEASE DO NOT RETURN YOUR COMPLETED FORM TO THE OFFICE OF MANAGEMENT AND BUDGET. SEND IT TO THE ADDRESS PROVIDED BY THE SPONSORING AGENCY.

This is a standard form used by applicants as a required face sheet for pre-applications and applications submitted for Federal assistance. It will be used by Federal agencies to obtain applicant certification that States which have established a review and comment procedure in response to Executive Order 12372 and have selected the program to be included in their process, have been given an opportunity to review the applicant's submission.

Item:	Entry:	Item:	Entry:
1.	Select Type of Submission.	11.	Enter a brief descriptive title of the project. If more than one program is involved, you should append an explanation on a separate sheet. If appropriate (e.g., construction or real property projects), attach a map showing project location. For preapplications, use a separate sheet to provide a summary description of this project.
2.	Date application submitted to Federal agency (or State if applicable) and applicant's control number (if applicable).	12.	List only the largest political entities affected (e.g., State, counties, cities).
3.	State use only (if applicable).	13	Enter the proposed start date and end date of the project.
4.	Enter Date Received by Federal Agency Federal identifier number: If this application is a continuation or revision to an existing award, enter the present Federal Identifier number. If for a new project, leave blank.	14.	List the applicant's Congressional District and any District(s) affected by the program or project
5.	Enter legal name of applicant, name of primary organizational unit (including division, if applicable), which will undertake the assistance activity, enter the organization's DUNS number (received from Dun and Bradstreet), enter the complete address of the applicant (including country), and name, telephone number, e-mail and fax of the person to contact on matters related to this application.	15	Amount requested or to be contributed during the first funding/budget period by each contributor. Value of in kind contributions should be included on appropriate lines as applicable. If the action will result in a dollar change to an existing award, indicate only the amount of the change. For decreases, enclose the amounts in parentheses. If both basic and supplemental amounts are included, show breakdown on an attached sheet. For multiple program funding, use totals and show breakdown using same categories as item 15.
6.	Enter Employer Identification Number (EIN) as assigned by the Internal Revenue Service.	16.	Applicants should contact the State Single Point of Contact (SPOC) for Federal Executive Order 12372 to determine whether the application is subject to the State intergovernmental review process.
7.	Select the appropriate letter in the space provided. A. State B. County C. Municipal D. Township E. Interstate F. Intermunicipal G. Special District H. Independent School District I. State Controlled Institution of Higher Learning J. Private University K. Indian Tribe L. Individual M. Profit Organization N. Other (Specify) O. Not for Profit Organization	17.	This question applies to the applicant organization, not the person who signs as the authorized representative. Categories of debt include delinquent audit disallowances, loans and taxes.
8.	Select the type from the following list: • "New" means a new assistance award. • "Continuation" means an extension for an additional funding/budget period for a project with a projected completion date. • "Revision" means any change in the Federal Government's financial obligation or contingent liability from an existing obligation. If a revision enter the appropriate letter: A. Increase Award B. Decrease Award C. Increase Duration D. Decrease Duration	18	To be signed by the authorized representative of the applicant. A copy of the governing body's authorization for you to sign this application as official representative must be on file in the applicant's office. (Certain Federal agencies may require that this authorization be submitted as part of the application.)
9.	Name of Federal agency from which assistance is being requested with this application.		
10.	Use the Catalog of Federal Domestic Assistance number and title of the program under which assistance is requested.		

SF-424 (Rev. 7-97) Back

Attachment C

Certifications Regarding Debarment,
Suspension and Other Responsibility Matters:
Drug Free Workplace: CD-511

FORM **CD-511**
(7-91)

UNITED STATES DEPARTMENT OF COMMERCE

CERTIFICATIONS REGARDING DEBARMENT, SUSPENSION AND OTHER RESPONSIBILITY MATTERS; DRUG-FREE WORKPLACE REQUIREMENTS AND LOBBYING

Applicants should refer to the regulations cited below to determine the certification to which they are required to attest. Applicants should also review the instructions for certification included in the regulations before completing this form. Signature on this form provides for compliance with certification requirements under 15 CFR Part 26, "Governmentwide Debarment and Suspension (Nonprocurement)" and "Governmentwide Requirements for Drug-Free Workplace" and 15 CFR Part 28, "New Restrictions on Lobbying." The certifications shall be treated as a material representation of fact upon which reliance will be placed when the Department of Commerce determines to award the covered transaction, grant, or cooperative agreement.

1. DEBARMENT, SUSPENSION AND OTHER RESPONSIBILITY MATTERS

As required by Executive Order 12549, Debarment and Suspension, and implemented at 15 CFR Part 26, for prospective participants in primary covered transactions, as defined at 15 CFR Part 26, Sections 26.105 and 26.110 -

(1) The prospective primary participant certifies to the best of its knowledge and belief, that it and its principals:

(a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

(b) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(c) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (1)(b) of this certification; and

(d) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

(2) Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

---

2. DRUG-FREE WORKPLACE REQUIREMENTS
Alternate I. Grantees Other Than Individuals

As required by the Drug-Free Workplace Act of 1988, and implemented at 15 CFR Part 26, Subpart F, for grantees, as defined at 15 CFR Part 26, Sections 26.605 and 26.610 -

A. The grantee certifies that it will or will continue to provide a drug-free workplace by:

(a) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the grantee's workplace and specifying the actions that will be taken against employees for violation of such prohibition;

(b) Establishing an ongoing drug-free awareness program to inform employees about --

(1) The dangers of drug abuse in the workplace;

(2) The grantee's policy of maintaining a drug-free workplace;

(3) Any available drug counseling, rehabilitation, and employee assistance programs; and

(4) The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace;

(c) Making it a requirement that each employee to be engaged in the performance of the grant be given a copy of the statement required by paragraph (a);

(d) Notifying the employee in the statement required by paragraph (a) that, as a condition of employment under the grant, the employee will--

(1) Abide by the terms of the statement; and

(2) Notify the employer in writing of his or her conviction for a violation of a criminal drug statute occurring in the workplace no later than five calendar days after such conviction;

(e) Notifying the agency in writing, within ten calendar days after receiving notice under subparagraph (d)(2) from an employee or otherwise receiving actual notice of such conviction. Employers of convicted employees must provide notice, including position title, to the Director, Office of Federal Assistance, Office of Federal Assistance and Management Support, HCHB Room 6054, U.S. Department of Commerce, Washington, DC 20230. Notice shall include the identification number(s) of each affected grant;

(f) Taking one of the following actions, within 30 calendar days of receiving notice under subparagraph (d)(2), with respect to any employee who is so convicted--

(1) Taking appropriate personnel action against such an employee, up to and including termination, consistent with the requirements of the Rehabilitation Act of 1973, as amended; or

(2) Requiring such employee to participate satisfactorily in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or local health, law enforcement, or other appropriate agency;

ADMINISTRATION/PSG ELECTRONIC FORM

(g) Making a good faith effort to continue to maintain a drug-free workplace through implementation of paragraphs (a), (b), (c), (d), (e) and (f).

B. The grantee shall insert in the space provided below the site(s) for the performance of work done in connection with the specific grant:

Place of Performance: (Street address, city, county, state, ZIP code):

____

____

____

Check ☐ if there are workplaces on file that are not identified here.

Alternate II. Grantees Who Are Individuals

As required by the Drug-Free Workplace Act of 1988, and implemented at 15 CFR 26, Subpart F, for grantees, as defined at 15 CFR Part 26, Sections 26.605 and 26.610 -

(A) The grantee certifies that, as a condition of the grant, he or she will not engage in the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance in conducting any activity with the grant;

(B) If convicted of a criminal drug offense resulting from a violation occurring during the conduct of any grant activity, he or she will report the conviction, in writing, within 10 calendar days of the conviction, to the Director, Office of Federal Assistance, Office of Federal Assistance and Management Support, HCHB Room 6054, U.S. Department of Commerce, Washington, DC 20230. When notice is made to such a central point, it shall include the identification number(s) of each affected grant.

3. LOBBYING

As required by Section 1352, Title 31 of the U.S. Code, and implemented at 15 CFR Part 28, for persons entering into a grant, cooperative agreement or contract over $100,000, or loan or loan guarantee over $150,000, as defined at 15 CFR Part 28, Sections 28.105 and 28.110, the applicant certifies that to the best of his or her knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

Statement for Loan Guarantees and Loan Insurance

The undersigned states, to the best of his or her knowledge and belief, that:

If any funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this commitment providing for the United States to insure or guarantee a loan, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

Submission of this statement is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required statement shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

As the duly authorized representative of the applicant, I hereby certify that the applicant will comply with the above applicable certification(s).

NAME OF APPLICANT	AWARD NUMBER AND/OR PROJECT NAME
PRINTED NAME AND TITLE OF AUTHORIZED REPRESENTATIVE	
SIGNATURE	DATE

FORM CD-511 (7-91)

Reset Entire Form

Print Form

ADMINISTRATION/PSG ELECTRONIC FORM

Appendix E
Focus Group Meeting Summary Report

NATIONAL MARINE FISHERIES SERVICE
STELLER SEA LION AND NORTHERN FUR SEAL RESEARCH EIS
FOCUS GROUP MEETINGS
SUMMARY REPORT

AUGUST 2006

NATIONAL MARINE FISHERIES SERVICE
IN COOPERATION WITH
URS CORPORATION

TABLE OF CONTENTS

INTRODUCTION

NMFS initiated preparation of an EIS for research on Steller sea lions and northern fur seals in the fall of 2005. The Permits Division in the Office of Protected Resources (PR1) is working in cooperation with the Grants Program Office in the Alaska Region and URS in Anchorage to prepare the EIS that will support issuance of grants and permits facilitating research on Steller sea lions and northern fur seals.

On May 26, 2006, the U.S. District Court in the District of Columbia ruled that NMFS violated the Administrative Procedure Act by acting arbitrarily, capriciously, and contrary to law by failing to prepare an EIS prior to its issuance of permits and permit amendments for research on Steller sea lions. (Civil Action No. 05-1392 (ESH)) The Court ordered the contested permits and permit amendments be vacated and required NMFS to prepare an EIS. This vacate order affected six permit holders and resulted in a halt of all research directed at SSL in the wild.

The EIS project team identified two mechanisms to develop a reasonable range of alternatives and take a hard look at the effects of research under these alternatives, as required by NEPA. One was to distribute a questionnaire to permit holders and applicants, followed by phone or in person interviews with URS project team members. The other was to hold a series of focus group meetings with various stakeholder groups, as indicated below.

- Researchers – Seattle, WA
- Non-governmental organizations and other government agencies – Silver Spring, MD
- North Pacific Fisheries Management Council and North Pacific Research Board – Anchorage, AK
- Native Groups – Anchorage, AK

This report presents discussions held during the focus groups meetings and highlights issues related to the EIS. It should be noted that these notes summarize comments and suggestions, but do not imply agreement to those comments and suggestions. Please see attached agenda, power point presentation and handouts for reference. Based on this report and any subsequent comments received from these groups on alternatives, URS and NMFS will be finalizing the alternatives for the Draft EIS tentatively schedule to be released in December 2006.

SUMMARY OF FOCUS GROUP MEETINGS

RESEARCHER FOCUS GROUP MEETING – SEATTLE, WA (JULY 24, 2006)

Meeting Participants (please see sign-in sheet in Appendix B): Andrew Trites, Sharon Melin, Tamara Faris, Steve Insley, Tom Gelatt, Brian Fadely, Lorrie Rea, Shannon Atkinson, Don Calkins, Markus Horning, John Bengtson, Lowell Fritz, Lianna Jack, Donna Willoya, Dan Ito, Rolf Reem, Shawn Carey, Ray Howard, Karin Holser, Jon Isaacs*, Anne Southam*, Rich Kleinleder*
* Indicates EIS Project Team

Issues Discussed:
General Comments on the EIS

- It seems that the major question is what 'impact' are we focusing on? Are we focusing on impacts to the individual marine mammal or the population? MMPA and ESA say we should focus on population.
- As a programmatic document, the specific details in the alternatives do not necessarily 'bind' NMFS in the future because they could be used as 'proxies' for analysis. In other words, specific take levels under the chosen preferred alternative would not necessarily be binding but could be used for analysis while the general philosophy of the alternative is what the agency takes action under.
- The EIS must be clear on the definition of intrusive. Refer to the permitting definition of intrusive. Intrusive is defined as breaking the skin or inserting through an orifice.[1]
- The EIS should be clear to specify differences between the use of anesthesia by intubation versus gas anesthesia with a mask.
- Should new technique developments be a separate row in the alternative table?
- The EIS should have a separate table to show what techniques are parallel (i.e., what methods or activities are connected).
- There will be elements common to all alternatives, such as issues related to humaneness (AWA laws) of procedures. The EIS should provide the legal setting as background for what is common to all alternatives, in other words, what boundaries the agency must operate within.
- The EIS alternatives should address issues related to PR1 superceding the authority of field crews to use techniques or drugs that have been approved under and IACUC process. If a technique or drug has been approved by an IACUC process, it should be acceptable under a permit.
- Should the permit process be part of the alternatives in the EIS?
- The EIS is not the place to get into changes to the permit process.

[1] Note that the full regulatory definition of intrusive research is "a procedure conducted for bona fide scientific research involving: a break in or cutting of the skin or equivalent, insertion of an instrument or material into an orifice, introduction of a substance or object into the animal's immediate environment that is likely either to be ingested or to contact and directly affect animal tissues (i.e., chemical substances), or a stimulus directed at animals that may involve a risk to health or welfare or that may have an impact on normal function or behavior (i.e., audio broadcasts directed at animals that may affect behavior)." 50 CFR 216.3

- Permit process may be discussed in an implementation section or chapter of the EIS.
- Coordination among researchers is not an issue and does not need to be part of any of the alternatives.

Scope of the EIS

NFS research is built into these alternatives and are almost held hostage to boundaries of SSL research in the alternatives. Can we separate these better in the alternatives? [*EIS project team responds that this is possible*].

- Are we including captive animal research into this EIS? *[EIS project team responds No. Only temporary captivity of animals is considered in this EIS.*][2]

NMML's Role in this EIS

- NMFS needs to provide clarification on who can comment and when so that these comments are put into the record. Conflicting information from Protected Resources in Silver Spring has been confusing as to NMML's role in this project and when NMML comments can or should be made.
- Why should we provide comments for the record and what should be our approach in submitting these comments? Should we provide a joint letter from researchers or individual letters?
- *[EIS team notes that under NEPA, submitting comments does not equate to voting.]* [3]

Cooperating Agencies

- Are there any cooperating agencies for this project? EIS project team responds No, there are no cooperating agencies.
- The Alaska Sea Otter and Steller Sea Lion Commission (TASSC) has asked NMFS PR1 for cooperating agency status but has not yet received a response.
- There are existing Co-Management Agreements with St. Paul and St. George in the Pribilof Islands; due to these agreements, these tribes should be considered for cooperating agency status.

Range and Structure of Alternatives

- Flexibility needs to be built into this EIS. It will be hard to predict future techniques to be used in research.

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[2] At this time, NMFS is processing permits for research on permanently captive ESA-listed marine mammals under Environmental Assessments and does not anticipate the need for an EIS to evaluate the environmental impacts of that type of activity. Since these animals are not intended to be returned to the wild, we have determined the impacts to be limited to the animals that are the subject of the permit, with the action area limited to the facility in which the animals are held.

[3] To further clarify, the EIS project team adds: As a researcher or interested member of the public, NMML staff are welcome to submit individual letters during public scoping expressing their personal concerns, making clear they are personal concerns and do not necessarily reflect the views of the agency. However, the appropriate forum for NMML staff to submit comments as part of the agency will be during the internal NMFS review process.

- The current structure of the alternatives may not be the best because it focuses on the impact to the individual (refer to attached diagram provided by NMML).
- The structure of alternatives mixes levels of impacts in an unnecessary way (impacts individuals vs. population). Using the priorities listed in the Recovery or conservation Plans is not the best structure because they do not translate (as implied by current structure) into level of impact.
- Can or should we add an Alternative 6 that would mean only money and statutes were binding the amount and nature of potential research?
- The Status Quo Alternative (4) should actually be placed before Alternative 3 on the continuum (see new table provided by NMML) as Alternative 3 includes more research than is currently conducted under status quo.
- *[The EIS project team notes that in a NEPA setting we must look at the full range of alternatives including no action, reduced take, status quo and increased take. The analysis of impacts AND how the alternatives meet mandates, will be provided in Chapter 4.]*
- Can we use the alternative titles proposed in the table provided by NMML? (see attached handout in Appendix C).
- *[The EIS project team responded that they recognize that the current alternative titles could be better phrased and will continue to work on re-titling the alternatives for the Draft EIS based on comments from all of the Focus Group Meetings.*]
- Alternative 1 should be called 'No Action Moratorium' or 'No Action Phased Out Research'.
- The Recommended Research Program (refer to NMML handout attached) means what is recommended in the SSL and NFS Recovery and Conservation Plans. Status quo is currently at the low end of permitted activities because of budget and does not necessarily represent where we should be for research. The SSL and NFS Recovery and Conservation Plans provide a 'Recommended Research Program' which we should have as an alternative.
- Some examples for Recommended Research include intentional lethal take - collection of moribund individuals.
- There are existing permits for intentional lethal take of California sea lions (moribund individuals) to look at disease screening etc. This should be allowed for SSL and NFS.
- Researchers also need the ability to continue proposed research despite other projects that have already reached the level of take due to incidental mortality. This is a challenge under the status quo that should be changed.
- Beyond the issues raised in the lawsuit, NMFS must do a good job at considering alternatives that are appropriate. For example, if someone wants to develop a new technique, statutory criteria requires researchers to determine if it is going to adversely impact the population or the species and requires it be conducted in the most humane way possible.

Discussion of Alternative Matrix

- Scat collection should be a separate row.

- The current alternative matrix is a little vague. We need another table to show specifically what types of activities fall under the major row headings in the current matrix.
- In the alternative tables, instrument attachment and insertion should be broken out separately into external versus internal.
- Some things are missing from the table that are not listed in the SSL Recovery or NFS Conservation Plans such as 'basic' research conducted by some of the university researchers (e.g., analysis of biomechanics or hearing). The current structure of the table misses these types of activities because it does not include activities that may not be listed as priorities in the Plans (e.g., Priorities 1, 2, 3 or otherwise).

SSL Recovery Plan and NFS Conservation Plan Research Priorities

(This discussion relates to the priorities identified in the species' plans listed in the implementation schedule of each of those plans; see handouts in Appendix A).

