UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
P.O. Box 21668
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Endangered Species Act (ESA) Section 7(a)(2) Biological Opinion
Reissuance of National Pollutant Discharge Elimination System General Permit AKG524000 for Offshore Seafood Processors in Alaska

NMFS Consultation Number: AKR-2018-9801

Action Agency: Environmental Protection Agency, Region 10

Affected Species and Determinations:

ESA-Listed Species	Status	Is Action Likely to Adversely Affect Species or Critical Habitat?	Is Action Likely To Jeopardize the Species?	Is Action Likely To Destroy or Adversely Modify Critical Habitat?
Blue whale (*Balaenoptera musculus*) Eastern North Pacific	Endangered	No	No	N/A
Sei whale (*Balaenoptera borealis*) Eastern North Pacific	Endangered	No	No	N/A
Beluga whale (*Delphinapterus leucas*) Cook Inlet DPS	Endangered	No	No	No
Fin whale (*Balaenoptera physalus*) Northeast Pacific	Endangered	No	No	N/A
Humpback whale (*Megaptera novaeangliae*) Western North Pacific DPS	Endangered	No	No	N/A
Humpback whale (*Megaptera novaeangliae*) Mexico DPS	Threatened	No	No	N/A
Sperm whale (*Physeter macrocephalus*) North Pacific	Endangered	No	No	N/A
Bowhead whale (*Balaena mysticetus*) Western Arctic	Endangered	No	No	N/A
North Pacific right whale (*Eubalaena japonica*)	Endangered	No	No	No
Gray whale (*Eschrichtius robustus*) Western North Pacific	Endangered	No	No	N/A
Bearded seal (*Erignathus barbatus*)	Threatened	No	No	N/A
Ringed seal (*Phoca hispida*)	Threatened	No	No	N/A
Steller sea lion (*Eumetopias jubatus*) Western DPS	Endangered	Yes	No	No
Green Sturgeon (*Acipenser medirostris*) Southern DPS	Threatened	No	No	No
Chinook salmon (*Oncorhynchus tshawytscha*)				
Lower Columbia River	Threatened	No	No	No
Upper Columbia River Spring	Endangered	No	No	No

ESA-Listed Species	Status	Is Action Likely to Adversely Affect Species or Critical Habitat?	Is Action Likely To Jeopardize the Species?	Is Action Likely To Destroy or Adversely Modify Critical Habitat?
Puget Sound	Threatened	No	No	No
Snake River Fall	Threatened	No	No	No
Snake River Spring/Summer	Threatened	No	No	No
Upper Willamette River	Threatened	No	No	No
Chum salmon (*Oncorhynchus keta*) Hood Canal summer-run	Threatened	No	No	No
Columbia River	Threatened	No	No	No
Coho salmon (*Oncorhynchus kisutch*) Lower Columbia River	Threatened	No	No	No
Sockeye salmon (*Oncorhynchus nerka*)				
Lake Ozette	Threatened	No	No	No
Snake River	Endangered	No	No	No
Steelhead trout (*Oncorhynchus mykiss*)				
Lower Columbia River DPS	Threatened	No	No	No
Middle Columbia River DPS	Threatened	No	No	No
Snake River Basin DPS	Threatened	No	No	No
Upper Columbia River DPS	Endangered	No	No	No
Upper Willamette River DPS	Threatened	No	No	No
Puget Sound DPS	Threatened	No	No	No
Green turtle (*Chelonia mydas*) Central N. Pacific DPS and East Pacific DPS	Threatened	No	No	N/A
Loggerhead turtle (*Caretta caretta*) North Pacific Ocean DPS	Endangered	No	No	N/A
Olive ridley turtle (*Lepidochelys olivacea*)	Threatened	No	No	N/A
Leatherback turtle (*Dermochelys coriacea*)	Endangered	No	No	No