- Priority 3 issues (identified in the SSL Recovery Plan and NFS Conservation Plan) need to be stated in Alternatives 4 and 5.
- Wording is critical as far as how these alternatives are compiled. The alternative titles imply Priority 2 has higher level of impact.
- Differentiating the alternatives according to research priorities listed in the Recovery and Conservation Plans may not be best approach because it may not relate, as it implies, to level of impact.
- Alternatives 2 and 3 don't cut it for accomplishing or meeting Priority 1 and 2 goals outlined in the SSL Recovery and NFS Conservation Plans.
- Under ESA – Priorities 1, 2 and 3 are necessary for the recovery of the species. Alternatives 2 and 3 should include Priority 3 activities but varied among the alternatives according to the specific activities chosen to address those priorities

Preferred Alternative

- Alternative 5 would be the researcher's choice but it is at the extreme end so it is hard to argue for. How is the preferred alternative chosen for the Final EIS?
- [*The EIS project team responded that the preferred alternative can be chosen from those presented as-is in the document or it can be a mix and match of components from all the alternatives if the agency chooses.*]

Status of New Permits/ Vacated Permits

- Will researchers have to re-apply for new permits next summer? We are hoping that when the EIS is complete, permits that were vacated by the court could be re-instated.
- Another researcher responded that NMFS PR1 has indicated that researchers need to be prepared to write new proposals to be submitted in spring 2007; permits that were vacated would not be re-instated as-is.][4]

[4] Note that anyone who wants a permit or amendment to a valid permit (as in not vacated or expired) or LOC under the GA will need to submit an application. NMFS will notify all researchers of the deadline by which applications must be submitted for research proposed for summer 2007. Anyone who currently has a valid permit or LOC and does not require changes (such as wanting an extension of the expiration date, changes in research methods, a new permit to replace an expiring one, etc.) does not need to submit an application to continue work under that valid permit or LOC. All research that has been permitted on these species, including that vacated by the court order or revoked pursuant to an enforcement settlement

Institutional Animal Care and Use Committee and Animal Welfare Act

- Institutional Animal Care and Use Committee (IACUC) and Animal Welfare Act (AWA) related issues should be kept separate from this EIS. The nexus between these laws and NMFS permits needs to be clarified.
- Alternative 3 – A centralized IACUC is very dangerous – particularly for private groups because this may result in conflicting direction between the NMFS IACUC and private institutions' IACUC.
- Is there a way to simplify the agency's review process by accepting an IACUC review by another organization if there is such a group? Otherwise a proposal could undergo an IACUC review from the agency if there wasn't already such a review.
- Different funding cycles specific to private or university groups may be problematic if there is a centralized IACUC.

Impact Analyses and Criteria

- Missing in the table are the criteria for each of the actions or tools. What is the impact of each of these tools?
- [*The EIS project team responded that significance criteria and the results of the analyses will be presented in Chapter 4 of the EIS. We will need some assistance from the research community and others in determining the criteria for the analyses.*]
- Potential Biological Removal (PBR) should not be used to analyze these alternatives; we need to discuss this in the EIS. The EIS needs to explain what PBR is and how it should be used. PBR has been misinterpreted by the Humane Society of the United States (HSUS) in their lawsuit.
- PBR in an endangered stock is the number below which you will NOT retard recovery to a certain extent. This equals 0.006 of the population for SSL.
- [*The EIS project team responded that they are attempting to develop some kind of metric to measure impacts related to mortality.*]
- A good threshold to use in analysis for SSL is 3% of N_{min}. This is the threshold below which you would expect the population to recover. NMML will provide the EIS project team with a paper and other information on this topic.
- [*The EIS project team stated that we have to analyze cumulative impacts in this EIS so we need a metric or way of analyzing cumulative impact that includes incidental mortality as well as sub-lethal effects.*]

New Techniques and Future Research

- It will be very important to address the development of new techniques in the EIS. For example, a permit for an experimental technique could require controlled validation to test its effectiveness. It's important to include this issue because

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agreement, and any research proposed in applications, including those that were returned, is being included for analysis in the EIS. Further, URS has conducted interviews with researchers to get information on the types of research they are doing or would like to do. This also will be included for analysis in the EIS. If researchers anticipate wanting to do things not already permitted or requested in applications submitted to NMFS, they need to let URS or NMFS know immediately. Researchers also need to provide URS with complete information to ensure the analysis in the EIS and related section 7 documents will cover the activities for which they need a permit.

some techniques may, in the long term, reduce impact on species and stocks because the new technique may provide more valuable or better information on the species resulting in less impact to many animals.

- Criteria under the MMPA should be the basis for new technique development or permitted research activities in the EIS.
- The 'developmental category' for research can be very broad; the EIS project team should take caution as to how this is defined such as with the use of new drugs by vets and how they can be tested.
- Where will the EIS analyze new techniques researchers had proposed in amendments to permits (vacated or not) that were submitted to PR1 before the lawsuit?[5]
- These proposed amendments should be included in the Status Quo alternative analysis.

[5] The EIS will include a discussion and analysis of all of the research techniques proposed in applications received for permits, including those that were pending at the time of the court order and those described by researchers during the interviews with URS.

NON-GOVERNMENTAL ORGANIZATIONS AND OTHER AGENCIES FOCUS GROUP MEETING – SILVER SPRING, MD (AUGUST 3, 2006)

Meeting Participants (please see sign-in sheet in Appendix B): Serda Ozbenian, Jennifer Gannett, Sharon Young, Steve MacLean, Mike Gosliner, Steve Leathery, John Hansel, Andrew Wright*, Tammy Adams*, Ann Garrett*, Mike Payne*, Jon Isaacs*, Anne Southam*
* Indicates EIS Project Team

General Comments on the EIS

- NMFS should not treat northern fur seals with less precaution than Steller sea lions in the EIS because of the similarity in the concerns regarding potential research impacts and the status of the population. The structure of an alternative could be different for the two species within the same alternative.
- What if Congress allocates money to a specific activity or entity that is not covered in the EIS?
- [*The EIS project team responded that a supplemental EIS on that money may be necessary in this case. Congress could also possibly exempt that money from NEPA. We will address this issue somehow in the EIS.*]
- As far as administration of the program (i.e., permit process), what do we need to know in this EIS to be able to sign off on permits in the future?
- What about consequences of exceeding takes? Will this be addressed in the EIS?
- What are the legal risks for not issuing permits for certain research activities? In other words, is there a danger in not issuing a permit and then getting sued because someone interprets MMPA and ESA differently? How will NMFS deal with this? What about the issue of treating northern right whales differently than SSL or NFS? Will this be a problem?

Range and Structure of Alternatives

- The titles for Alternatives 2 and 3 indicate that we understand the level of effect. Should we talk about the criteria we'll use to analyze the alternatives? When do we do this?
- What is appropriate as a formal tool in an alternative and what is more appropriate as part of implementation of the alternative?
- [*The EIS project team notes that the titles of the alternatives are intended to convey a range of level of precaution.*]
- The terminology used for the alternative titles should be evaluated because they are somewhat suggestive.
- The MMC staff find the current alternatives confusing. There may be better ways to package or bundle this so the tools in the alternatives can be mixed and matched. It is good to hear that mixing and matching is a possibility.
- Will there be another opportunity to comment on the potential mix and match alternative?
- [*The EIS project team responded that right now, another review of draft alternatives before the Draft EIS is released is not built into our schedule. The current schedule considers getting researchers out next summer (2007) which is very aggressive.*]

- Can there be two preferred alternatives because this involves both SSL and NFS?
- [*The project team responded that the preferred alternative could be a mix and match alternative of components in other alternatives.*]
- Is there a way to quantify these alternatives in terms of something like PBR? In terms of thresholds instead; using the thresholds to drive the alternative philosophy for example?
- With regard to NFS research, you should pay particular attention to frequency and intensity across research alternatives.
- What about the idea of some kind of cap, not only for take but other activities? So for example, research to be approved would have to fit under this cap.
- This brings up allocation issues. Who is going to get their allocation, and who is not? What are your caps based on? Localized areas, population level, sub-population level?
- Cap concept is a derivative of the cumulative impact concept under NEPA. This is going to be an issue under these alternatives.
- What kind of caps are you talking about?
- [*The EIS project team responded that they were referring to caps on permitted levels of activities.*]
- We have concerns over the use of Section 7 within the alternative framework.

<u>New Techniques and Future Activities</u>

- We need to build in enough flexibility into this EIS because of how variable future funding and level of activities may be.
- [*The EIS project team stated that under at least one of the alternatives new techniques could be permitted on either a surrogate species or different stock.*]
- With regard to the concept of using more intrusive techniques to gather more valuable information, isn't this covered under the current amendment process?
- In the lawsuit, the issue was that new techniques were just approved without a very good assessment of what their effects would be. We need to bring this issue out into the public arena as far as evaluating new techniques that may be used.
- [*The EIS project team stated that our intent is to try to deal with this in the EIS. There would be stipulations for future research.*]

<u>Species Recovery Coordination Team (SRCT)</u>

- The idea of a Species Recovery Coordination Team (SRCT) needs to be inclusive of people outside the permit process (in other words, not permittees). A representative from the conservation community needs to be on this team.
- What is the function of the SRCT? Would this team be responsible for reviewing permits from an independent review process? Or is this group made up of the researchers themselves?
- A CIE review could help provide some independent perspectives on research activities. However, coordination among the researchers themselves is also critical.
- Should this SRCT be part of the NEPA process? Should this be part of the alternatives?
- Does the SRCT get at the effects of research? It does address the lawsuit concerns but how does it evaluate effects of research?

SSL Recovery Plan and NFS Conservation Plan Research Priorities

(This discussion relates to the priorities identified in the species' plans listed in the implementation schedule of each of those plans; see handouts in Appendix A).

- We are concerned that the tool categories presented in the alternatives may be putting barriers around your alternatives. By setting up the alternatives based on Priorities listed in the Recovery and Conservation Plans, are we allowing enough flexibility? Should we reconsider the use of the 'priorities' as the structure for the alternatives?

Impact Analyses and Criteria

- [*The EIS project team stated that we will need feedback on the criteria we use for analyzing the alternatives when we finalize the alternatives.*]
- Is there going to be a look at the effects of research?
- [*The* EIS project team *responded that our definition of affect may be different. In other words, impact on individuals is very important in addition to impact on populations.*]
- Sub-lethal or delayed effects are an important issue and should be addressed in the EIS.
- Criteria used to evaluate alternatives must be stated up front.
- If research follows the Recovery or Conservation Plans, we would assume there could be cumulative positive effects as well, not just negative.
- Could we adapt the Section 7 approach to risk analysis to evaluate the alternatives?
- Yes, but Section 7 Consultation would not provide a definitive answer for each separate activity or alternative, only the preferred alternative.
- Numbers need to be tied to spatial and temporal distribution as well as the actual activity.
- These numbers, as a ratio or percentage of population, must also take the baseline into account. In other words, whether the population is in a decline or an increase.
- We are concerned with how the evaluation of sample size was evaluated for marking (e.g., branding). How was sample size determined?
- Jeopardy is established by the status of the species AND the environment in which they live in. This evaluation is more of a qualitative approach but addresses sub-lethal effects whereas metrics such as PBR only look at lethal effects.
- One of the concerns is that we don't have a good understanding of what is going on after researchers leave or finish their activities. There is a minimal amount of monitoring the effects of research. Not all of the research has been sufficiently reviewed to determine whether the impacts were necessary to achieve the research goals.
- There are some different standards being applied by the agency now. For example, there are PBRs for NFS and western SSL but there is no PBR for northern right whales.
- What level of detail will the alternatives go in to in the EIS? For example, are things like hot branding part of the alternatives? Or are they used as criteria for defining what is humane or not, etc.?

NORTH PACIFIC RESEARCH BOARD (NPRB) AND NORTH PACIFIC FISHERIES MANAGEMENT COUNCIL FOCUS GROUP MEETING – ANCHORAGE, AK (AUGUST 10, 2006)

Meeting Participants (please see sign-in sheet in Appendix B): Diana Evans, Bill Wilson, Clarence Pautzke, Steve Davis, Ann Garrett*, Tammy Adams*, Mike Payne*, Anne Southam*, Rich Kleinleder*, Jon Isaacs*
* Indicates EIS Project Team

General Comments on the EIS

- NPRB will be making decisions about funding new marine mammal research in April 2007. Is this schedule possible given this EIS?
- [*The EIS project team responded that PR1 is planning discussions with researchers about the type of information that will need to be included in their new proposals so as to cover potential new activities.*]
- Can the NPRB put an advisory note in request for proposals (RFPs) for upcoming research on marine mammals to alert researchers that work on SSL or NFS may have to wait until after the permits are approved after the ROD is issued in 2007?
- What time period will this EIS cover?
- [*The EIS project team responded that we hope that it will cover permits for up to ten years. We are trying to build flexibility into this document by including future research activities.*]
- Is there a statement summarizing the types of research being done and why? Is this in the SSL Recovery Plan?
- Who will be issuing the ROD?
- [*The EIS project team responded Dr. Bill Hogarth is the agency official who signs the ROD. There will be a 30-day cooling off period after the ROD is issued before any permits can be issued.*]
- [*Section 7 Consultation would begin with the PDEIS in October 2006 (tentatively).*]
- Will the vacated permits be re-instated after the ROD?
- [*That would be up to the Court to re-authorize those permits. It may be faster to just begin a new permit process by submitting a new application. .*][6]
- [*The EIS project team noted that researchers who want permits as quickly as possible after the ROD is signed are advised to follow the EIS process and look at the alternatives so they are aware of any necessary changes to their proposals before applying for new permits.*]
- How is this NEPA process linked to the existing northern right whale research?
- [*The EIS project team responded that there is a separate EIS for northern right whales that is currently underway by PR1.*]

Purpose and Need

[6] In addition, a new permit application gives researchers the opportunity to make changes to their activities as needed since they were first issued in 2002 or 2005, whereas a court order likely would not.

- Is there a Purpose and Need (P&N) statement for the EIS? The P&N should focus on the status of the species and the regulatory context. The P&N needs to be succinct but followed by a section that summarizes the important issues or questions that will be analyzed later in the document.
- *[The EIS project team responded that the Notice of Intent (NOI) stated the P&N which included the regulatory context and why these species must be studied.*]
- This EIS could take the opportunity of providing a clear outline of what it is we are doing by all this research and the millions of dollars at stake if we do not do this research (i.e., commercial fishing). If we did not have certain kinds of data, the Council could/ would have to be more conservative in fisheries management. There is a high cost associated with funding research programs not only related to better understanding the species to promote recovery but to also allow other actions to continue such as commercial fishing.
- Is it appropriate in this EIS that one of the needs is that research must be done so that other activities such as commercial fishing can continue?
- SSL data are currently being used to refine management measures in the Council process and if we didn't have information about these species from the current research, we would not have as much knowledge about them to properly manage commercial fishing. There are conservation issues that certain research needs to address. This context needs to be placed up front in the EIS document.

<u>Range and Structure of Alternatives</u>

- Will you be identifying a preferred alternative in the DEIS?
- [*The EIS project team responded that this has not been determined.*]
- You may want to do so in order to avoid getting comments on alternatives that are not likely to be chosen as a preferred alternative.
- Do not forget about the grant process in this EIS. Under the No Action Alternative, grants that do not require permits could be issued.
- Will the permit process be included in the EIS alternatives?
- There is value of having a discussion of proposed changes to the permit process so the public would understand the potential implications of these changes on the permit process.
- A Center for Independent Expert (CIE) review of a research techniques manual should be under all alternatives (i.e., an element common to all alternatives).
- Should this be an option in an alternative at all? Or should it be part of implementation?

<u>SSL Recovery Plan and NFS Conservation Plan Research Priorities</u>

(This discussion relates to the priorities identified in the species' plans listed in the implementation schedule of each of those plans; see handouts in Appendix A).

- Recently, the comment period on the 2006 Draft SSL Recovery Plan was extended until September 1, 2006. What if the SSL Recovery Plan has major changes before we finalize this EIS? Is it a good idea to tie the alternatives so heavily to the Conservation and Recovery Plans?
- [The EIS project team responded that this is not likely to be an issue. Whether you use the existing Recovery or Conservation Plans or the new draft Plans, we're focusing on research techniques in this EIS more than anything.]

- Using the Recovery and Conservation Plan Priorities (listed in the implementation schedules of the Plans) in the alternatives is confusing. It may be better to use different descriptions.

Impact Analyses and Criteria

- A question was raised about 'humane methods' used in research.
- [*There is a statutory requirement related to 'humaneness' which requires researchers to justify their research techniques by explaining why available techniques that would result in less pain, stress or suffering would not fulfill the study objective.*]
- Where in the EIS will you discuss issues such as 'fluorescent paint is less effective than hot branding' for marking because of 'said' reasons for meeting specific research needs?
- Could the EIS discuss the range of techniques used to answer the same research questions and in this discussion provide information on the advantages and disadvantages of these research techniques (e.g., similar to the QA papers (Appendix F) in the Alaska Groundfish PSEIS).
- [*The EIS could expand Appendix E of the SSL Permit EA to include a discussion on the 'effectiveness' of research techniques.*]
- [*Under MMPA, the burden is on the applicant to justify techniques chosen for research.*]
- What metrics will be used for analysis?
- [*The EIS project team stated that Potential Biological Removal (PBR) or the total number of animals that die from research is only one element of our cumulative effects analysis. We continue to develop our methodology for analysis.*]
- One key element to your evaluation criteria should tie all this to the P&N and why we're doing research. Tie results of your alternatives analysis to the overarching scientific questions that are driving the research.
- Should we base the alternatives on the research activities themselves and how those activities meet the needs of the major research questions?

NATIVE TRIBES AND ORGANIZATIONS FOCUS GROUP MEETING – ANCHORAGE, AK (AUGUST 10, 2006)

Meeting Participants (please see attached sign-in sheet in Appendix B): Don Bremner, Monica Riedel, Karen Pletnikoff, Steve MacLean, Margaret Williams, Lianna Jack, Peggy Osterbeck, Mike Miller, Max Malavansky, Andy Malavansky, Mike Payne*, Tammy Adams*, Ann Garrett*, Jon Isaacs*, Steve Davis, Taylor Brelsford*, Anne Southam*, Rich Kleinleder*
* Indicates EIS Project Team

General Comments on the EIS

- We are concerned that the permitting requirements might trickle down to the Native community resulting in Native subsistence harvest requiring some kind of permit. This should not be a result of this EIS.
- [*The EIS project team assured the group that it is not NMFS intent in the EIS to institute permit requirements for subsistence activities. The EIS is solely about research.*]
- [*The EIS project team asked are there different research questions that should be asked than are currently being addressed by research today? Are there different techniques that could be used to answer new questions or questions that are already on the table regarding SSL or NFS?*]
- Why are NFS in this EIS?
- *[The EIS project team responded that the dramatic decline in the NFS population raises similar questions to the SSL decline and research techniques used are similar between the species. The agency is trying to be proactive by including NFS in this EIS.*]
- Has something changed in the level of funding to make us think that the NFS Conservation Plan would be implemented when there is currently not much funding? Are we bogging down the EIS process by including NFS?
- [*The EIS project team responded that including NFS in this EIS is an attempt by the agency to avoid future lawsuits and provide more flexibility for future research should more funding become available.*]
- Has the Native community considered an exception for their research under the MMPA?
- Yes, this has been considered but it has not been done.
- This might be a good approach to think about for future research activities that could separate Native research activities from other research.
- The Native community is interested in better education and outreach with NMFS over the long-term.
- A techniques manual could be useful for determining a reasonable sample size for requested activities. It could help bring the requested number of permitted takes and the actual number of takes closer together.
- Natives are in a paradox in that we are brought to the table because of this lawsuit which was based on incorrect information. If this is really about the science of survival of the species, anything below Alternative 4 does not address the decline of the species. We should not have a loss of customary and traditional rights as a

result of this lawsuit. Native concerns and perspectives were missing in the court order.

- Who drafted the NFS Conservation Plan?
- The Pribilof Islands have been very involved in developing the NFS Conservation Plan. NMFS works very closely with these communities on NFS research. There are other research groups that study the animals that do not coordinate very much with the communities. Max and Andy are leaders for coordination on NFS research for the St. George Tribe. Aquilina Lestenkoff is the leader for coordination on NFS research for the St. Paul Tribe.
- The EIS must be readable and digestible for all readers.

<u>Project Schedule</u>

- How will this project schedule affect the research schedule? And how will it affect other entities such as NPRB or other groups that might fund research?
- [*The EIS project team responded that NMFS has been coordinating with the research community to make sure future activities are covered in this EIS.*]
- Perhaps groups such as NPRB could 'condition' their RFPs such that proposed research on NFS or SSL would be 'on hold' until the ROD is issued.
- What is the probability that the NMFS PR1 office will be able to actually process all of these permits given this aggressive schedule in trying to get researchers out in the field next summer? Is this realistic?

<u>Range and Structure of Alternatives</u>

- What about an Alternative 6 that encourages more collaboration with the Native community by incorporating Traditional Knowledge (TK) in research more than is portrayed in the current alternatives? These alternatives seem to focus on Western science.
- Could we incorporate local TK as part of research activities in the alternatives rather than in a stand alone alternative?
- Incidental take by commercial fisheries should also be in these alternatives similar to the way subsistence harvest is accounted for (e.g., with regard to using tissue samples from subsistence harvest for research).
- The southeast Alaska populations, especially for SSL, should be treated differently in the alternatives.
- There are some things that need to be common across alternatives such as incorporating TK. Tissue collection using subsistence harvested animals should be common across alternatives.
- What other types of Native activities can be common across alternatives?
- We really need to have Native activities defined well in the EIS alternatives. From a Native perspective, English words that refer to specific activities in the lawsuit do not adequately capture the Native perspective. It is important to make sure the Native perspective is captured in the EIS.
- The use of Priorities from the Recovery and Conservation Plans is not logical when considering intrusiveness; some Priority 3 activities are less intrusive than some Priority 2 activities. The Priorities listed in the Plans also seem to be oriented towards level of funding and the value of the information obtained for the level of funding granted.

- By naming these alternatives 'Minimal Impact' and 'Reduced Impact' you are pre-supposing the impact of these alternatives.
- [*The EIS project team responded that the names of the alternatives are going to be changed in recognition of this.*]
- We need to add more description of the types of activities that will be allowed under each alternative.
- There are no choices in choosing Alternatives 1, 2, or 3.
- Researchers can only do what is funded. Funding is a critical element of all these alternatives which is why it is important to analyze the full range of alternatives.

Impact Analyses and Criteria

- What is more likely and less likely to have an impact on residents and subsistence harvesters? Slight impacts that end up having a cumulative effect should be an important part of this analysis.

Coordination and Interaction with Native and Rural Communities/ Co-Management Agreements

- Not everyone has the same opportunity under co-management agreements. In other words, not every tribe has a co-management agreement to facilitate collaboration and coordination. The co-management agreements do not take into account community involvement on a broader level, or those communities that do not have such agreements.
- Could samples taken from subsistence harvested animals be covered under the University of Alaska (UAF) Alaska Marine Mammal Tissue Archival Project? This is currently being done under the UAF Archival Project.
- [*The EIS project team noted that this kind of coordination with UAF is not in the control of the PR1 Office. It is up to of each of the researchers to work with Native communities to get samples from subsistence harvested animals..*]
- Does the UAF archival program qualify under this research permit program?
- [*The UAF archival program permit is not a part of the EIS because that permit does not involve authorizing "takes" of live animals. The continuation of that project is not dependent on the EIS*].
- St. George does require a Memorandum of Agreement (MOA) with researchers they work with currently.
- The Aleut Marine Mammal Commission (AMMC) Sentinel Program trains observers for harbor seal research out in the Aleutians. This kind of program could be used for SSL and NFS research.
- Native groups from different parts of the country have different techniques or approaches. A single "representative" on the SRCT could not speak for all Native communities.
- Emphasize what is already in place for harbor seals in cooperation with ADF&G using the Sentinel Program. Could this be used for SSL and NFS research?
- The biosampling program for harbor seals has been in place for many years now.
- The EIS should place emphasis on analyzing potential social impacts; cross cultural impacts to the Native community.
- The AMMC Sentinel Program for monitoring species could be used as a model for monitoring effects of research under alternatives in this EIS.

- The Harbor Seal Commission is funded by NMFS and is made up of a collaborative group of researchers including UAS, ASLC, AMMC, and others. There are a total of 35 research projects on harbor seals and 2 of them involving Alaska Natives were rated among the best of these 35 programs. Under this program, this collaborative group comes together once a year to review the research in light of the Co-Management Plan for harbor seals.
- Does this kind of collaboration occur under the Co-Management Agreements for NFS?
- No formal group has been formed yet and no NFS Co-Management Agreement Research Plan has been developed.
- Coordination with the Native community should fall under the permit and grant process. Perhaps any involvement with a Native community where research occurs or that could be affected by a research program would require a permit or authorization from that community?
- Isn't this already built into the Co-Management Agreements and the by-laws that implement this agreement?
- Co-Management Agreements work very well for those communities that have them. What about those communities that do not have those types of agreements? Can we apply the structure of a Co-Management Agreement to other communities that could be affected by these research projects?
- A protocol for interacting with rural communities should be developed and used as a standard by researchers. This protocol would include how much lead-time to give the community and a description of what activities they will be doing there rather than just showing up, permit in had, stating what they will be doing as often happens now.
- The National Science Foundation funded an effort in 1994-1995 called 'A Compilation and Summary of Ethical Principles for Arctic Research' that could be used as a model for developing protocols for informing local tribes and organizations on SSL and NFS research.
- AMMC is in the process of finalizing Co-Management Agreements with NMFS on SSL and other species. Research Plans are part of this draft agreement. What we have found is that other entities want to come out and do research. In some cases we have already started doing this.
- Local communities and organizations need to be informed as to what research is already taking place in Alaska on marine mammals and to let these communities know when researchers are coming in.
- The SRCT could also be used as a research 'clearing house' that could help inform rural Alaskan communities as to what research is being prioritized and when their communities may be affected in an attempt to avoid duplication and facilitate communication among communities and researchers.
- Upfront involvement and communication with the Native community is encouraged. The judge that ruled on the SSL permits did not understand the Native perspective when this ruling was made. Cross cultural education must be part of these alternatives so that the Native perspective is captured up front rather than after the fact. We should include research activities that incorporate Native TK. The Native perspective has to be part of the social impact analysis in Chapter

4 of the EIS and alternatives should protect Native customary and traditional uses which must be clearly presented. There must be Native representatives on the SRCT as part of the up front process. There should be no presupposing of findings and impacts as are indicated in the current titles of the alternatives. We cannot let 'outsiders' define our rights and our environment.

APPENDIX A
MEETING POWER POINT AND HANDOUTS

SSL NFS Research EIS Focus Group Meetings
Summary Report
August 2006

Agenda
Steller Sea Lion and Northern Fur Seal Research EIS
Focus Group Meeting

I. Introduction
   a. Purpose of the Focus Group Meeting
   b. Project Background
      i. Purpose and Need of the EIS
      ii. Legal Requirements and Setting: Status of the HSUS Lawsuit and Implications for the EIS
      iii. Overall Project Schedule
   c. Ground Rules
II. Draft Alternatives
   a. Presentation of Alternative Approaches and Philosophy
   b. Review of Alternative Tables
   c. Discussion
III. BREAK
IV. Continued Discussion on Alternative Tables
V. Wrap Up
   a. Follow-Up to this Meeting (Minutes)
   b. Schedule for Additional Focus Group Meetings
   c. Next Steps

Environmental Impact Statement on Steller Sea Lion and Northern Fur Seal Research

Focus Group Meeting
Seattle, WA
July 24, 2006

Office of Protected Resources
NOAA Fisheries

Welcome and Introduction

Moderator:
Jon Isaacs, URS

July 2006 Steller Sea Lion & Northern Fur Seal EIS 2

Welcome and Introduction

Focus Group Agenda

- Introductions
- Meeting Purpose
- Background on NEPA Process
- Legal Requirements and Setting
- Proposed Project Schedule and Implications
- Discussion Ground Rules
- Discussion of Alternatives
- Next Steps in the Process

July 2006 Steller Sea Lion & Northern Fur Seal EIS 3

Welcome and Introduction

Focus Group Locations

- July 24 – SSL and NFS Researchers -Seattle, Washington
- Early August – NGO's, Governmental Agencies - Silver Spring, Maryland
- Mid-August – Alaska Native Groups, North Pacific Fishery Management Council -Anchorage, Alaska

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Welcome and Introduction

Focus Group Meeting Purpose

- Present the NEPA and Legal Context of Construction of Research Alternatives
- Present the Alternative Framework and Range of Alternatives to Stake Holder Groups
- Get Feedback and Suggestions Regarding Finalizing Alternatives for Analysis in the DEIS

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The NEPA Process

Intent of a Programmatic EIS

- NEPA compliance for federal programs during initiation or re-evaluation
- Tiered document to simplify, for reference by, NEPA compliance
- Broad look at issues and alternatives
- Policy guidance for future management actions

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The NEPA Process

Intent of the SSL/NFS Research EIS

- Comply with NEPA
- Address the Issues Raised in the HSUS Lawsuit and Subsequent Court Ruling
- Facilitate NEPA Compliance for Research Grants and Permits
- Prepare a Thorough and Legally Defensible EIS that can Allow Research Next Year

NEPA DOES NOT: Dictate the decision to be made by NMFS.

The NEPA Process

Purpose and Need of the Proposed Action

- Why the Agency is Proposing a Specific Action
- Purpose and Need should have a Basis in Statutory Mandates and Regulatory Requirements
- Purpose and Need should be Clear and Convincing
- The Range of Alternatives Considered must meet the Purpose and Need

The NEPA Process

What is the Purpose of this Proposed Action?

- NMFS awards grants to assist in funding of activities identified by Congress or NMFS as important for management of protected species
- Purpose of issuing permits is to provide an exemption to MMPA and ESA prohibitions on "takes" for conduct of bona fide scientific research and enhancement activities

The NEPA Process

What is the Need for this Proposed Action?

- Facilitate research needed to identify, evaluate or resolve conservation problems for the species
- Information from authorized research is needed by NMFS to:
  - Prevent harm and avoid jeopardy or disadvantage to the species
  - Promote recovery
  - Identify natural and anthropogenic factors limiting the populations or stocks
  - Identify reasonable actions to minimize impacts of human activities
  - Implement conservation and management measures

The NEPA Process

Legal Requirements and Setting

- The EIS must comply with NEPA
  - NEPA requires that an EIS evaluate a reasonable range of alternatives that meet the purpose and need
- The EIS must relate to Fulfilling Statutory Mandates re: Recovery and Conservation Plans
- The EIS must address the issues raised during scoping
- The EIS must be cognizant of the issues raised in the HSUS lawsuit and the court ruling

The NEPA Process

Legal Requirements and Setting

- The EIS must be cognizant of the issues raised in the **HSUS lawsuit** and the court ruling
  - NMFS inappropriately dismissed alternatives
  - NMFS did not consider full spectrum of alternatives
  - NMFS failed to consider alternatives to the research methodologies that were being evaluated
  - NMFS did not show evidence of coordinating research and results so as to minimize the effects of research

The NEPA Process

Legal Requirements and Setting

- The EIS must be cognizant of the issues raised in the HSUS lawsuit and the **court ruling**
  - "...the plaintiff's contention that the defendants failed to give adequate consideration to potential alternatives to the proposed research appears to provide further justification for a remand."
  - "... a temporary moratorium on all Steller Sea Lion Research was not considered further...in the EA
  - "...the option of authorizing only non-intrusive research was similarly summarily rejected..."
  - "Since NMFS will have to prepare an EIS, it will have opportunity to consider, among other things, ... available alternatives to the proposed research activities."

The NEPA Process

Proposed Project Schedule

- Finalize Alternatives – end of August 2006
- Preliminary Draft EIS – end of October 2006
- Release Draft EIS – December 2006
- Public comment period for Draft EIS – January 2007
- Prepare Final EIS – March 2007
- ROD, estimated completion – May 2007

Alternatives Discussion

Discussion Ground Rules

- Patience
  - we are all working towards a defensible yet expeditious EIS
- Constructive comments and solutions
  - Everyone here has expertise and knowledge
- No accusations or personal attacks
- Be aware of time limits
  - We have limited time today, be as concise as possible and avoid debates
  - I will limit unproductive comments

Alternatives Discussion

Alternatives Approach and Philosophy

- Alaska Groundfish Management EIS provides model for complex policy-based alternative structure
- Preferred Alternative may not be identified until after DEIS comment period, "Mix and Match" from all alternatives
- Range of alternatives must anticipate multi-year permits and research that might be proposed
- Covering the range of potential activities under alternatives is intended to make future NEPA compliance more routine

Alternatives Discussion

Alternatives Carried Forward for Analysis

- Alternative 1 – No Action: No New Permits or Amendments
- Alternative 2 – Minimal Impact Approach: Priority 1 Research Only
- Alternative 3 – Reduced Impact Approach: Priority 1 and 2 Research Only
- Alternative 4 – Status Quo: Existing Research Programs
- Alternative 5 –Expanded Research Approach

Alternatives Discussion

Alternative 1 – No Action: No New Permits or Amendments

- NEPA requirement for analysis, look at consequences of no further action
- Existing permits would run their course, no new amendments, no new permits
- Minimum stock assessment requirements under MMPA and ESA
- Research that does not require take permits could occur

Alternatives Discussion

Alternative 2 – Minimal Impact Approach: Priority 1 Research Only

- Priority 1 Research Only from revised draft SSL recovery plan and NFS conservation plan
- SSL Recovery Plan
  - estimate abundance trends with aerial surveys
  - adaptive management plan for fisheries
- NFS Conservation Plan
  - Population trend, feeding ecology, vital rates, habitat issues
- Aerial Survey and Adaptive Management Emphasis

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Alternatives Discussion

Alternative 3 – Reduced Impact Approach: Priority 1 and 2 Research Only

- Priority 1 and 2 Research Only from revised draft SSL recovery plan and NFS conservation plan
- SSL Recovery Plan (see handouts)
- NFS Conservation Plan (see handouts)
- Aerial Survey and Adaptive Management Emphasis; most of current intrusive research allowed under one permit (per n. right whale)
- Formalized coordination/review processes (SRCT & CIE), overall research plans, and procedures manuals

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Alternatives Discussion

Alternative 4 – Status Quo: Existing Research Programs

- Research activities justified under objectives of revised draft SSL recovery plan and NFS conservation plan
- Pre-court order level of activities, existing approved permits
- Current permit/grant review processes, voluntary coordination, individual research proposals, individual IACUC reviews

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Alternatives Discussion

Alternative 5 –Expanded Research Approach

- Research activities justified under objectives of revised draft SSL recovery plan and NFS conservation plan
- Expand the types of research allowed (sex, age classes), more intrusive research to maximize value of data obtained
- Increase scope and intensity of research on NFS
- Anticipate future research activities over the planning horizon
- Additional features/activities that may require regulatory changes (duration of permits)

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Alternatives Discussion

Review of Alternatives Tables

- What do the Alternatives Contain?
  - Research Activities
  - Permit and Grant Process
  - Oversight and Evaluation
- Variables
  - Levels of take not currently an alternative component: could be held at a maximum acceptable constant, varied by alternative, and/or used as an impact indicator
  - Processes that are linked to determining or reducing impacts could be held constant (rather than variable) for all action alternatives

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Alternatives Discussion

Additional Discussion and Questions

- See tables

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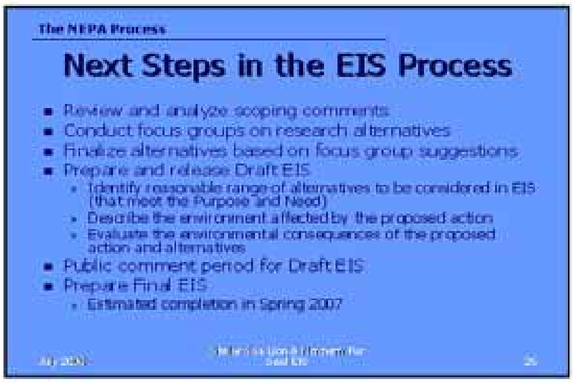
The NEPA Process
Next Steps in the EIS Process
Review and analyze scoping comments
Conduct focus groups on research alternatives
Finalize alternatives based on focus group suggestions
Prepare and release Draft EIS
Identify reasonable range of alternatives to be considered in EIS (that meet the Purpose and Need)
Describe the environment affected by the proposed action
Evaluate the environmental consequences of the proposed action and alternatives
Public comment period for Draft EIS
Prepare Final EIS
Estimated completion in Spring 2007

2.2 Alternatives Carried Forward for Analysis

Five alternatives will be carried forward for analysis of environmental consequences in this EIS. These alternatives represent a reasonable range of research granting and permitting options that fulfill the purpose and need for the federal action as described in Chapter 1. The general policy of each alternative is described below and examples of the specific numbers and kinds of takes permitted under each alternative are listed in Table 2.1.