Consultation Conducted By: National Marine Fisheries Service, Alaska Region

Issued By:

for James W. Balsiger, Ph.D.
Regional Administrator

Date: June 2, 2019

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TERMS AND ABBREVIATIONS

ADFG	Alaska Department of Fish and Game
BOD	biochemical oxygen demand
BSAI	Bering Sea and Aleutian Islands
CFR	Code of Federal Regulations
CWA	Clean Water Act
DPS	distinct population segment
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESU	evolutionarily significant unit
ITS	Incidental Take Statement
MLLW	mean lower low water
NM	nautical mile
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
PBF	physical and biological features (of critical habitat)
PCE	primary constituent element (of critical habitat)
RPA	reasonable and prudent alternative
TSS	total suspended solids
USFWS	U.S. Fish and Wildlife Service

1. INTRODUCTION

Section 7(a)(2) of the Endangered Species Act of 1973, as amended (ESA; 16 U.S.C. 1536(a)(2)) 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 endangered or threatened species or result in the destruction or adverse modification of critical habitat of such species. When a Federal agency's action "may affect" a protected species, that agency is required to consult with the National Marine Fisheries Service (NMFS) or the U.S. Fish and Wildlife Service (USFWS), depending upon the endangered species, threatened species, or designated critical habitat that may be affected by the action (50 CFR §402.14(a)). Federal agencies are may fulfill this general requirement informally if they conclude that an action "may affect, but is not likely to adversely affect" endangered species, threatened species, or designated critical habitat, and NMFS or the USFWS concurs with that conclusion (50 CFR §402.14(b)).

Section 7(b)(3) of the ESA requires that at the conclusion of consultation, NMFS and/or USFWS provide an opinion stating how the Federal agency's action is likely to affect ESA-listed species and their critical habitat. If incidental take is reasonably certain to occur, section 7(b)(4) requires the consulting agency to provide an incidental take statement (ITS) that specifies the impact of any incidental taking, specifies those reasonable and prudent measures necessary to minimize such impact, and sets forth terms and conditions to implement those measures.

In this document, the action agency is the Environmental Protection Agency (EPA), which proposes to reissue a Clean Water Act National Pollutant Discharge Elimination System General Permit for Offshore Seafood Processors in Alaska. The consulting agency for this proposal is NMFS's Alaska Region. This document represents NMFS's biological opinion (opinion) on the effects of this proposal on endangered and threatened species and designated critical habitat.

The opinion and incidental take statement were prepared by NMFS in accordance with section 7(b) of the ESA (16 U.S.C. 1531, *et seq.*) and implementing regulations at 50 CFR 402.

The opinion and ITS are in compliance with the Data Quality Act (44 U.S.C. 3504(d)(1) *et seq.*) and underwent pre-dissemination review.

1.1 Background

This opinion considers the effects of reissuing a permit to discharge seafood processing waste from vessels operating greater than 3 nautical miles (NM) from the Alaskan shoreline. EPA proposes to reissue the permit with changes from the existing permit, including the removal of a requirement, under certain conditions, for smaller-volume dischargers to grind effluent to no more than 0.5 inches in any dimension. This action has the potential to affect every threatened and endangered species under NMFS's jurisdiction in waters off the coast of Alaska, including whales, seals, sea lions, sea turtles, and a variety of fish species.

This opinion is based on information provided in EPA's May 21, 2019, revised request for consultation, including a cover letter, draft permit, draft Fact Sheet, and "Revised Biological

Evaluation for the General NPDES Permit for Offshore Seafood Processors in Federal Waters off the Coast of Alaska, Permit No. AKG524000" dated May 2019, as well as email and telephone conversations between NMFS Alaska Region and EPA staff, and other sources of information. A complete record of this consultation is on file at NMFS's Juneau, Alaska office.