2.4.1 Alternative 1 - No Action: No New Permits or Amendments

The No Action alternative, which must be considered in an EIS according to CEQ regulations, would only allow research activities on SSLs and NFSs that are currently authorized under existing permits (i.e. those that have not been vacated by the 26 May 2006 court order) until the permits expire (see Section XX for a list and summary of existing permits). No new permits would be issued to replace these permits as they expire, nor would existing permits be amended to allow modifications in research activities, sample sizes, or objectives. Grant monies administered by NMFS that have already been awarded would be allocated according to existing contract stipulations. No new grant applications would be processed to fund research activities on SSL and NFS that require permits.

When the existing permits expire, all research activities that require a permit would have to cease. Any research on SSL or NFS would have to be conducted under conditions that do not require permits. This restriction would prevent most of the recent research activities from continuing but may allow use of remote sensing techniques and scat collection if researchers only landed on vacant haulouts and rookeries. It may also include aerial surveys and behavioral observations conducted at distances and conditions that are not likely to result in takes (and therefore would not require permits). This alternative would therefore allow researchers to monitor the populations and collect information pertinent to their recovery using only techniques that do not disturb the animals. This policy of not issuing new permits, amendments, or grant monies for research related takes would be applicable to both SSL and NFS.

2.4.2 Alternative 2 – Minimal Impact Approach; Priority 1 Research Only

The policy of this alternative would be to issue permits and provide grant support to qualified individuals and institutions to conduct *bona fide* research related to the highest priority recovery actions described in the Draft Revised Recovery Plan for SSL (SSL Plan) and the Draft Revised Conservation Plan for NFS (NFS Plan). To minimize the cumulative impacts on SSL and NFS, no permits would be issued for lower priority research activities. Under this alternative, NMFS would not issue research permits for any activities that did not contribute substantially to the information needs of the highest priority recovery actions as described in their respective plans.

SSL, Western DPS

The SSL Plan identifies 78 substantive actions needed to achieve recovery of the Western DPS but highlights three actions that are especially important:

- Maintain current fishery conservation measures,

- Design and implement an adaptive management program to evaluate fishery conservation measures,
- Continue population monitoring and research on the key threats potentially impeding sea lion recovery.

All recovery actions were prioritized into three categories in the SSL Plan Implementation Schedule (NMFS 2006, pp 157). Priority 1 was defined as "an action that must be taken to prevent extinction or to prevent the species from declining irreversibly in the foreseeable future". Priority 2 was defined as "an action that must be taken to prevent a significant decline in species population/habitat quality or some other significant impact short of extinction". Priority 3 was defined as "all other actions necessary to provide for full recovery of the species". Only two recovery actions received the Priority 1 designation and were described as follows:

1) *Estimate abundance trends for pups and non-pups via aerial surveys*. Conduct surveys biennially at trend sites, and at least every four years at all rookeries and haulouts in the western DPS using aerial survey techniques with medium format photogrammetry, which allows for counting pups as well as non-pups. Information from trend sites forms the basis of the stock assessment reports.
2) *Design and implement an adaptive management program for fisheries, climate change, and predation*. The mechanisms by which different threats affect sea lions can be similar, as are the responses that sea lions exhibit to these different threats. This represents a fundamental difficulty in identifying which threats are impeding recovery and which mitigation measures would be effective. Due to the uncertainty in how fisheries affect Steller sea lions and their habitat, and the difficulty in extrapolating from individual scientific experiments, a properly designed adaptive management program should be implemented. This type of program has the potential to assess the relative impact of commercial fisheries and to better distinguish the impacts of other threats (including killer whale predation). This program will require a robust experimental design with replication at the proper temporal and spatial scales with the appropriate levels of commercial fishing as experimental treatments. It will be a challenge to construct an adaptive management plan that meets the requirements of the ESA, is statistically sufficient, and can be implemented by the commercial fisheries. Acknowledging these hurdles, we must make a significant effort to determine the feasibility of such a program.

The SSL Plan distinguishes between "improvisational approaches to management" and genuine "adaptive management" that develops, in advance, a plan that covers all contingencies, optimizes the trade-offs among experimentation, risk, and action under uncertainty (NMFS 2006, Appendix 3). A key component of an adaptive management plan is that it describes the optimization rationale and management path that will be chosen in response to each possible outcome of the experiments and monitoring, including damage control for the eventuality of experiments with unfavorable outcomes.

The information needs for implementing an adaptive management plan are not clear at this time and would depend greatly on how the effects of the experimental treatments on SSL are measured. Since different treatments would take place in many areas and over many years, the number of different oceanographic and environmental variables that could affect the experiments would be huge. The central issue in developing the adaptive management plan would be to determine how the experimental treatments are evaluated, thereby serving as the basis for adaptive management decisions. One approach would be to monitor and account for all the environmental variables over time and space and attempt to separate the effects of the given experimental treatments from other factors. This would require a wide range of scientific investigations, including intrusive research on SSL to measure their nutritional and physiological responses to different conditions. An alternative approach would be to use population trends as the primary measure of response and not attempt to track all the other variables or physiological responses.

Although the approach taken by the adaptive management plan cannot be determined ahead of time, for the purposes of assessing the effects of research activities in this EIS, it will be assumed in this alternative that the adaptive management plan will only be based on population trend responses. Under this alternative, NMFS will only issue permits and provide grant support for population trend monitoring by aerial surveys (consistent with the other Priority 1 recovery action in the SSL Plan) and Level B disturbance from other non-intrusive research and monitoring activities. This will allow for the analysis of an essentially minimal impact, no intrusive research alternative that is still consistent with the highest priorities of the SSL Plan and NMFS regulatory imperative to conduct regular stock assessments. An adaptive management plan that took the other approach would likely allow essentially the same types and scope of research as is conducted under the status quo conditions and these effects will be analyzed under Alternative 4.

Under this alternative, no permits would be issued or grant funds allocated for research activities on the Western DPS that did not directly support the two priority 1 recovery actions. This means that many of the recent research activities that involved capturing, restraining, sampling, and disturbing Western DPS sea lions on their haulouts and rookeries would not be permitted or funded. This alternative would allow for continued census surveys and behavioral observations that do not have the potential to cause injury to animals. Scat collection would be allowed but only from unoccupied rookeries and haulouts. Tissue samples would be allowed from animals that have been taken legally for subsistence harvest or found dead due to other causes. Observers and remote sensing equipment would need to be placed at times and in such a manner as to minimize disturbing animals, especially at rookeries.

SSL, Eastern DPS

Regarding the Eastern DPS, the SSL Plan recommended the initiation of a status review to consider removing the Eastern DPS from the List of Threatened and Endangered Wildlife. Given the long-term increasing population trend and lack of significant conservation threats, the SSL Plan concludes the primary recovery imperative is to develop a post-delisting monitoring plan to ensure re-listing is not necessary after removal. Key components of this plan relative to research activities have not been prioritized in the SSL Plan but would likely include population trend monitoring, genetics research to refine population structure, monitoring terrestrial habitat threats, monitoring for unusual mortality events that may be related to contaminants or other human factors, and monitoring of fishery management plans to ensure they stay consistent with sea lion requirements.

To be consistent with the minimal impact approach described above for the Western DPS, research permits would be issued and grant funds allocated only for projects that directly related to the post-delisting monitoring plan. Permits and grant funds for intrusive research on Eastern DPS sea lions would be limited to the collection of genetic samples if non-intrusive methods were not available.

NFS
The highest priority conservation actions described in the NFS Plan that contain field research components are the following:

- Monitor and manage subsistence harvest
- Identify and evaluate illegal harvests
- Basic studies on fur seal feeding ecology
- Determine impact of fisheries
- Monitor male and pup abundance at Pribilof Islands
- Estimate pup survival
- Evaluate marking and resighting program
- Study vital rates
- Behavioral/physiological studies
- Comparative studies between Pribilof animals and other islands
- Conduct oceanographic and fishery surveys in relation to essential fur seal habitat
- Reevaluate carrying capacity

Under this alternative, research permits would be issued and grant funds allocated only for projects that directly related to these highest priority recovery actions. Intrusive research activities would be allowed only if they were consistent with the requirements of the MMPA for *bona fide* research, NMFS implementing regulations, and with the Co-management research plans developed with the Pribilof Island Aleut Communities.

2.4.3 Alternative 3 – Reduced Impact Approach; Priority 1 and 2 Research Only

Under this alternative, NMFS would issue permits and provide grant support to qualified individuals and institutions to conduct *bona fide* research activities that are designated as Priority 1 and Priority 2 in the Draft Revised Recovery Plan for SSL and Draft Revised Conservation Plan for NFS. To reduce the number of permitted takes and cumulative impacts on SSL and NFS relative to the baseline conditions, NMFS would take several steps to consolidate and formalize the various review processes that research proposals undergo, improve the coordination and communication between different research groups, and establish standardized procedures for field work.

Under this alternative, NMFS would establish new administrative positions and processes to consolidate and formalize coordination, assessment, and communication of all research activities involving SSL and NFS. These research oversight functions would not replace NMFS Grants Office and Permits Division responsibilities or processes but would be structured to address granting and permitting issues at the same time as they address the scientific value of proposals. These new personnel and formal processes would supply the Grants Office and Permit Divisions with the pertinent information they need about each proposal at the same time. The separate decision-making processes for grants and permits, including NEPA analyses, could therefore take place simultaneously and in consultation with each other.

For the purpose of this EIS alternative, the new research oversight function will be conducted by the "Species Research Coordination Team" (SRCT). The makeup of the SRCT and its physical location would have administrative and budgetary implications beyond the scope of this EIS and would therefore be determined at a later date. However, in order to fulfill the broad scope of duties described in this alternative, the SRCT would probably need to include representatives from NMFS research, grants, and permit offices as well as representatives from other research agencies and institutions, Alaska Native co-management councils, and the Marine Mammal Commission.

For the purposes of this alternative, it is assumed that the SRCT would deliberate on the appropriateness of the proposed research projects with regards to the conservation and management of SSL and NFS and serve as a clearinghouse for information about all aspects of research on these species. SRCT reviews would be conducted at least annually and would be adaptive to the results of previous studies, changing population trends, changing management information needs, and the development of new research methodologies. The SRCT would address questions about the appropriateness of particular proposals pertinent to the granting and permit processes, including but not limited to:

- Determining whether proposed research activities are consistent with the goals and objectives of the Priority 1 and 2 actions listed in the species' respective Recovery and Conservation Plans and whether they provide data essential to conservation management of the species.
- Prioritizing the proposed research activities according to their ability to test crucial hypotheses and/or provide useful data for conservation measures.
- Assessing and determining the most effective methods currently available to provide the necessary data to accomplish the research objectives, explicitly weighing tradeoffs between sample size and risk to individual animals.
- Creating a "best practices" or "state-of-the-art" procedures manual for fieldwork that specifies the least risky methods available to acquire different types of data (with risk being measured by the potential for adverse effects on individual animals and the overall level of disturbance to the haulout/rookery). This fieldwork procedures manual would be reviewed and approved by the Center for Independent Experts, an independent agency established at the University of Miami to provide independent peer-review of NOAA Fisheries resource science. This manual would then serve to direct the choice of methods used by different research activities. It could be updated and revised to incorporate new, less risky techniques as they are developed and validated.
- Establishing field monitoring procedures that would be necessary to measure the effects of research activities on the animals disturbed. The results of these monitoring efforts will be used to modify future proposals and procedures as necessary to reduce the impact of research activities on the species.
- Developing a fully coordinated research plan and program (elements of which are conducted by separate agencies, institutions, and researchers) that results in less redundancy of effort, less double counting of takes by researchers working collaboratively but under separate permits, and fewer non-essential research programs. The SRCT would determine, before summer field season, which research should be conducted at particular places and times in order to maximize cooperative and collaborative research and logistical opportunities while minimizing impacts on particular rookeries and haulouts.

For all proposals for research on live animals, including those that involve capture, handling, or physical contact with animals, or activities that could otherwise harm or materially alter the behavior of an animal under study, the Animal Welfare Act requires an Institutional Animal Care and Use Committee (IACUC) to review all procedures to ensure the safe and humane treatment of animals. Although individual institutions currently use IACUCs to review their proposals, there is no central IACUC that reviews all the different research proposals for the species. The creation of a central IACUC would require new administrative and budgetary support but would complement the SRCT approach to standardizing minimum impact procedures. For the purpose of this EIS alternative, it will be assumed that a central IACUC would be created and would work in conjunction with the SRCT. Once the overall research objectives and methods have been determined by the SRCT, the central IACUC could review all proposals that require capture and handling of animals. The type of information provided in the central IACUC review would be crucial for the grant and permit decision-making processes, especially for activities involving the most intrusive research activities.

Another management tool that could be used to minimize potential impacts of intrusive activities would be to incorporate all proposals that require handling of animals into one permit. All researchers wishing to participate in these types of intrusive activities would have to be listed as Co-Investigators and work under the conditions of this one permit. This would ensure the highest degree of coordination amongst researchers for intrusive activities and promote the use of standardized and minimal impact methodology. For the purpose of this EIS alternative, it will be assumed that all research activities that require capture and handling of animals would be authorized under a single permit.

The SRCT reviews would be used to inform the granting and permitting processes in terms of getting complete information and adequate justification from applicants, and would be treated as part of the public NEPA process regarding research. The SRCT review meetings would therefore be open to the public and would include specified times for public comments as well as specified periods for written comments. Minutes from these meetings would be made available in written format as soon as possible and would be used as official records supporting granting and permitting decisions and NEPA analyses.

SSL, Western DPS

The SSL Plan ranked recovery actions for the Western DPS into three priority classes, as described above in section 2.4.2. Under this alternative, NMFS would administer grants and issue permits only for research activities contributing to the top two priorities for recovery of the Western DPS.

The formal SRCT review process outlined above would address the need to optimize sampling sizes and research designs such that key scientific information is acquired while the cumulative impact from research activities is minimized. If a proposed technique or research design requires a larger sample size than can reasonably be achieved, grant money would not be awarded and the permit application would be denied. If a new technique for research on the Western DPS is developed that requires field testing to determine its feasibility and data return rate in order to calculate an appropriate sample size, the technique must first be tested, including an assessment of adverse effects, using animals from the Eastern DPS or a surrogate species.

SSL, Eastern DPS
The SSL Plan did not prioritize specific recovery actions for the Eastern DPS but concludes that the primary recovery need is to develop a post-delisting monitoring plan in support of a status review to remove the Eastern DPS from the list of threatened species. Key components of this plan are outlined above in section 2.4.2.

Under this alternative, grants and research permits would be issued only for projects that directly related to the post-delisting monitoring plan. As is the case for the Western DPS under this alternative, only one permit would be issued for intrusive research on Eastern DPS sea lions and the same criteria pertaining to optimized research design and sample sizes would be used. Development of new research techniques intended to be used for the Western DPS could be permitted on the Eastern DPS if the research results supported the post-delisting monitoring plan. Otherwise, surrogate species would need to be used for experimental purposes.

NFS
In the NFS Plan, the conservation actions with the two highest priorities include those listed under Alternative 2 plus most other research activities (Table XX).
Under this alternative, grants and research permits would be issued only for projects that directly related to these highest priority conservation actions. The same provisions regarding the optimization of intrusive research efforts that applied to SSL would also apply to NFS.

2.4.4 Alternative 4 - Status Quo: Existing Research Programs

The existing grant and permit process is flexible in that it can accommodate changes in funding level, management priorities, scientific interests, research techniques, population status, and threats to the populations' recovery. Under the status quo process, summarized in Chapter 1, permits are issued to qualified individuals and institutions to conduct research according to the scope and methods requested in their applications with permit restrictions and mitigation measures required by the MMPA, ESA, and NMFS implementing regulations. Other than these statutory and regulatory permit restrictions, the only limitation that is placed on SSL permit issuance under the status quo process is that proposed research programs have impacts at a level below that which would jeopardize the continued existence of the species or result in adverse modification of critical habitat (ESA Section 7 review). This alternative could therefore be seen as maximizing the collection of scientific data given existing legal requirements for permitting, including avoiding causing jeopardy.

The scope of research activity conducted under this alternative depends substantially on the amount of funding that is available. Funding for SSL research peaked from 2000-2004 due to special congressional appropriations. Research funding has decreased since that time and is not expected to reach those levels again in the foreseeable future. For the purposes of this EIS, the amount of funding and therefore research effort on SSL will be assumed to have reached peak levels under the most recently completed permits (2002-2006). The average number, types, and distribution of takes allowed by those permits will be used for the analysis of effects of this alternative. For NFS, the number, types, and distribution of takes allowed by permits and requested in recent applications will be used for the analysis of effects under this alternative. This may not represent a peak research effort for this species, for which funding levels have recently increased. Peak research levels for NFS will be affected by future population trends and congressional funding.

Under the status quo alternative, new permits would be issued for the same type and scope of research as occurred under SSL permits prior to a court order that vacated most of them in May 2006. It would also include all other existing permits for research on SSL and NFS that were not affected by that order. New permits would be issued to replace permits as they expire such that the levels and types of research activities would continue to the extent that funding allowed.

New requests for permits and amendments to existing permits would be considered on a case-by-case basis and would be granted as long as the researchers were qualified to do the work, the research was bona fide as defined under the MMPA and justified through reference to the SSL or NFS Plan objectives, the project had a reasonable chance of succeeding, and it passed Section 7 review. Thus, the types of activities for which permits are issued would not be determined by their relationship to priority items in the SSL or NFS Plans. Under this alternative, each new permit requested would be evaluated separately during Section 7 consultation against the baseline of impacts from whatever permits were in effect at the time of the request. Permits would only be denied if it were determined that issuance would exceed the jeopardy or adverse modification threshold when impacts were added to existing research and other activities in the baseline at the time the application was received.

SSL

The Status Quo Alternative would include the type and scope of research activities described in Table XX along with a suite of procedures and mitigating factors that are typically attached as conditions of the permits. These conditions include stipulations for notification, coordination, and reporting of specific project information to NMFS (see Appendix XX for a complete description of mitigation measures and "best practices" that were included in the research permits vacated by the May 2006 court order). Most of the research activities involved animals from the Western DPS although some permit holders specified the location of work to be "all of Alaska". The population or location of work conducted, as listed in the most recent permits, is described in Table XX.

NFS

The type and scope of research activities on NFS under the Status Quo Alternative are described in Table XX. Procedures and mitigating factors are also typically attached as conditions of these permits which are issued under the authority of the MMPA (see Appendix XX).

2.4.5 Alternative 5 – Expanded Research Approach;

This alternative would provide the greatest amount of granting support that congressional appropriations allow and issue all requested permits for research regardless of how those proposed activities are prioritized in the species' Recovery or Conservation Plan, provided that they meet all permit issuance criteria and would not jeopardize the continued existence of the species. This alternative would require changes to existing regulations that would loosen permit issuance criteria to allow certain permit activities such as an increase in the use of certain invasive procedures, as described below.

Under this alternative, emphasis would be placed on the value of the information to the recovery of the species and less on the risk to individual animals. For example, under the current permits, intentional lethal takes of SSL or NFS have not been authorized, although some projects involve collection of tissue samples from legal subsistence harvests. Under Alternative 5, more intrusive research techniques could be authorized that had a greater risk of serious injury to individuals or sensitive age/sex classes if the agency determined the information was critical to the eventual recovery of the species. We will assume under this alternative that the amount of research and takes permitted will increase relative to the status quo, including the potential for lethal takes.

Under the MMPA regulations (50 CFR 216.41), if the lethal taking of depleted marine mammals is proposed the applicant must demonstrate that: (i) Non-lethal methods for conducting the research are not feasible; and (ii) For depleted, endangered, or threatened species, the results will directly benefit that species or stock, or will fulfill a critically important research need. Alternative 5 would allow use of lethal take or increase the use of certain invasive procedures even though non-lethal or less invasive methods are feasible. For example, permits could allow increased use of new techniques on endangered populations even where non-ESA listed surrogate species are available, and increased intrusive research on pregnant or lactating females.

The scope of research permitted for SSL and NFS would be increased under Alternative 5 relative to status quo. Sample size and age/sex classes chosen for research activities could be expanded.

Table 2-X - Comparison of SSL NFS EIS Research Alternatives **(DRAFT)**

		Alternative 1 – No-Action[1]	Alternative 2 - Minimal Impact Approach; Priority 1 Research Only	Alternative 3 - Reduced Impact Approach; Priority 1 and 2 Research Only	Alternative 4 - Status Quo: Existing Research Programs	Alternative 5 - Expanded Research Approach
Research Activities	Aerial surveys	- Only allowed at high altitude such that disturbance is unlikely and no permit or authorization is required	- Biennial at all rookeries and trend sites as needed for stock assessment and trend analysis associated with adaptive management plan - Standardized techniques and flight mitigation measures	- Biennial at all rookeries and trend sites as needed for stock assessment and other critical research - Standardized techniques and mitigation measures as determined by Species Research Coordination Team (SRCT) and Center for Independent Experts (CIE) approved procedures manual	- Annual or Biennial at all rookeries and trend sites as needed for stock assessment and other justified research -Quarterly at some sites as specified by research design proposal - Various techniques and flight mitigation measures	- Survey frequency determined by stock assessment requirements and other research needs - Various techniques and flight mitigation measures
	Land & Vessel Observations	- Only allowed at distances and conditions such that disturbance is unlikely and no permit or authorization is required	- Only if supports top priority objectives, with mitigation to minimize impact	- Standardized techniques and mitigation measures as determined by SRCT and CIE-approved procedures manual	- Procedures as specified by research design proposal, indeterminate sample size allowed for justifiable research purposes - Mitigation measures specified by applicant, plus those required by law	- Same as Alternative 4 Status Quo but with changes to regulations for permit mitigation (restrictions and requirements)
	Disturbance Incidental to Other Research	- Only allowed at distances and conditions such that disturbance is unlikely and no permit or authorization is required	- Allowed with mitigation measures	- Allowed with mitigation measures	- Allowed with mitigation measures	- Same as Alternative 4 Status Quo but with changes to regulations for permit mitigation (restrictions and requirements)
	Capture & Restraint	- No permits, authorizations, or grants issued	- Not allowed for Western DPS - Allowed for Eastern DPS and NFS for top priority recovery needs only, with "best practices" mitigation	- Logistics, timing, and location of research teams coordinated by annual SRCT review - Minimum but sufficient sample size to make meaningful progress on top 2 recovery/conservation priorities - Standardized techniques and mitigation measures as determined by SRCT and CIE-approved procedures manual - Central IACUC review of all capture and handling procedures - Assume fewer animals affected than Alt 4	- Sample sizes constrained only by budget and ESA Section 7 considerations -Logistics, timing, location, procedures & sample size determined by research proposal design - Mitigation measures specified by applicant, plus those required by law -Performed by PI, CI, or persons under their direct supervision	- Same as Alternative 4 Status Quo -Performed by PI, CI, or persons under their direct supervision
	Tissue Sampling	- No permits, authorizations, or grants issued	- For Western DPS SSL, tissue samples permitted on specimens from legal subsistence harvests and scat collection allowed from vacant haulouts	- Central IACUC review of all sampling procedures - Standardized techniques and mitigation measures as determined by SRCT and CIE-approved	- Tissue types, procedures, age class, sample size, and sex/age classes determined by research proposal design - Mitigation measures specified by	- Same as Alternative 4 Status Quo -Performed by PI, CI, or persons under their direct supervision

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		Alternative 1 – No-Action[1]	Alternative 2 - Minimal Impact Approach; Priority 1 Research Only	Alternative 3 - Reduced Impact Approach; Priority 1 and 2 Research Only	Alternative 4 - Status Quo: Existing Research Programs	Alternative 5 - Expanded Research Approach
			- Same as above for Eastern DPS SSL and for NFS - Anesthesia administered and intrusive procedures conducted on NFS by PI, CI, or persons under their direct supervision	procedures manual (including criteria for administering anesthesia)	applicant, plus those required by law - Anesthesia administered and intrusive procedures conducted by PI, CI, or persons under their direct supervision	
	Temporary & Permanent Marking	- No permits, authorizations, or grants issued	- Not allowed for Western DPS - Allowed for Eastern DPS and for NFS for top priority recovery needs only, with "best practices" mitigation	- Standardized techniques and mitigation measures as determined by SRCT and CIE-approved procedures manual (including criteria for administering anesthesia) - Central IACUC review of all marking procedures - Additional hot branding only permitted if tied to rigorous, funded, resighting programs and optimum sample size analysis - Use of less risky alternative techniques encouraged	- Marking needs, techniques, & sample sizes determined by research proposal design - Mitigation measures specified by applicant, plus those required by law - Anesthesia administered by PI, CI, or persons under their direct supervision	- Marking needs, techniques, & sample sizes determined by maximum contribution to vital rate data (life history information) - Mitigation measures as required by law - Only qualified practitioners administer anesthesia
	Instrument Attachment & Insertion	- No permits, authorizations, or grants issued	- Same as above	- Central IACUC review of all handling and surgical procedures - Standardized techniques and mitigation measures as determined by SRCT and CIE-approved procedures manual (including criteria for administering anesthesia)	- External and internal instrument specifications, attachment or insertion techniques, and sample sizes determined by research proposal design - Mitigation measures specified by applicant, plus those required by law - Anesthesia administered and intrusive procedures conducted by PI, CI, or persons under their direct supervision	- Maximize sample size for conservation and management objectives - External and internal instrument specifications, attachment, and insertion techniques determined by research proposal design - Experimental techniques considered for all stocks - Mitigation measures as required by law - Only qualified practitioners administer anesthesia and conduct surgery
	Other Procedures	- No permits, authorizations, or grants issued	- Same as above	- Same as above	-Types of procedures, age/sex class, & sample size determined by research proposal design - Mitigation measures specified by applicant, plus those required by law - Anesthesia administered and intrusive procedures conducted by PI, CI, or persons under their direct supervision	- Maximize sample size for conservation and management objectives -Types of procedures and age/sex class determined by research proposal design - Mitigation measures as required by law - Only qualified practitioners administer anesthesia and conduct surgery
	Transport & Temporary Captivity	- No permits, authorizations, or grants	- Same as above	- Minimum but sufficient sample size to make meaningful progress	- Research design specifications, transport methods, and holding	- Maximize sample size for conservation and management

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		Alternative 1 – No-Action[1]	Alternative 2 - Minimal Impact Approach; Priority 1 Research Only	Alternative 3 - Reduced Impact Approach; Priority 1 and 2 Research Only	Alternative 4 - Status Quo: Existing Research Programs	Alternative 5 - Expanded Research Approach
		issued		on critical conservation objectives - Central IACUC review of all handling, transportation, and husbandry procedures as well as captive facility conditions - Standardized techniques and mitigation measures as determined by SRCT and CIE-approved procedures manual - Assume fewer animals affected than Alt 4	facility criteria specified by applicant (but must be compliant with AWA and APHIS regulations) - Mitigation measures specified by applicant, plus those required by law - Qualified veterinary support for all operations - Health screening prior to release back into the wild	objectives - Mitigation measures as required by law - Qualified veterinary support for all operations - Health screening prior to release back into the wild
	Incidental Mortality	- No permits, authorizations, or grants issued	- Not allowed for Western DPS - Permitted number not to exceed 5% of PBR for Eastern DPS or Section 7 jeopardy assessment, whatever is lower - Actual number of incidental mortalities monitored on real-time basis. - If actual number of mortalities exceeds 5 SSL from all activities in a given year, all related research must stop immediately until procedures are reviewed - Permitted number not to exceed 5% of PBR for NFS	- Permitted number not to exceed 10% of PBR for all stocks or Section 7 jeopardy assessment, whatever is lower - Actual number of incidental mortalities monitored on real-time basis. - If actual number of mortalities exceeds 8 SSL from all activities in a given year, all related research must stop immediately until procedures are reviewed and re-approved by the SRCT and central IACUC	- For SSL, permitted number based on researcher estimates of potential take but must be below jeopardy threshold as determined by Section 7 assessment - Actual number of incidental mortalities monitored on real-time basis. - If actual number of mortalities exceeds 10 SSL from Western DPS from all activities in a given year, all related research must stop immediately until procedures are reviewed - For NFS, permitted number based on researcher estimates of potential take but cannot have significant adverse impact on species or stock (per MMPA)	- For SSL, permitted number based on researcher estimates of potential take but must be below jeopardy threshold as determined by Section 7 assessment - For NFS, permitted number based on researcher estimates of potential take - Intentional lethal takes considered for critical information needs
Permit and Grant Process	Number and Duration of Permits	- No permits, authorizations, or grants issued	- One permit for intrusive activities (Eastern DPS, NFS, or surrogate species only) - Permit duration up to 2 years	- One permit each for SSL and NFS stocks for intrusive activities, others wishing to participate must work under that permit - Permit duration up to 3 years	- All qualified applications considered - Duration up to regulatory maximum of 5 yrs	- Duration of permits could be extended pending regulatory change
	Amendments	- No amendments issued	- No major amendments allowed - Minor amendments considered	- Major and minor amendments considered on case-by-case basis	- Major and minor amendments considered on case-by-case basis	- Same as Alternative 4 Status Quo
	Review Requirements (for applications and for research)	- Annual review of existing permits, authorizations, and grants until they expire - Annual review of research activities that have not been issued permits or authorizations to ensure lack of takes	-Review consistent with current statutes and regulations - Biennial review of all field techniques and mitigation measures used -Annual review of grant and permit compliance - Revocation of permit for non-compliance	- SRCT coordinates the scientific evaluation and approval of research proposals in support of the grant and permitting review processes. - SRCT review informs Section 7 & MMC review - SRCT coordinates field logistics to minimize spatial and temporal overlap of research activities	- All applications & major amendments subject to full statutory and regulatory processes, including Section 7 & MMC review - Review of grant and permit compliance through annual and special permit holder reports - Revocation of permit for non-compliance	- Same as Alternative 4 Status Quo

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TABLE 5. NORTHERN FUR SEAL IMPLEMENTATION SCHEDULE

Plan Task	Task Number	Priority	Task Duration	FY 1	FY 2	FY 3	FY 4	FY 5	Comments
				Est. Fiscal Year Costs (thousands of $)					
1. Identify/eliminate causes of human-related mortality									
1.1 Marine Debris									
disentanglement	1.1.1	2	Ann.	75	75	75	75	75	
debris removal and surveys	1.1.2	2	Ann.	20	20	20	20	20	
laboratory and field debris studies	1.1.3	3	Tri.		40			40	
statutes, regulations, education, enforcement	1.1.4	2	Ann.[2]	10	10	10	10	10	
Determine marine debris sources	1.1.5	2	Ann.	10	10	10	10	10	
1.2 Monitor incidental take									
observer programs	1.2.1	3	Ann.[2]	20		20		20	
review observer data	1.2.2	2	Ann.[2]	15	10		10		
1.3 Evaluate harvests and harvest practices									
monitor and manage subsistence harvest	1.3.1	1	Ann.	75	50	55	60	65	
Develop & implement harvest sampling program	1.3.2	2	Ann.	15	15	15	15	15	
compile and evaluate existing data	1.3.3	2	1 yr	30					
identify and evaluate illegal harvests	1.3.4	1	Ann.	10	10	10	10	10	
2. Assess and avoid adverse effects of development									
Tribal consultation & Co-management agreements	2.1	1		200	220	245	270	300	
Advise the relevant action agencies and industries	2.2	1	Ann.						existing staff work
Review plans and make recommendations	2.3	1	Ann.						existing staff work & NEPA
Conduct studies to quantify effects	2.4	2	Per.	25	75	50		50	costs depend on development
Undertake conservation or management measures	2.5	2	Ann.	?	?	?	?	?	costs depend on projects

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				Est. Fiscal Year Costs					
	Task		Task	(thousands of $)					
Plan Task	Number	Priority	Duration	FY 1	FY 2	FY 3	FY 4	FY 5	Comments
2.6 Assess and monitor pollutants									
compile and evaluate existing data	2.6.1	1	1 yr	20					
evaluate environmental pollutant exposure	2.6.2	2	Per.	50		50			every fifth year
evaluate carcass salvage programs	2.6.3	3	Per.	25				25	every fifth year
oil spill response plans	2.6.4	2	Per.	10		10		10	
2.7 Fur seals/fisheries/resources									
fur seal feeding ecology	2.7.1	1	Ann.	200	220	245	270	300	
evaluate pelagic fur seal sampling	2.7.2	3	Per.[3]		150				every fifth year
report fishery interactions	2.7.3	2	Ann.	20	20	20	20	20	
determine impact of fisheries	2.7.4	1	Per.	100	100	150	200	200	concurrent studies with fisheries
3. Monitor trends and essential habitat									
3.1 Monitor changes in the fur seal population									
analyze fur seal teeth	3.1.1	2	5 yrs	35	25	25	25	25	
monitor male and pup abundance at Pribilof Islands	3.1.2	1	Ann.	85	10	85	10	85	
estimate pup survival	3.1.3	1	Ann.	25	25	25	25	25	
evaluate marking & resighting program	3.1.4	1	5 yrs	100	25	25	25	25	
study vital rates	3.1.5	1	Per.		100	110	120	130	Resighting and retagging annually
behavioral/physiological studies	3.1.6	1	Per.	50	55	60	65	70	
comparative studies on other islands	3.1.7	1	Ann.	150	165	180	200	220	
predation studies	3.1.8	2	Per.	150		150		150	
Promote joint research	3.1.9	2	Ann	15	15	15	15	15	
3.2 Improve assessment of disease effects									
compile and evaluate existing data	3.2.1	2	Per.	20				20	
determine and mitigate disease effects	3.2.2	2	Ann.		25	15	15	15	long-term monitoring

				Est. Fiscal Year Costs					
	Task		Task	(thousands of $)					
Plan Task	Number	Priority	Duration	FY 1	FY 2	FY 3	FY 4	FY 5	Comments
manage introduced species	3.2.3	2	Ann.						Existing staff work
3.3 Monitor essential habitat									
compile and evaluate available habitat use data	3.3.1	1	1 yr	50			50		
conduct oceanographic and fishery surveys	3.3.2	1	Tri.		200			200	
3.4 Identify and evaluate natural ecosystem changes									
Reevaluate carrying capacity	3.4.1	1	1 yr		75			75	
Continue Sentinel program	3.4.2	2	Ann	75	85	95	105	120	
compile and evaluate existing data	3.4.3	1	5 yrs	25	50	25	50	25	
select appropriate environmental indices	3.4.4	2	5 yrs			50	50	50	
physiological/survival studies	3.4.5	2	5 yrs			50	50	50	
ecosystem modeling	3.4.6	2	5 yrs			50	50	50	
4. Implement Plan									
Conservation Plan Coordinator	4.1	1	Ann				50		Update Plan in FY 4
Education & Outreach Programs	4.2	2	Ann	25	25	25	25	25	
International Conservation	4.3	2	Ann	20	15	15	15	20	
Enforce Regulations	4.4	3	Ann	50	50	50	50	50	
Total costs ($K)[4]				1810	1975	2040	1970	2620	
Inflation Adjustment (7% of total)					138	142.8	137.9	183.4	

Priority: 1– highest, 2 – moderate, 3 –lowest
[1] Triennial
[2] Annual Periodic as needed
[3] Periodic as needed

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E. Recovery Action Implementation Schedule

The Implementation Schedule that follows outlines actions and estimated costs for the recovery program for the western DPS of Steller sea lion, as set forth in this recovery plan. It is a guide for meeting the recovery goal and criteria outlined in this plan. This schedule indicates action priorities, action numbers, action descriptions, duration of actions, the parties potentially responsible for actions (either funding or carrying out), and estimated costs. Parties believed to have authority or responsibility for implementing a specific recovery action are identified in the Implementation Schedule. When more than one party has been identified, the proposed lead party is indicated by an asterisk (*). The listing of a party in the Implementation Schedule does not require the identified party to implement the action(s) or to secure funding for implementing the action(s). Priority numbers are assigned as described below, which follow the NMFS interim Recovery Planning Guidance.

Priority Number

Priority 1 - An action that must be taken to prevent extinction or to prevent the species from declining irreversibly in the foreseeable future.

Priority 2 - An action that must be taken to prevent a significant decline in species population / habitat quality or some other significant impact short of extinction.

Priority 3 - All other actions necessary to provide for full recovery of the species.