1.2 Consultation History

On October 31, 2008, NMFS and EPA completed consultation regarding the effects of the existing AKG524000 General Permit, with NMFS concurring that issuance of the permit was not likely to adversely affect listed species or critical habitat under NMFS's jurisdiction. EPA contacted NMFS in August 2015 to discuss reissuing the permit, including the possibility of modifying the requirement for permittees to grind fish waste to less than 0.5 inches before discharging it. NMFS provided basic information about potential effects, especially to Steller sea lions, which may be attracted to discharges of larger pieces of fish. NMFS provided input on the possibility of designing a study to help document the effects of grinding fish waste versus not grinding, but in August 2016 EPA informed NMFS that the Freezer Longline Coalition (petitioner for eliminating the grinding requirement) had decided not to pursue such a study. EPA noted concerns about potential long-term effects to Steller sea lions and short-tailed albatross from eliminating the requirement to grind fish waste, and indicated that it was moving forward with reissuing the permit with a requirement to grind seafood waste to half an inch in size. In June 2018, EPA contacted NMFS again to provide early notification that EPA was proceeding with a proposal to modify the permit to eliminate the grinding requirement. On July 10, 2018, EPA delivered to NMFS the draft Biological Evaluation for this action, and requested that NMFS initiate consultation under section 7 of the ESA. On July 18, NMFS met with EPA to discuss the draft Biological Evaluation. On August 14, NMFS sought clarification of the geographic extent of waters excluded from the general conditions of the proposed permit. On September 6, 2018, EPA provided clarification indicating that this proposed action would authorize unground seafood processing waste discharges within Steller sea lion critical habitat.

By letter dated July 10, 2018, EPA requested section 7 consultation with NMFS and transmitted a draft permit, draft Fact Sheet, and draft Biological Evaluation for a proposal that would have removed the requirement to grind effluent to no more than 0.5 inches in any dimension. EPA subsequently revised the proposed action to remove the grinding requirement only for smaller-volume dischargers under certain conditions. EPA published the draft General Permit for public comment on March 25, 2019. On April 1, 2019, EPA provided a revised request for consultation describing some changes to the proposed action, and included a revised draft Biological Evaluation. On May 21, 2019, the EPA provided NMFS with a revised final Biological Evaluation, Fact Sheet, and updated draft permit language with a new request for consultation. EPA concluded that the proposed action is not likely to adversely affect any listed species under NMFS's jurisdiction. NMFS determined that the proposed action is likely to adversely affect endangered western Distinct Population Segment (DPS) Steller sea lions, and thus we initiated formal consultation on May 21, 2019.

2. DESCRIPTION OF THE PROPOSED ACTION AND ACTION AREA

2.1 Proposed Action

"Action" means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies. "Interrelated actions" are those that are part of a larger action and depend on the larger action for their justification. "Interdependent actions" are those that have no independent utility apart from the action under consideration (50 CFR 402.02). NMFS has not identified any interrelated or interdependent actions associated with this action.

The EPA proposes to reissue the National Pollutant Discharge Elimination System (NPDES) General Permit to Seafood Processors in Alaska (AKG524000) [1] discharging at least 3 nm or greater from the shoreline or closure line. This Permit does not authorize the discharge of pollutants from any shore-based facilities, nor any pollutants from vessels transporting seafood processing waste solely for the purpose of dumping materials into ocean waters. The General Permit will authorize discharges of seafood processing waste from facilities (also referred to as "vessels") that (1) discharge at least 3 nm or greater from the Alaska shore as delineated by mean lower low water (MLLW) or a closure line and (2) which engage in the processing of fresh, frozen, canned, smoked, salted or pickled seafood, the processing of mince, or the processing of meal, paste and other secondary by-products. Types of vessels with coverage under this Permit include catcher-processors and motherships.

These vessels may process any of a large number of species, primarily pollock and Pacific cod, but also including sablefish, arrowtooth flounder, Pacific hake, jack mackerel, Alaska plaice, Pacific Ocean perch, rockfish, sculpin, lumpsucker, skate, sole, Greenland turbot, and bairdi, opilio, and king crab. Catcher/processor vessels may discharge waste while actively fishing.