Plan Task	Priority	Responsible Parties	Task Duration	Fiscal Year Costs ($K)					Threats*
				FY 1	FY 2	FY 3	FY 4	FY 5	
1. BASELINE POPULATION MONITORING									
1.1.1 Estimate trends for pups and non-pups via aerial surveys	1	NMFS	annual	*250*	*250*	*250*	*250*	*250*	M
1.1.2 Monitor population trends in the Pribilof Islands (particularly the Walrus Island rookery) via aerial surveys or land-based counts	2	NMFS	annual	*50*	*50*	*50*	*50*	*50*	M
1.2.1 Continue to estimate survival, fecundity, and immigration/emigration rates through a branding/resight program	2	NMFS, ADF&G	annual	*1,000*	*1,000*	*1,000*	*1,000*	*1,000*	M
1.2.2 Promote cooperative pup branding/resight programs in Russia	2	NMFS, Russia	annual	*500*	*500*	*500*	*500*	*500*	M
1.2.3 Develop an age-structured population model using medium format photos from aerial surveys	2	NMFS	1 yr	*20*					M
1.2.4 Determine pregnancy and parturition rates	2	NMFS	annual	*30*	*30*	*30*	*30*	*30*	M
1.3.1 Examine the effects of season, age, and sex on	2	NMFS	annual	*500*	*500*	*500*	*500*	*500*	M,F,EV

Plan Task	Priority	Responsible Parties	Task Duration	Fiscal Year Costs ($K)					Threats*
				FY 1	FY 2	FY 3	FY 4	FY 5	
body condition									
1.3.2 Develop improved indices of health, body condition, and reproductive status using chemical methods (e.g., hematology serum chemistries, and endocrine monitoring)	2	NMFS	10 yrs	*250*	*250*	*250*	*250*	*250*	M,D/P
1.4.1 Develop improved live capture techniques for general research needs	2	NMFS	5 yrs	*250*	*250*	*250*	*250*	*250*	M,D/P
1.4.2 Develop improved non-lethal sampling techniques to assess health	2	NMFS	5 yrs	*200*	*200*	*200*	*200*	*200*	M,D/P
1.5 Develop an implementation plan	2	NMFS	1 yr with biennial updates	***50***		***10***		***10***	M
TOTAL -- ACTION 1				***3,100***	***3,300***	***3,040***	***3,030***	***3,040***	
2.1 Maintain critical habitat designations	3	NMFS	5 yrs	*100*	*100*	*100*	*100*	*100*	F,EV
2.2 Protect rookery and haulout sites (terrestrial habitat)	3	NMFS, USFWS, BLM, USFS	1 yr with 5 yr updates	*5*					DVT,IS,DR
2.3.1 Collect and analyze scat samples and stomach contents to determine prey consumption	2	NMFS	annual	*400*	*400*	*400*	*400*	*400*	F,EV
2.3.2 Develop stable isotope and fatty acid methodologies to assess prey consumption	2	NMFS	annual	*150*	*150*	*150*	*150*	*150*	F,EV
2.3.3 Deploy instruments to obtain finer scale data on sea lion foraging habitat	2	NMFS	annual	*500*	*500*	*500*	*500*	*500*	F,EV
2.3.4 Evaluate all information on sea lion foraging areas and develop a description of foraging needs	2	NMFS	2 yrs with updates	*200*	*200*				F,EV
2.4.1 Assess the relationships between oceanographic features and sea lion foraging ecology	2	NMFS	2 yrs	*125*	*125*				F,EV
2.4.2 Examine the influence of ecosystem variability on non-commercial prey species as an index to sea lion carrying capacity	3	NMFS	5 yrs	*300*	*300*	*300*	*300*	*300*	F,EV
2.4.3 Distinguish how natural and anthropogenic factors influence marine ecosystem dynamics and subsequently sea lion population dynamics	2	NMFS	5 yrs	*500*	*500*	*500*	*500*	*500*	F,EV
2.5.1 Determine the physiological diving	3	NMFS	5 yrs	*500*	*500*	*500*	*500*	*500*	F,EV

Plan Task	Priority	Responsible Parties	Task Duration	Fiscal Year Costs ($K)					Threats*
				FY 1	FY 2	FY 3	FY 4	FY 5	
capabilities and evaluate how this limits the ability to forage successfully									
2.5.2 Determine the energetic costs of foraging to sea lions	2	NMFS	5 yrs	*1,500*	*1,500*	*1,500*	*1,500*	*1,500*	F,EV
2.5.3 Assess the nutritional value of prey by species, season, and area including digestibility and overall value to sea lions	2	NMFS	3 yrs	*150*	*150*	*150*			F,EV
2.5.4 Develop an energetics model to investigate the interrelationships…and sea lion growth, condition, and vital rates	2	NMFS	5 yrs	*100*	*100*	*100*	*100*	*100*	F,EV
2.6.1 Improve groundfish stock assessment surveys to determine seasonal and inter-annual patterns of prey abundance, distribution, and movement at scales relevant to sea lions	2	NMFS, ADF&G	annual	*1,500*	*1,500*	*1,500*	*1,500*	*1,500*	F,EV
2.6.2 Assess competition for prey with sympatric consumers (e.g., gadids and flatfish, fur seals, harbor seals, other marine mammals, and seabirds)	3	NMFS	5 yrs	*250*	*250*	*250*	*250*	*250*	F,EV
2.6.3 Utilize groundfish fishery observer data to assess the spatial-temporal distribution of the fishery	2	NMFS, ADF&G	annual	*20*	*20*	*20*	*20*	*20*	F
2.6.4 Assess effectiveness of sea lion closure zones around rookeries and haulouts using small-scale experiments	2	NMFS, ADF&G	3 yrs	*750*	*750*	*500*			F, DVT
2.6.5 Assess the response of sea lions to changes in prey distribution and availability	2	NMFS	5 yrs	*200*	*200*	*200*	*200*	*200*	F,EV
2.6.6 Evaluate and implement appropriate fishery regulations to protect foraging habitat and prey resources for sea lions	2	NMFS, ADF&G	annual	*2000*	*2000*	*2000*	*2000*	*2000*	F
2.6.7 Explore the use of ecosystem based (multi-species) stock assessment models to set fishery catch limits to ensure adequate prey resources for a recovered sea lion population	2	NMFS, ADF&G	5 yrs	*60*	*60*	*60*	*60*	*60*	F,EV
2.6.8 Design and implement an adaptive management program for fisheries, climate change, and predation	1	NMFS, ADF&G	3 yrs dev. 10 yrs impl.	*500*	*500*	*500*	*200*	*200*	F,EV,KW
2.6.9 Prepare a habitat conservation plan under	2	ADF&G	3 yrs	*100*	*100*	*50*			F

Plan Task	Priority	Responsible Parties	Task Duration	Fiscal Year Costs ($K)					Threats*
				FY 1	FY 2	FY 3	FY 4	FY 5	
section 10 of the ESA for fisheries authorized by the State of Alaska									
2.6.10 Consider and implement conservation measures in herring and salmon fisheries in Alaska as appropriate	2	ADF&G	annual	*200*	*200*	*200*	*200*	*200*	F
TOTAL -- ACTION 2				***10,110***	***10,105***	***9,480***	***8,780***	***8,780***	
3.1.1 Monitor and evaluate incidental take in commercial fisheries through observer and self-reporting programs	3	NMFS, ADF&G, USCG	annual	*500*	*500*	*500*	*500*	*500*	IT
3.1.2 Monitor and evaluate incidental take in non-commercial fisheries	3	NMFS, ADF&G, USCG	1 yr	*300*					IT
3.2.1 Monitor intentional take via shoreline surveys for carcasses near suspected conflict 'hotspots' and by encouraging reporting of illegal shooting through NMFS's Enforcement hotline	3	NMFS, ADF&G, USCG	annual	*250*	*250*	*250*	*250*	*250*	IS
3.2.2 Reduce threat of illegal shooting by developing and promoting use of non-lethal deterrents for commercial fisherman	3	NMFS	2 yrs	*300*	*300*				IS
3.3.1 Develop and promote non-lethal means of deterring sea lions from hauling out on docks	3	NMFS, USCG	2 yrs	*100*	*100*				DVT,IS
3.3.2 Continue to publicize "No feeding" regulations in harbor areas and keep active programs for notification and enforcement	3	NMFS, USCG	annual	*50*	*50*	*50*	*50*	*50*	DVT
3.4.1 Publicize and enforce existing no-transit areas to minimize vessel and aircraft disturbance of rookery sites	3	NMFS, USCG	annual	*20*	*20*	*20*	*20*	*20*	DVT
3.4.2 Review and revise existing Marine Mammal Approach Guidelines and provide to charter operators and other mariners to minimize disturbance at haulouts	3	NMFS	annual	*25*	*25*	*25*	*25*	*25*	DVT
3.5.1 Coordinate research efforts to reduce potential for unnecessary or duplicative research-related take	3	NMFS	Annual	*25*	*25*	*25*	*25*	*25*	DR
3.5.2 Monitor and minimize unintentional take	3	NMFS, USCG	5 yrs	*200*	*200*	*200*	*200*	*200*	DR

Plan Task	Priority	Responsible Parties	Task Duration	Fiscal Year Costs ($K)					Threats*
				FY 1	FY 2	FY 3	FY 4	FY 5	
TOTAL – ACTION 3				*1,770*	*1,470*	*1,070*	*1,070*	*1,070*	
4.1.1 Conduct epidemiological surveys	2	NMFS	5 yrs	250	250	250	250	250	D/P
4.1.2 Develop and implement methods for parasite evaluations	2	NMFS	5 yrs	50	50	50	50	50	D/P
4.1.3 Develop and implement methods to test immune system functioning	2	NMFS	5 yrs	25	25	25	25	25	D/P
4.1.4 Evaluate causes of mortality by examining dead and live animals of all age and sex classes	2	NMFS	10 yrs	50	50	50	50	50	all
4.1.5 Develop disease management plans	2	NMFS	2 yrs	30	30				D/P
4.1.6 Develop an unusual mortality events (UMEs) management plan	2	NMFS	2 yrs	50	50				D/P,DVT,IT
4.1.7 Develop models to simulate disease impacts on energetics, physiology, abundance and demographics	2	NMFS	5 yrs	100	100	100	100	100	D/P
4.2.1 Design a contaminant research and management plan	2	NMFS	2 yrs	30	30				T
4.2.2 Collect samples from free-ranging sea lions and environmental 'hotspots'	2	NMFS	5 yrs	200	200	200	200	200	T
4.2.3 Examine blood and tissue samples for evidence of contaminant-linked endocrine effects	2	NMFS	5 yrs	100	100	100	100	100	T
4.2.4 Modeling contaminant impact and effect	2	NMFS	5 yrs	100	100	100	100	100	T
4.3.1 Understand predator life histories, biology, and ecology – captive work	2	NMFS	5 yrs	400	400	400	400	400	KW
4.3.2 Determine killer whale diets	2	NMFS	5 yrs	300	300	300	300	300	KW
4.3.3 Develop methods to obtain samples from live killer whales	2	NMFS	5 yrs	100	100	100	100	100	KW
4.3.4 Expand the stranding network	2	NMFS	2 yrs	25	25				KW, M
4.3.5 Determine killer whale distribution and behavior across the North Pacific	2	NMFS	5 yrs	500	500	500	500	500	KW
4.3.6 Estimate numbers of killer whale ecotypes in time and space	2	NMFS	5 yrs	500	500	500	500	500	KW
4.3.7 Develop models to simulate predation rates based on killer whale energetics and abundance and Steller sea lion demographics	2	NMFS	5 yrs	100	100	50	50	50	KW

Plan Task	Priority	Responsible Parties	Task Duration	Fiscal Year Costs ($K)					Threats*
				FY 1	FY 2	FY 3	FY 4	FY 5	
TOTAL – ACTION 4				*2,910*	*2,910*	*2,725*	*2,725*	*2,725*	
5.1 Reduce damage to sea lions and their habitat from discharges of pollutants by developing preventive measures	2	NMFS, USCG	5 yrs	*25*	*25*	*25*	*25*	*25*	T
5.2.1 Reduce discards of debris (e.g., trawl web, packing bands)	2	NMFS, USCG	5 yrs	*100*	*100*	*100*	*100*	*100*	E
5.2.2 Cleanup derelict gear and beached debris	3	NMFS	5 yrs	*100*	*100*	*100*	*100*	*100*	E
5.3.1 Continue and expand the Alaska stranding network to increase coastal coverage and community involvement in monitoring sea lion mortality	2	NMFS, ADF&G	5 yrs	*100*	*100*	*100*	*100*	*100*	all
5.3.2 Survey selected areas for dead stranded animals	2	NMFS	5 yrs	*50*	*50*	*50*	*50*	*50*	all
5.3.3 Expand tissue sampling efforts to improve the information obtained from dead sea lions	2	NMFs	5 yrs	*100*	*100*	*100*	*100*	*100*	all
5.3.4 Monitor the incidence and impact of entanglement in marine debris	2	NMFS	5 yrs	*100*	*100*	*100*	*100*	*100*	all
5.4 Effectively administer the Steller sea lion recovery program by continuing to provide a recovery coordinator staff position	2	NMFS	annual	*850*	*850*	*850*	*850*	*850*	all
5.5 Improve sea lion conservation by consulting with the State of Alaska on actions that are likely to adversely impact Steller sea lions	2	NMFS, ADF&G	annual	*250*	*250*	*250*	*250*	*250*	F,IT,IS,E,DVT
5.6.1 Encourage and facilitate public reporting of sea lion observations	3	NMFS, ADF&G	5 yrs	*50*	*50*	*50*	*50*	*50*	M
5.6.2 Publicize current conservation efforts and protective measures	3	NMFS	annual	*50*	*50*	*50*	*50*	*50*	all
5.7.1 Manage subsistence harvests and evaluate the efficacy and accuracy of using retrospective subsistence harvest surveys	2	NMFS, ADF&G	annual	*150*	*150*	*150*	*150*	*150*	SUB
5.7.2 Support Alaska Native subsistence use information programs	2	NMFS, ADF&G	annual	*75*	*75*	*75*	*75*	*75*	SUB
5.7.3 Analyze carcasses from subsistence harvest to assess age, body condition, and other relevant information to ensure safety of carcasses for human	2	NMFS	annual	*100*	*100*	*100*	*100*	*100*	D/P,T

Plan Task	Priority	Responsible Parties	Task Duration	Fiscal Year Costs ($K)					Threats*
				FY 1	FY 2	FY 3	FY 4	FY 5	
consumption									
5.7.4 Document local knowledge and cultural science (Traditional Ecological Knowledge - TEK) pertaining to sea lions to better understand changes in sea lion movement (local and seasonal), feeding patterns and prey, seasonal haulouts, predation and ecosystem dynamics	2	NMFS	2 yrs	*100*	*100*				all
5.8 Improve the effectiveness of research for Steller sea lion recovery by instituting a "fast track" process for expediting NMFS research permits for Steller sea lions.	2	NMFS	2 yrs	*100*	*100*				all
TOTAL – ACTION 5				*2,300*	*2,300*	*2,100*	*2,100*	*2,100*	
TOTAL – ALL ACTIONS				***20,190***	***19,815***	***18,415***	***17,705***	***17,715***	***93,840***

* IT=incidental take by fisheries; SUB=Alaska native subsistence harvest; IS=illegal shooting; E=entanglement in marine debris; D/P=disease and parasitism; T=toxic substances; DVT=disturbance from vessel traffic and tourism; DR=disturbance from research; KW=killer whales; EV=environmental variability; F=competition with fisheries

APPENDIX B
MEETING SIGN-IN SHEETS

SSL NFS Research EIS Focus Group Meetings
Summary Report
August 2006

NMFS – URS

STELLER SEA LION AND NORTHERN FUR SEAL RESEARCH EIS

FOCUS GROUP MEETING

July 2006

SIGN-IN SHEET

URS

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RESEARCHERS

NMFS – URS

STELLER SEA LION AND NORTHERN FUR SEAL RESEARCH EIS

FOCUS GROUP MEETING

July 2006

SIGN-IN SHEET

URS

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RESEARCHERS

NMFS – URS

STELLER SEA LION AND NORTHERN FUR SEAL RESEARCH EIS

FOCUS GROUP MEETING

July 2006

SIGN-IN SHEET

URS

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RESEARCHERS

NMFS – URS
STELLER SEA LION AND NORTHERN FUR SEAL RESEARCH EIS
FOCUS GROUP MEETING
July 2006
SIGN-IN SHEET

URS

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NGOs / Other Agencies

NMFS – URS

STELLER SEA LION AND NORTHERN FUR SEAL RESEARCH EIS

FOCUS GROUP MEETING

July 2006

SIGN-IN SHEET

URS

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NPRB / NPFMC

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FOCUS GROUP MEETING
July 2006
SIGN-IN SHEET

URS

PLEASE PRINT NAME AND ADDRESS	AGENCY and DISCIPLINE	PHONE NUMBER	EMAIL ADDRESS	
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Natives

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APPENDIX C
DRAFT NMML PROPOSED ALTERNATIVE STRUCTURE

SSL NFS Research EIS Focus Group Meetings
Summary Report
August 2006

Table 2-X - Comparison of SSL NFS EIS Alternatives.

				Alternative 1 - No action	Alternative 2 - Reduced research program	Alternative 3 - Status quo research program	Alternative 4 - Recommended research program	Alternative 5 – Enhanced research program
	Relative environmental impact		Action	No direct impacts (but likely indirect impacts)	Low impacts	Medium impacts	High impacts	Highest impacts
Research Activities	On species	Endangered						
		Threatened						
		Depleted						
	On populations/ stocks	Endangered						
		Threatened						
		Depleted						
	On individuals	Non-invasive						
		Invasive						

Appendix F
Co-Management Agreements for
St. Paul and St. George Islands

Co-Management Agreement Between The Aleut Community of St. George Island and the National Marine Fisheries Service

AGREEMENT
BETWEEN THE
ALEUT COMMUNITY OF ST. PAUL ISLAND
AND THE
NATIONAL MARINE FISHERIES SERVICE

I. PARTIES AND SCOPE

This document constitutes an agreement between the National Marine Fisheries Service (NMFS) and The Aleut (Unangan) Community of St. Paul Island, Alaska, otherwise referred to as the Parties.

A. This Agreement covers the species *Callorhinus ursinus* and *Eumetopias jubatus*, referred to as the laaqun (Unangan) or northern fur seal, and the qawan (Unangan) or Steller sea lion, hereafter referred to as fur seal and sea lion, respectively. It encompasses St. Paul Island, Alaska and associated interaction areas (Walrus, Otter Islands and Sea Lion Rock). However, specific actions taken or recommendations made pursuant to this Agreement may be limited to certain regions or sub-areas, as deemed appropriate.