2.1.1 Proposed Activities

EPA proposes to continue permitting discharges of seafood processing waste offshore of Alaska, as described in section 2.1 above. The proposed action includes the following changes to the 2009 NPDES General Permit to Seafood Processors in Alaska (from EPA Draft Fact Sheet for permit AKG524000):

(1) Terminology clarifications

(2) Removal of the grind requirement for all vessels outside of Steller sea lion critical habitat areas. Within Steller sea lion critical habitat areas that are more than 3 NM from the Alaska coast, vessels that discharge less than 10 million pounds annually will not be required to grind seafood waste prior to discharge, and vessels that discharge greater than 10 million pounds annually will be required to grind seafood waste prior to discharge.

[1] Permit issued March 1, 2010 can be accessed at: https://www.epa.gov/npdes-permits/npdes-general-permit-offshore-seafood-processors-alaska

(3) In cases where grinding is required prior to discharge, permittees must use grinding equipment that is designed to grind seafood wastes to 0.5 inches or smaller, rather than applying a requirement to grind to 0.5 inch in any dimension

(4) Removal of the metals monitoring requirement

(5) A Best Management Practice (BMP) provision that "vessels should be moving while discharging in order to aid dispersion of the discharge, unless doing so would compromise the safety of the vessel"

(6) A requirement to conduct a sea surface visual monitoring program to estimate the occurrence and number of endangered species attracted to the discharge

(7) Revised Notice of Intent (NOI) in Attachment A of the General Permit

(8) Revised Annual Report in Attachment B of the General Permit

(9) A BMP Plan Certification page in Attachment C of the General Permit.

Detailed information on the nature of the effluent is provided in the revised Ocean Discharge Criteria Evaluation (USEPA et al. 2018). Briefly, the types of discharges to be covered by this permit include:

1. Seafood process wastes are authorized for discharge under the permit. The quantity and character of the seafood processing wastes generated vary due to the types of fish processed, finished product, and seasonal variation in their abundance. Discharges from offshore seafood processors may be classified into solid (particulate) and dissolved (soluble) wastes. The major pollutants of concern include residues, biochemical oxygen demand (BOD), total suspended solids (TSS), non-petroleum oil and grease, and nutrients. These pollutants come from the waste solids (shell, bones, skin, scales, flesh and organs), blood, body fluids, slime, oils and fats from cooking and rendering operations. Ammonia may be present intermittently in negligible amounts. The color, turbidity, pH and temperature of process waste effluent may also differ from that of the receiving water.
2. Process disinfectants are authorized for discharge under the permit. Sodium hypochlorite and ammonium chlorides are the primary disinfectants used in the control of microbial contamination of seafood processing equipment and containers. As a result of the periodic use of these disinfectants to sanitize equipment, free chlorine may be present in residual amounts. Other disinfectants that may be discharged under the permit are iodine disinfectants which may also be used for sanitation and may be found in trace amounts.
3. Other wastewaters, including cooling water, boiler water, freshwater pressure relief water, refrigeration condensate, refrigerated seawater, cooking water, scrubber water, water used to transfer seafood to the facility, and live tank water, are authorized for discharge under the permit. Pollutants in these miscellaneous wastewater streams may include TSS, BOD, non-petroleum oil and grease, metals, pH and temperature.

The annual waste discharges from the offshore vessels submitting 2014 annual reports ranged from 0 (no discharge) to 87.8 million pounds. The annual waste discharges from the offshore vessels submitting 2015 annual reports ranged from 0 (no discharge) to 88.2 million pounds. Of the 83 vessels that reported data in 2015, 12 reported zero discharge. The frequency distribution of vessels in 2014 and 2015 is positively skewed with approximately 60 and 65 percent of the facilities discharging less than 10 million pounds, respectively. The median annual waste discharged from vessels in 2014 and 2015 was 7.1 and 6.2 million pounds, respectively. Total discharge for all offshore vessels reporting in 2015 (the most recent data available) was approximately 1.1 billion pounds, representing on the order of 40 percent of the harvested biomass (NMFS 2018).