B. NMFS is the congressionally mandated federal agency responsible for the protection, conservation and management of fur seals and sea lions within jurisdiction of the United States of America.

C. The Tribal Government of St. Paul (TGSNP) represents the conservation and co-management interests of fur seal and sea lion hunters and customary/traditional practices of the Aleut Community of St. Paul Island, Alaska.

II. AUTHORITIES

The Parties recognize and acknowledge that:

A. NMFS has the authority to enter into this Agreement with the TGSNP under Section 119 (16 U.S.C. 1388) of the Marine Mammal Protection Act of 1972, as amended (MMPA), and the Endangered Species Act of 1973, as amended (ESA) (16 U.S.C. 1531 et seq.).

B. The TGSNP has the authority to enter into this Agreement according to its constitution and bylaws for the Aleut Community of St. Paul Island.

III. PURPOSE

The TGSNP, representing the interests of the Unangan (Aleuts) of St. Paul Island and NMFS, representing the interests of the citizens of the United States of America, desire to work in partnership for the purpose of:

A. Promoting the conservation and preservation of fur seals and sea lions;

B. Utilizing traditional knowledge, wisdom and values, and conventional science in research, observation, and monitoring efforts to establish the best possible management actions for the protection and conservation of fur seals and sea lions;

C. Establishing a process of shared local responsibilities regarding the management and research of fur seals and sea lions on behalf of the citizens of the United States;

D. Identifying and resolving through a consultative process any management conflicts that may arise in association with fur seals and sea lions; and

E. Providing information to hunters and the affected community, as a means of increasing the understanding of the sustainable use, management, and conservation of fur seals and sea lions.

To achieve these purposes, this Agreement provides for:

1. Cooperation between members of the TGSNP and NMFS in the conservation and management of fur seals and sea lions for the year 2000 and thereafter; and

2. The establishment of a St. Paul Island Co-Management Council under this Agreement.

IV. BACKGROUND

In April 1994, the MMPA was amended to include Section 119 "Marine Mammal Cooperative Agreements in Alaska." Section 119 formalizes the rights of Alaska Native Organizations to participate in conservation-related co-management of subsistence resources and their use. Section 119 also authorized the appropriation of funds to be transferred by NMFS to Alaska Native Organizations to accomplish these activities.

V. GUIDING PRINCIPLES

A. The best way to conserve and provide for stewardship of fur seals and sea lions critical to traditional practices and the Unangan way of life is through a partnership between the TGSNP and NMFS that provides for full participation by the Unangan of St. Paul, through the TGSNP, in decisions affecting the management of marine mammals used for subsistence purposes .

B. As the primary customary/traditional users of the fur seals and sea lions in the Bering Sea Region, the Aleut Community of St. Paul is committed to long term sustainable use of these animals for cultural continuity, food, clothing, arts, and crafts. The rich Unangan tradition and ancestral interaction with fur seals and sea lions provides a unique understanding and knowledge of these animals.

C. Under the MMPA as amended, NMFS is mandated to employ the best conventional science and natural resource management practices available to maintain marine mammal stocks and populations at levels necessary to sustain customary/traditional uses by indigenous peoples of Alaska, including the Unangan of St. Paul.

D. A key to the success of this partnership is to incorporate the spirit and intent of co-management by building trust and by establishing close cooperation and communication between the two Parties. Shared decision making shall be through consensus, based on mutual respect and understanding the cultural perspective of each party.

VI. CO-MANAGEMENT OF FUR SEALS AND SEA LIONS ON ST. PAUL ISLAND, ALASKA

Understanding that the structure, process and responsibilities associated with the successful implementation of this Agreement and effective co-management of fur seals and sea lions on St. Paul must be clearly defined, the Parties agree that;

A. Operational Structure

1. Regarding the need for a cooperative effort to conserve fur seal and sea lion populations and to maintain a sustainable harvest for traditional uses, the Parties agree to establish a St. Paul Island Co-Management Council (hereafter referred to as Council).

2. Upon the effectness of this Agreement, the TGSNP and NMFS shall each

appoint three (3) members to the Council. The members of the Council shall serve at the pleasure of the Party by which they were appointed. The Council shall select co-chairs by consensus. One (1) co-chair shall be a representative of the TGSNP and one (1) a representative of NMFS.

3. The Council shall hold at least two (2) meetings a year and may hold other meetings, as necessary, at the request of either Party. Council meetings shall be held and conducted on St. Paul Island Alaska, unless mutually agreed otherwise. The Co- Chairs shall circulate a draft agenda for comment two (2) weeks prior to each meeting. A quorum of four (4) members is required to conduct a meeting. Decisions of the Council shall be through consensus, based on mutual respect. Meetings of the Council shall be open to the public.

4. The Council shall perform the following actions:

a. Develop annual management plans, monitoring programs, and research programs for St. Paul Island;

b. Review annually the contents, performance and responsibilities in this Agreement;

c. Review and assess progress towards implementation of this Agreement;

d. Identify challenges to achieving the purpose of this Agreement;

e. Recommend solutions to any identified challenges;

f. Identify future courses of action; and

g. Review laws and regulations governing the subsistence take and use of fur seals and sea lions.

B. Cooperative Responsibilities:

Guided by the Council, the TGSNP and NMFS will share the following responsibilities in each of the subject areas identified:

1. <u>Management Plans</u>: Develop local management plans for fur seals, sea lions, and their associated haul-out and rookery areas. The management plans will be reviewed annually. The management plans will include the topics and items deemed appropriate and necessary by the Council such as:

a. Monitoring and Research Programs; Harvest and Rookery

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Management; Local Regulations and Enforcement Plans for the protection of fur seals, sea lions and their haulouts or rookeries;

b. Education and Information; Training; Funding; Summary of recent progress and new information;

c. Outline of future goals and activities; Identify information and conservation needs and; and

d. Other items as deemed necessary.

2. Monitoring Programs: To establish consistent year-round rookery and shoreline observations to document and respond to activities on the rookeries that might include, but not be limited to, wildlife behavior, disturbance, oil spills, and other activities as appropriate. The Parties agree to:

a. Develop and implement long term monitoring programs for local fur seal and sea lion populations, associated rookeries and haul out areas to document and respond to any observed changes;

b. Conduct seasonal debris clean-ups and surveys at rookeries and beaches identified by the Council; and

c. Identify the appropriate equipment, facilities, and technical assistance to conduct rookery and beach clean up programs and surveys as necessary.

3. Research Programs: As advised and monitored by the Council, the Parties agree to promote and continue the following specific research efforts:

a. Assessment of population abundance and trends by stock and, as possible, by sub-areas within those stocks using conventional science methods;

b. Assessment of habitat use and seasonal movements (including information on preferred haulout sites, foraging areas, and prey composition);

c. Assessment of sources of mortality and the extent, timing, and location of such mortality; and

d. Assessment of population status (including age structure, vital rates, and indices of physical condition).

4. Disentanglement Program: To reduce the level of entanglement and effect the release of fur seals and sea lions from marine debris, the Parties agree to promote and continue the following efforts and activities :

a. Collection of information regarding date, location, sex, age, age class, debris type, capture attempts, disentanglements, degree of wound, re-sightings, animals sheared, animals with shear marks, scarred animals, and tagged animals and numbers;

b. Calculation of entanglement rates incorporating data from the annual subsistence fur seal harvest including debris type, width, mesh diameter, twine size and other information as appropriate; and

c. Maintenance of existing research and identification of the appropriate equipment, facilities, and technical assistance to conduct the disentanglement program.

5. Local Opportunities for Scientific Research Projects: Recognizing the need for and value of community awareness and involvement regarding the protection and conservation of fur seals and sea lions, the Parties agree to undertake a collaborative effort to accomplish the following:

a. Establish mentoring opportunities for local youth regarding environmental science and natural resource management;

b. Work with the local school district regarding support of and participation in science fairs and special projects regarding environmental education and natural resource management; and

c. Coordinate with local entities and programs to establish employment opportunities regarding environmental science and natural resource management.

6. Maintenance of Fur Seal Rookeries: To improve the condition and ensure continued use of the fur seal rookery and haulout areas, the Parties agree to:

a. Design, construct, and maintain permanent signs for each rookery;

b. Put up road barricades at Reef, Ketovi, and Northeast Point Rookeries as specified by the governing regulations;

c. Identify the appropriate equipment and materials to maintain the rookery catwalks, tripods, signs, and barricades; and

d. Repair and maintain annually, all catwalks and tripods identified by the Council.

7. Co-Managing the Harvest: To improve and advance the viability and sustainability of the subsistence take of fur seals the Parties agree:

a. To support and continue the annual Humane Observer contract for the subsistence fur seal harvest to ensure that the harvest continues to be conducted in a humane manner;

b. To negotiate and establish the beginning date of each annual fur seal harvest, in accordance with current regulations;

c. That the Tribal Ecosystem Conservation Office (ECO) Co-Directors, in consultation with the Harvest Foreman and the NMFS Representative, and in accordance with current regulations, will determine which fur seal rookery to harvest on a daily basis;

d. That the ECO Co-Directors and Harvest Foreman will accept responsibility for ensuring an absolute minimum of heat stressed animals as is possible. Jointly with the Humane Observer and NMFS Representative, they will have the authority to shut down the harvest for that day due to temperature or other factors contributing to heat stress;

e. The ECO Co-Directors and Harvest Foreman will accept responsibility for keeping the number of females taken to the following levels;

(i). When five (5) females have been killed the harvest will stop for a period of two (2) days so that the harvest workers can discuss the reasons why females were harvested and correct problems contributing to the take of females, and

(ii). When eight (8) females have been killed the harvest may be stopped for that season.

f. The ECO Co-Directors and Harvest Foreman will insure the entire harvest operation is done in an efficient manner to avoid or minimize unnecessary injury and mortality, and also that the harvest fields are left litter-free;

g. The ECO Co-Directors will work with NMFS to promote and establish "full utilization" by making every attempt within the law to use all parts of the animals taken at the harvest. All parts means the pelts, teeth, guts, bacula ("seal sticks"), carcasses and other inedible by-products of the subsistence harvest the Tribe can use within existing laws and regulations to cover harvest and processing costs;

h. The ECO will conduct local surveys of the subsistence take of fur seals and sea lions. The surveys will include:

(i). Number harvested;
(ii). Number struck and/or lost;
(iii). Total take (harvest plus struck and lost);
(iv). Sex of harvested or recovered animals;
(v). Categories harvested or recovered (number of pups, subadults, or adults);
(vi). Designated fur seal haul outs and sea lion hunting sites as determined annually by the Council; and
(vii). The collection of biological samples if deemed necessary by the Council;

8. <u>Providing Education and Information</u>: Recognizing the value of an informed public regarding the protection, conservation and management of fur seals and sea lions, the Parties agree to:

a. Educate and inform subsistence harvest workers in the most appropriate methods for harvesting and processing fur seals;

b. Educate and inform the Aleut Community of St. Paul about the health and status of northern fur seals and sea lion populations on St. Paul Island including factors contributing to the sea lion's decline or increase;

c. Educate and inform St. Paul sea lion hunters in the proper methods for hunting sea lions;

d. Develop a training and internship program to directly involve local people in harvest monitoring, bio-sampling, and research programs;

e. Involve hunters and customary/traditional users in the development of regulatory and management decisions affecting the subsistence use of fur seals and sea lions through representation on the Council; and

f. Designate the TGSNP as the primary local contact for exchange of information regarding fur seals and sea lions.

C. Training

To establish a fair and equitable co-management relationship and a level of practical experience and technical expertise, the Parties agree to:

1. Work in partnership to develop and provide cross cultural information, including understanding of Unangan ways of life, traditional ways of knowing, local concerns and issues regarding fur seal and sea lion use by the Aleut Community of St. Paul (e.g., food, medicinal, handicraft, arts, and spiritual uses), as well as agency policies, legal and administrative constraints, and scientific approaches for managers, researchers and others coming to the island;

2. Obtain appropriate training for local Conservation Officers in Tribal and federal regulations;

3. Provide mentors and research opportunities for local individuals whenever possible; and

4. Share TGSNP/NMFS planning, research, and data collection procedures and provide appropriate training in those procedures.

VII. CONSULTATION

To facilitate the implementation of this Agreement and ensure an equitable working relationship, the Parties agree that:

A. The TGSNP and NMFS shall consult on a routine basis as set forth in this Agreement. In addition, the TGSNP President and NMFS Representative for St. Paul Island shall communicate on an as needed basis concerning matters related to northern fur seals and sea lions; and

B. Should disagreement arise on interpretation of the provisions of this Agreement (or amendments and/or revisions thereto) that cannot be resolved at the operating level, the Parties shall submit written statements regarding the disagreement to the Council. Within thirty (30) days from receipt of the written statements, the Council shall provide copies to each Party and convene a meeting of the Council for the purpose of resolving the disagreement. If disagreement remains unresolved after the thirty day period and absent a mutual agreement by the Parties to extend the time period, the Council shall refer the matter to higher levels of the respective Parties for appropriate action.

VIII. REGULATION AND ENFORCEMENT

To effectively implement this Agreement, the Parties agree that:

A. The TGSNP recognizes the Secretary of Commerce's authority to enforce the provisions of the MMPA, ESA and Fur Seal Act applicable to the subsistence harvest of fur seals and sea lions; and

B. NMFS recognizes the existing Tribal authority to govern and regulate their members and conduct regarding the traditional uses of fur seals and sea lions, and acknowledges tribal authority to conduct the following in cooperation with NMFS:

1. Conduct rookery disturbance monitoring and local enforcement upon closing of the rookeries and to monitor sea lion hunting activities;

2. Conduct access permitting for the fur seal viewing blinds and fur seal harvest;

3. Develop and implement Tribal ordinances governing the hunting of sea lions and harvesting of fur seal and provide NMFS with up to date Tribal ordinances;

4. Develop and implement effective local processes for informing the public regarding applicable Federal and Tribal laws and regulations;

5. Develop and implement cooperative enforcement plans between Federal, local and Tribal authorities; and

6. Review, recommend, and advise on revisions to federal regulations governing fur seals and sea lions.

IX. FUNDING

A. Recognizing that certain costs may be associated with the implementation of this Agreement, both Parties agree that long term funding for sustained co-management and conservation programs is important for the health of fur seals and sea lions. No financial commitment on the part of any Party is required by this Agreement. Any requirement of this Agreement for the obligation or expenditure of funds by NMFS or TGSNP shall be subject to the availability of appropriated funds.

B. The TGSNP and NMFS will assist each other in seeking funding from a variety of sources to support research and management projects of mutual benefit regarding fur seals and sea lions.

C. TGSNP will submit a yearly budget to NMFS to fulfill specific responsibilities stated in this Agreement for each fiscal year the Agreement is in effect.

D. NMFS will review the annual budget and, after consultation with the TGSNP, will assist with the obligation and provision of funding as deemed appropriate under the authorities specified in Section II (A) of this Agreement.

X. OTHER PROVISIONS

A. Nothing in this Agreement is intended or shall be construed to authorize any expansion or change in the respective jurisdiction of Tribal, Federal, or State Governments over fish and wildlife resources, or alter in any respect the existing political or legal status of Alaska Native entities.

B. Except as expressly provided herein, nothing in this Agreement shall restrict or limit any right or privilege of the TGSNP (Unangan Community of St. Paul) with respect to fisheries, customary/traditional uses, or other use of any species.

C. Nothing herein is intended to conflict with current National Oceanic and Atmospheric Administration or NMFS directives. If the terms of this Agreement are inconsistent with existing laws, regulations, or directives of either of the Parties entering into this Agreement, then those portions of this Agreement which are determined to be inconsistent shall be invalid, but the remaining terms and conditions not affected by the inconsistency shall remain in full force and effect. At the first opportunity for revision of this Agreement, all necessary changes will be accomplished by either an amendment to this Agreement or by entering into a new Agreement, whichever is deemed expedient to the interests of both Parties.

D. This Agreement will stand as an official management tool for fur seals and sea lions as identified in Section I (A) of this Agreement.

E. Both Parties shall strive to support a policy of "no surprises" concerning contact with the media on potentially sensitive issues pertaining to northern fur seals and Steller sea lions. Each Party shall endeavor to consult with the other prior to initiating contact with the media on topics contained within this Agreement. Under circumstances in which the media initiates contact with one Party, the contacted Party shall inform the other Party and provide details on the nature of the information communicated. In addition, when a Party is contacted by the media concerning issues relevant to this Agreement, that Party shall provide the other Party's contact information to the media representative and request that the media representative contact the other Party.

F. Whenever possible, all scientists who plan to conduct research on behalf of either Party on or around St. Paul (as defined in Section I of this agreement) are required to advise the Council established herein in a timely manner as to the purpose, goals, and time-frame of the research, data gathering techniques, expected results and possible adverse impacts of the proposed research. The Council shall review this information and upon reaching a consensus, may provide comments and recommendations accordingly.

XI. ADOPTION, DURATION, AND MODIFICATION

A. This Agreement shall take effect upon the latest date of signature of the respective Parties and shall remain in effect until terminated by either of the Parties in accordance with the termination provision of this Agreement.

B. Modification of this agreement may be proposed at any time by either Party and shall become effective upon written approval by both Parties.

C. This Agreement may be terminated by either Party by providing forty-five (45) days prior written Notice of Termination to the other Party. Such Notice shall be addressed to the principal contact for the receiving Party.

XII. SIGNATORIES

In Witness Whereof, the Parties hereto have executed this Agreement to be effective as of the last written date below:

National Marine Fisheries Service

6.13.00

James W. Balsiger Date
Administrator, Alaska Region
National Marine Fisheries Service
U. S. Department of Commerce
P. O. Box 21668
Juneau, Alaska 99801

Aleut Community of St. Paul Island

Richard Zacharof Date
President, Tribal Government of St. Paul
P.O. Box 86
St. Paul Island, Alaska 99660

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Agreement Between The Aleut Community of St. Paul Island and the National Marine Fisheries Service

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CO-MANAGEMENT AGREEMENT
BETWEEN THE
ALEUT COMMUNITY OF ST. GEORGE ISLAND
AND THE
NATIONAL MARINE FISHERIES SERVICE

I. PARTIES AND SCOPE

This document constitutes an agreement between the National Marine Fisheries Service and The Aleut (Unangan) Community of St. George Island, Alaska, otherwise referred to as the Parties.