The draft General Permit authorizes seafood processing discharges to federal marine waters between 3 and 200 NM seaward of the Alaskan MLLW or closure line, including throughout the areas of Steller sea lion critical habitat that are more than 3 NM from shore[2]. The following areas are not covered under the standard conditions of the proposed permit:

Protected water resources and critical habitats.

- Waters within 1 NM of the boundary of a State Game Sanctuary, State Game Refuge, State Park, State Marine Park, or State Critical Habitat are excluded from coverage by the draft General Permit.
- Waters within 1 NM of the boundary of a National Park, Monument or Preserve or within any bay, fjord or harbor enclosed by a National Park, Monument or Preserve are excluded from coverage by the draft General Permit.
- Waters within 1 NM of the boundary of a National Wildlife Refuge are excluded from coverage by the draft General Permit.
- Waters within 1 NM of a National Wilderness Area are excluded from coverage by the draft general permit.
- Waters within 1 NM of designated critical habitat for the Steller's eider or spectacled eider, including nesting, molting and wintering units are excluded from coverage by the draft General Permit.

At-risk resources and waterbodies.

> Areas with water depth of less than 10 fathoms (60 feet) at MLLW that have poor flushing, including but not limited to sheltered waterbodies such as bays, harbors, inlets, coves and lagoons and semi-enclosed water basins bordered by sills of less than 10 fathom depths are excluded from coverage under the draft General Permit. For the purposes of this section, "poor flushing" means average water currents of less than one third of a knot within 300 feet of the outfall. Currents of one third knot and greater offer

[2] In Alaska, Steller sea lion critical habitat in the aquatic zone extends 20 nautical miles (37 kilometers) seaward in State and Federally managed waters from the baseline or basepoint of each major rookery and haulout west of 144°W longitude. The EPA's proposed exclusion zone would still permit seafood discharge in the rest of the aquatic critical habitat (i.e., between 3 and 20 nautical miles of major haulouts and rookeries).

> significant dispersion and re-suspension of seafood process waste residues (ADEC, EPA and Tetra Tech 2018).

EPA also states that areas with "living substrates" such as submerged aquatic vegetation, kelp, and eelgrass in shallow coastal waters are not authorized for discharge. Since these living substrate areas are generally in waters less than 60 feet deep (10 fathoms), they would also be covered under the above stipulation.

Waters covered by other general NPDES permits.

> The permit does not authorize the discharge of pollutants in state waters (0 to 3 nm) and areas covered by other general NPDES permits. The following general permits are currently in effect: AKG527000 (Pribilof Islands), AKG528000 (Kodiak Island), AKG520000 (shore-based), AKG521000 (shore-based), and AKG523000 (near-shore).

Revision to the Grind Requirement

In the 2009 General Permit, the EPA required all permittees to "grind solid seafood processing wastes to 0.5 inch or smaller in any dimension prior to discharge." Under the 2009 General Permit, waters within 3 nautical miles of a rookery or a haulout of the Steller sea lion are excluded from coverage, and no discharge of seafood waste is permitted in those areas. In addition, no discharge is permitted within the fishing areas closed by NMFS to preserve prey for Steller sea lions—the Pacific cod trawl and non-trawl, Pollock fisheries, and Atka mackerel fisheries closed areas. Discharge of seafood processing waste is currently permitted in the other areas of Steller sea lion aquatic critical habitat, that is, in marine waters between 3 and 20 nautical miles around major haulouts and rookeries, and in the special foraging areas, but only if the waste is ground to 0.5 inch or smaller.

In response to guidance in the Fiscal Year 2018 Omnibus, as well as comments from industry, EPA is proposing a revision to the grind requirement. The EPA is proposing to remove the effluent grinding requirement for all vessels if discharge occurs outside of Steller sea lion critical habitat. Furthermore, within Steller sea lion critical habitat, EPA is proposing to exempt from the grinding requirement those vessels that discharge less than 10 million pounds annually. Discharge would not be authorized in areas within 3 nautical miles of a Steller sea lion rookery or major haulout. However, discharge would be authorized in the fishing areas listed above where discharge was previously not permitted under the 2009 General Permit.