A. This Agreement covers the species *Callorhinus ursinus* and *Eumetopias jubatus*, referred to as the laaqux (Unangan) or northern fur seal, and the qawax (Unangan) or Steller sea lion, hereafter referred to as fur seal and sea lion, respectively; and in addition, the use and management of the structure referred to locally as the old sealing plant. This Agreement encompasses activities and program developed and/or conducted by the parties on and adjacent to St. George Island, Alaska in the geographical and topical areas specified by the Co-management Council established pursuant to this Agreement.

B. The National Marine Fisheries Service (NMFS) is the congressionally mandated federal agency responsible for the protection, conservation and management of fur seals and sea lions within jurisdiction of the United States of America.

C. The St. George Traditional Council (STGTC), organized pursuant to the Indian Reorganization Act of 1934, is the legally recognized tribal organization for the Aleut people of St. George and it represents the conservation and co-management interests of fur seal and sea lion hunters and customary/traditional practices of the Aleut Community of St. George Island, Alaska.

II. AUTHORITIES

The Parties recognize and acknowledge that:

A. NMFS has the authority to enter into this Agreement with the STGTC under Section 119 (16 U.S.C. 1388) of the Marine Mammal Protection Act of 1972, as amended (MMPA), and the Endangered Species Act of 1973, as amended (ESA) (16 U.S.C. 1531 et seq.), and the Department of Commerce Joint Project Authority (15 U.S.C. 1525).

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B. The STGTC has the authority to enter into this Agreement according to its constitution and bylaws for the Aleut Community of St. George Island. Additional guidance is provided by Executive Order #13084, May 14, 1998 ("Consultation and Coordination with Indian Tribal Governments"; 63 FR 27655"); Presidential Memorandum, April 29, 1994 ("Government-to-Government Relations with Native American Tribal Governments"; 59 FR No.85).

III. PURPOSE

The STGTC, representing the interests of the Unangan (Aleuts) of St. George Island and NMFS, representing the interests of the citizens of the United States of America, desire to work in partnership for the purpose of:

A. Promoting the conservation and preservation of fur seals and sea lions;

B. Utilizing traditional knowledge, wisdom and values, and the best available science in research, observation, and monitoring efforts to establish the best possible management actions for the protection and conservation of fur seals and sea lions;

C. Establishing a process of shared local responsibilities regarding the management and research of fur seals and sea lions.

D. Identifying and resolving, through a consultative process, any conflicts that may arise in association with the management and conservation of fur seals and sea lions on and adjacent to St. George Island, Alaska.

E. Providing information to hunters and the affected community, as a means for increasing the understanding of sustainable use, management, and conservation of fur seals and sea lions.

F. Establishing a process of shared responsibility for the use, management, operation, and upkeep of the structure locally known as the old sealing plant.

To achieve these purposes, this Agreement provides for:

1. Cooperation between members of the STGTC and NMFS in the conservation and management of fur seals and sea lions for the year 2001 and thereafter, and;

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2. The establishment of a St.George Island Co-Management Council under this Agreement.

IV. BACKGROUND

In April 1994, the MMPA was amended to include Section 119 "Marine Mammal Cooperative Agreements in Alaska." Section 119 formalizes the rights of Alaska Native Organizations to participate in conservation-related co-management of subsistence resources and their use. Section 119 also authorized the appropriation of funds to be transferred by NMFS to Alaska Native Organizations to accomplish these activities.

V. GUIDING PRINCIPLES

A. The best way to conserve and provide for stewardship of fur seals and sea lions critical to traditional practices and Unangan way of life, is through a partnership between the STGTC and the federal statutory management authority, which to the maximum extent allowed by law, provides for full participation by Unangan of St. George, through the STGTC, in decisions affecting the management of marine mammals used for subsistence purposes.

B. As the primary customary/traditional users of the fur seals and sea lions on and adjacent to St. George Island, Alaska, the Aleut Community of St. George is committed to long term sustainable use of these animals for cultural continuity, food, clothing, arts, and crafts. The rich Unangan tradition and ancestral interaction with fur seals and sea lions provides a unique understanding and knowledge of these animals.

C. Under the MMPA as amended, NMFS is mandated to employ the best available science and natural resource management practices to maintain marine mammal stocks and populations at levels necessary to sustain customary/traditional uses by Unangan of St. George Island and other indigenous peoples of Alaska.

D. A key to the success of this partnership is to incorporate the spirit and intent of co-management by building trust and by establishing close cooperation and communication between the two Parties. Shared decision making shall be through consensus, based on mutual respect and understanding of each Party's cultural perspectives.

VI. CO-MANAGEMENT OF FUR SEALS AND SEA LIONS ON ST. GEORGE ISLAND, ALASKA

Understanding that the structure, process and responsibilities associated with the successful implementation of this Agreement and effective co-management of fur seals and sea lions on St. George Island must be clearly defined, the Parties agree that;

A. Operational Structure

1. Regarding the need for a cooperative effort to conserve fur seal and sea lion populations and to maintain a sustainable harvest for traditional uses, the Parties agree to establish a co-management body to be called the St. George Island Co-Management Council (here after referred to as the Co-Management Council).

2. Upon effect of this Agreement, the STGTC and NMFS shall each appoint three (3) members to the Co-Management Council. The members of the Co-Management Council shall serve at the pleasure of the Party by which they were appointed. The Co-Management Council shall select co-chairs by consensus. One (1) co-chair shall be a representative of the STGTC and one (1) a representative of NMFS.

3. The Co-Management Council shall hold at least two (2) meetings a year and may hold other meetings, as necessary, at the request of either Party. Co-Management Council meetings shall be held and conducted on St. George Island Alaska, unless mutually agreed otherwise. The Co- Chairs shall circulate a draft agenda for comment two (2) weeks prior to each meeting. A quorum of four (4) members is required to conduct a meeting. Decisions of the Co-Management Council shall be through consensus, based on mutual respect. Meetings of the Co-Management Council shall be open to the public. The Co-Management Council may also hold executive sessions.

4. The Co-Management Council shall perform the following actions:

   a. Develop annual management plans, monitoring programs, and research programs for St. George Island.

   b. Annually review the contents, performance and responsibilities in this Agreement.

   c. Review and assess progress towards implementation of this Agreement.

   d. Identify challenges to achieving the purpose of this Agreement.

   e. Recommend solutions to any identified challenges.

   f. Identify future courses of action.

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g. Review applicable laws and regulations governing the subsistence take and use of fur seals and sea lions for the purpose of making recommendations for appropriate change to NMFS.

B. **Cooperative Responsibilities**:

Guided by the Co-Management Council and process, the STGTC and NMFS will share the following responsibilities in each of the subject areas identified:

1. **Management Plans:** Develop local management plans for fur seals, sea lions, and their associated haul-out and rookery areas. Develop a management plan for the sealing plant. The management plans will be reviewed annually. The management plans will include the topics and items deemed appropriate and necessary by the Co-Management Council such as:

a. Monitoring and Research Programs; Harvest and Rookery Management; Local Regulations and Enforcement for the protection of fur seals, sea lions and their haul-outs or rookeries;

b. Education and Information; Training; Funding; Summary of recent progress and new information;

c. Outline of future goals and activities; Identify information and conservation needs;

d. A joint-use agreement for the use of the structure locally known as the old sealing plant for fur seal pelt processing, research, and interpretation and:

e. Other items as deemed necessary.

2. **Monitoring Programs:** To establish consistent year-round rookery and shoreline observations to document and respond to unusual or specific events including wildlife behavior, disturbance, oil spills, etc. the Parties agree to;

a. Develop and implement long term monitoring programs for local fur seal and sea lion populations, associated rookeries and haul out areas to document and respond to any observed changes;

b. Conduct seasonal debris clean-ups and surveys at rookeries and beaches identified by the Co-Management Council; and

c. Identify the appropriate equipment, facilities, and technical assistance necessary to conduct rookery and beach clean up programs and surveys.

3. **Research Programs:** As directed by the Co-Management Council, the Parties agree to promote and continue the following specific fur seal and sea lion research efforts, including, but not limited to:

a. Assessment of population abundance and trends by stock and, as possible, by sub-areas within those stocks using conventional science methods;

b. Assessment of habitat use and seasonal movements (including information on preferred haul-out sites, foraging areas, and prey composition);

c. Assessment of sources of mortality and the extent, timing, and location of such mortality;

d. Assessment of population status (including age structure, vital rates, and indices of physical condition);

4. **Disentanglement Program:** To reduce the level of entanglement and effect the release of fur seals and sea lions from marine debris, the Parties agree to promote and continue the following efforts and activities:

a. Collection of information regarding date, location, sex, age, age class, debris type, capture attempts, disentanglements, degree of wound, re-sightings, animals sheared, animals with shear marks, scarred animals, and tagged animals and numbers;

b. Calculation of entanglement rates incorporating data from the annual subsistence fur seal harvest including debris type, width, mesh diameter, twine size and other information as appropriate;

c. Maintenance of existing research and identify the appropriate equipment, facilities, and technical assistance to conduct the disentanglement program.

5. **Local Opportunities for Scientific Research Projects:** Recognizing the need for and value of community awareness and involvement regarding the protection

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and conservation of fur seals and sea lions, the Parties agree to undertake a collaborative effort to accomplish the following:

a. Establish mentoring opportunities for local youth regarding environmental science and natural resource management;

b. Work with the local school district regarding support of and participation in science fairs and special projects regarding environmental education and natural resource management;

c. Coordinate with local entities and programs to establish employment opportunities regarding environmental science and natural resource management.

d. Annually meet for the purpose of assessing progress under this section, and to strategically plan new initiatives.

e. Develop such other activities, projects, and/or programs as the parties may agree to undertake from time to time.

6. **Maintenance of Fur Seal Rookeries:** To improve the condition and ensure continued use of the fur seal rookery and haul-out areas by local people and visitors, the Parties agree to:

a. Design, construct, and maintain permanent signs for each rookery.

b. Such other actions as deemed appropriate by the Co-Management Council.

7. **Co-Managing the Harvest:** To improve and advance the viability and sustainability of the subsistence take of fur seals the Parties agree:

a. To negotiate and establish the beginning date of each annual fur seal harvest, in accordance with applicable federal regulations;

b. That the Harvest Foreman and NMFS Representative will, in accordance with applicable federal regulations determine which fur seal rookery subsistence seal harvesting will be conducted on a daily basis;

c. That the Harvest Foreman will accept responsibility to ensure that the number of fur seals experiencing heat stressed is kept to the absolute minimum number as possible. The Harvest Foreman and the NMFS

Representative, will have the authority to shut down the subsistence harvest any day when the temperature or other factors contributing to heat stress;

d. The Harvest Foreman will accept responsibility for keeping the number of females taken to the following levels:

(i). When five (5) females have been killed the subsistence harvest will stop for a period of two (2) days so that the subsistence harvest workers can discuss the reasons why females were harvested and correct problems contributing to the take of females.

(ii). When eight (8) females have been killed the subsistence harvest may be stopped for that season.

e. The Harvest Foreman will insure the entire subsistence harvest operation is done in an efficient manner, and which avoids or minimizes unnecessary injury and mortality to the fur seals and the subsistence harvest workers;

f. The Harvest Foreman will ensure that the subsistence harvesting activities will not result in litter or undue damage to habitat and tundra;

g. The Co-Management Council will work with NMFS to promote and establish "full utilization" of fur seals taken in the subsistence harvest by making every attempt to use, to the maximum extent practical and allowed by law, all parts of the animals taken at the subsistence harvest. In addition to edible parts, the term "all parts" includes the pelts, teeth, guts, bacula ("seal sticks"), carcasses and other inedible by-products of the subsistence harvest which may be legally utilized to cover subsistence seal harvest and processing costs.

h. The Co-Management Council will conduct local surveys of the subsistence take of fur seals and sea lions on an annual basis. The surveys will include:

(i). Number harvested.
(ii). Number struck and/or lost.
(iii). Total take (harvest plus struck and lost).
(iv). Sex of harvested or recovered animals.
(v). Categories harvested or recovered (number of pups, sub-adults, or adults).

(vi). Designated fur seal haul outs and sea lion hunting sites as determined annually by the Co-Management Council.
(vii). The collection of biological samples if deemed necessary by the Co-Management Council.

i. Identify the appropriate equipment, facilities, and technical assistance necessary to conduct the subsistence fur seal harvest.

8. **Providing Education and Information:** Recognizing the imperative and value of an informed public regarding the protection, conservation and management of fur seals and sea lions, the Parties agree to:

a. Educate and inform subsistence harvest workers as to the most appropriate and best available methods for harvesting and processing fur seals;

b. Educate and inform the Aleut Community of St. George as to the health and status of northern fur seals and sea lion populations on St. George Island including factors contributing to the fur seal's and/or sea lion's decline or increase;

c. Educate and inform St. George Island sea lion hunters in the proper methods for hunting sea lions;

d. Develop a training and internship program to directly involve local people in harvest monitoring, bio-sampling, and research programs;

e. Involve hunters and customary/traditional users in the development of regulatory and management decisions affecting the subsistence use of fur seals and sea lions through representation on the Co-Management Council;

f. Designate the STGTC as the primary local contact for exchange of information regarding fur seals and sea lions.

C. Training

To establish a fair and equitable co-management relationship and an appropriate level of practical experience and technical expertise, the Parties agree to:

1. Work in partnership to develop and provide cross cultural training and information for efforts to increase understanding of Unangan ways of life,

traditional ways of knowing, local concerns and issues regarding fur seal and sea lion use by the Aleut Community of St. George (i.e. food, medicinal, handicraft, arts, and spiritual uses). In addition, the training will involve orientation on such issues as agency policies, legal and administrative constraints, and scientific approaches;

2. Obtain appropriate training for a local Conservation Officer, especially regarding the identification and proper documentation of Tribal and federal regulations;

3. Provide mentors and research opportunities for local individuals whenever possible;

4. Network and share STGTC/NMFS planning, research, and data collection procedures with the community of St. George and to provide the appropriate training in those procedures.

VII. CONSULTATION

To facilitate the implementation of this Agreement and ensure an equitable working relationship, the Parties agree that:

A. The STGTC and NMFS shall consult on a routine basis as set forth in this Agreement. In addition, the STGTC President and NMFS Representative for St. George Island shall communicate on an "as needed basis" concerning matters related to northern fur seals and sea lions that either Party deems suitable for such consultation.

B. Should disagreement arise on the interpretation of the provisions of this Agreement, or amendments and/or revisions thereto, that cannot be resolved at the operating level, the Parties shall submit written statements regarding the disagreement to the Co-Management Council created herein. Within thirty (30) days from receipt of the written statements, the Co-Management Council shall provide copies to each Party and convene a meeting of the Co-Management Council for the purpose of resolving the disagreement. In the event that the disagreement remains unresolved after the thirty day period and absent a mutual agreement by the Parties to extend the time period, the Co-Management Council shall refer the matter to higher levels of the respective Parties for appropriate action.

VIII. REGULATION AND ENFORCEMENT

To effectively implement this Agreement, the Parties agree that:

A. The STGTC recognizes the Secretary of Commerce's authority to enforce the provisions of the MMPA, ESA and Fur Seal Act applicable to the subsistence harvest of fur seals and sea lions.

B. NMFS recognizes the existing STGTC authority to govern and regulate their own members and their conduct regarding the traditional uses of fur seals and sea lions, and all parties acknowledge the authority of the tribe to conduct the following in cooperation with NMFS:

1. Conduct rookery disturbance monitoring and local enforcement upon closing of the rookeries and to monitor sea lion hunting activities;

2. Conduct access permitting for the fur seal viewing blinds and subsistence fur seal harvest;

3. Develop and implement Tribal ordinances governing the hunting of sea lions and harvesting of fur seal and provide NMFS with up to date Tribal ordinances;

4. Develop and implement an effective local processes for informing the public regarding fur seal and sea lion federal and tribal laws and regulations;

5. Review, recommend, and advise on revisions to federal regulations governing fur seals and sea lions.

IX. FUNDING

Recognizing that certain costs may be associated with the implementation of this Agreement, both Parties agree:

A. That long term funding for sustained co-management and conservation programs is important for the health of fur seals and sea lions. No financial commitment on the part of any Party is required by this Agreement. Any requirement of this Agreement for the obligation or expenditure of funds by NMFS or STGTC for the use of staff or agency resources provided by specific appropriations, shall be subject to the availability of appropriated funds.

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C. The STGTC will submit a yearly budget to NMFS to fulfill specific responsibilities stated in this Agreement for each fiscal year the Agreement is in effect.

D. The NMFS will review the annual budget and after consultation with the STGTC, will assist with the obligation and provision of funding as deemed appropriate under the authorities specified in Section II (A) of this Agreement.

X. OTHER PROVISIONS

A. Nothing in this Agreement is intended or shall be construed to authorize any expansion or change in the respective jurisdiction of Tribal, Federal, or State Governments over fish and wildlife resources, or alter in any respect the existing political or legal status of Alaska Native entities.

B. Except as expressly provided herein, nothing in this Agreement shall restrict or limit any right or privilege of the STGTC (Unangan Community of St. George Island) with respect to fisheries, customary/traditional uses, or other use of any species.

C. Nothing herein is intended to conflict with current National Oceanic and Atmospheric Administration or NMFS statutory requirement and mandate. If the terms of this Agreement are inconsistent with existing laws, regulations, or legal mandates of either of the Parties entering into this Agreement, then those portions of this Agreement which are determined to be inconsistent shall be invalid, but the remaining terms and conditions not affected by the inconsistency shall remain in full force and effect. At the first opportunity for revision of this Agreement, all necessary changes will be accomplished by either an amendment to this Agreement or by entering into a new Agreement, whichever is deemed appropriate to the interests of both Parties.

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F. All scientists who plan to conduct research on behalf of either Party on or around St. George Island as defined in Section I of this agreement are required to advise the Co-Management Council established herein in a timely manner as to the purpose, goals, and time frame of the research, data gathering techniques, expected results and possible adverse impacts of the proposed research. The Co-Management Council shall review this information and upon reaching a consensus, may provide comments and recommendations accordingly.

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National Marine Fisheries Service

7/27/01

for James Balsinger Date
Administrator, Alaska Region
National Marine Fisheries Service
U. S. Department of Commerce
P. O. Box 21668
Juneau, Alaska 99801

Aleut Community of St. George Island

Boris Merculief Date
President, St. George Traditional Council
P.O. Box 940
St. George Island, Alaska 99591

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