The aquatic zone of Steller sea lion critical habitat varies depending on where the rookery or haulout is located. For major rookeries and haulouts:

- West of 144°W longitude, the aquatic zone is 20 nautical miles (37km).
- East of 144°W longitude, the aquatic zone is 3,000 feet (0.9km).

The aquatic zone of critical habitat for Steller sea lions also includes special foraging areas in the Shelikof Strait, Bogoslof, and Seguam Pass areas.

Existing and proposed permit grinding requirements relative to Steller sea lion habitat are depicted in Figure 1 and Table 1.

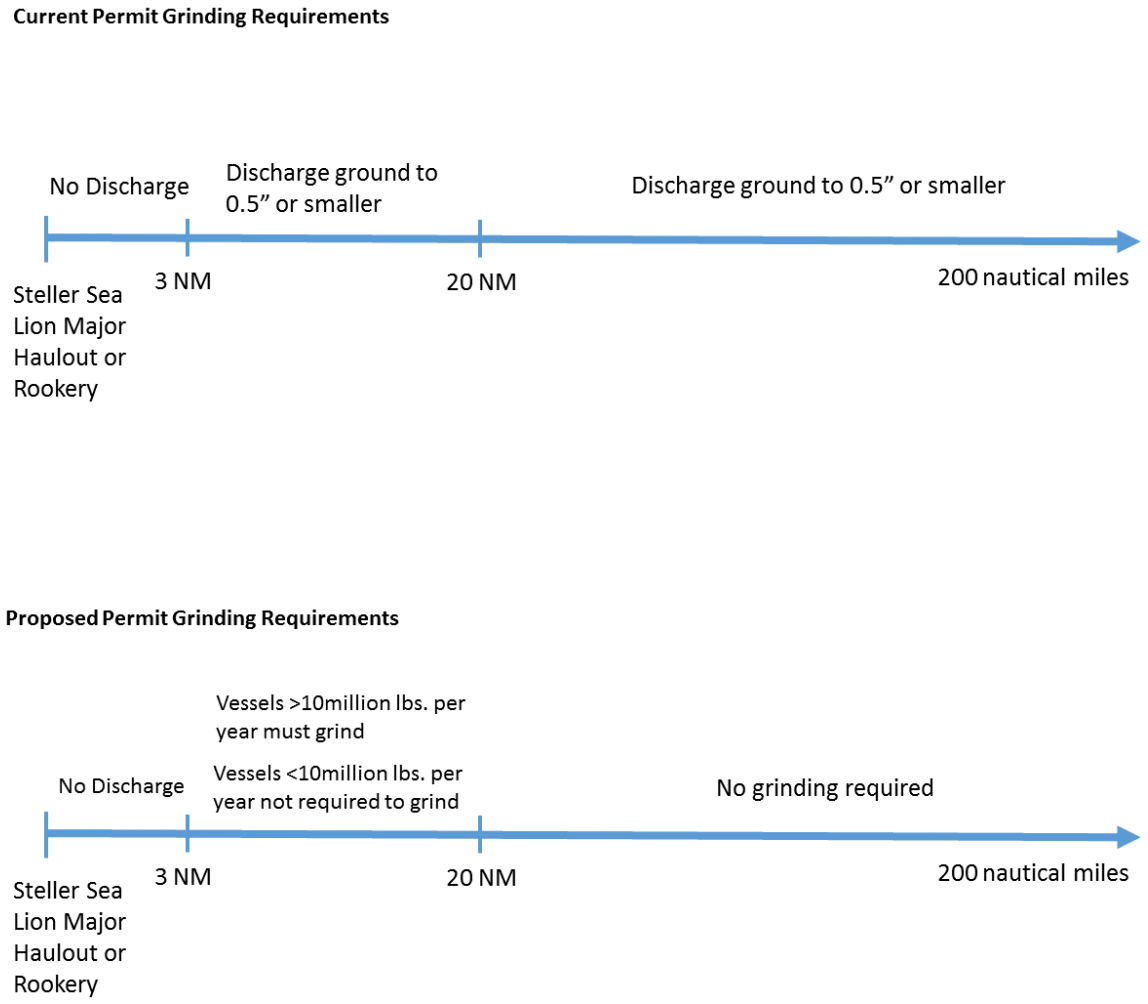


Figure 1. Pictorial representation of existing and proposed permit conditions for grinding of seafood waste relative to distance from Steller sea lion major haulouts and rookeries.

Table 1. Summary of the Current Permit Conditions and the Proposed Revisions for the Seafood Waste Grinding Requirement

Areas	Current 2009 Permit	Proposed Permit
Sea lion critical habitat within 3 NM of a major haulout or rookery	No Discharge Authorized	No Discharge Authorized
Sea lion critical habitat between 3 and 20 NM of major haulout or rookery	Discharge Authorized Grinding Requirement: All Vessels	Discharge Authorized Less than 10 million pounds: No Grinding Requirement More than 10 million pounds: Grinding Requirement
Sea lion critical habitat Special Aquatic Foraging Areas	Discharge Authorized Grinding Requirement: All Vessels	Discharge Authorized Less than 10 million pounds: No Grinding Requirement More than 10 million pounds: Grinding Requirement
Closed Fishing Areas	No Discharge Authorized	Discharge Authorized No Grinding Requirement
All Other Permitted Areas	Discharge Authorized Grinding Requirement: All Vessels	Discharge Authorized No Grinding Requirement

2.1.2 Mitigation Measures

A full account of mitigation measures for this action is contained in the Draft Biological Evaluation and Fact Sheet for this action. In this section, we discuss only the mitigation measures intended to reduce impacts to ESA-listed species under NMFS's jurisdiction.

The draft General Permit includes provisions intended to ensure compliance with marine water quality criteria and to monitor potential interactions with ESA-listed species. The requirements of the sea surface monitoring program are detailed in Part VI.C. of the draft General Permit. Logs of this monitoring must be kept on-board the vessel and submitted to the EPA with the Annual Report on or before February 14th of each year. All permittees must conduct a daily sea surface monitoring program during each year of coverage.

The sea surface monitoring must estimate the occurrence and number of the following ESA-

listed species attracted to the discharge identified within the survey area: short-tailed albatross (*Phoebastria albatrus*), spectacled eider (*Somateria fischeri*), Steller's eider (*Polysticta stelleri*), and Steller sea lion (*Eumetopias jubatus*) (Permit Section VI.C.3.b.(1)). Monitoring of the sea surface by the permittee will provide daily assessments of the presence and amounts of residues floating on the sea surface during a facility's operation and record potential interactions between ESA-listed species and the discharge (blank Sea Surface Visual Monitoring Log form available at: https://www.epa.gov/npdes-permits/npdes-general-permit-offshore-seafood-processors-alaska). The draft permit does not include a requirement to document the duration of each daily monitoring event. Therefore, in our analysis, we consider each daily monitoring session to represent a snapshot in time.

The daily monitoring of the sea surface will:

- Take place while discharge is occurring, if discharge is occurring.
- Record the total number of days for which observations were made.
- Record the daily occurrence and areal extent of floating seafood waste, contiguous films, sheens, or mats of foam.
- Include ESA-listed species monitoring with a record of the geographic location of the vessel, in longitude and latitude, if ESA-listed species are observed [i.e., those listed in the paragraph above].

In its daily monitoring requirements, the EPA stipulated terms specific for Steller sea lions. For Steller sea lions, the survey area extends 250 meters from the point of discharge. If a Steller sea lion is observed, the permittee must note if the animal interacts with the discharge or fishing gear, and provide a description of the interaction.

In addition, permittees are required to submit 4 photographs or images each quarter that show at least one of the following:

1) The receiving water in the immediate vicinity of where the outfall system is discharging;
2) An extended view of the receiving water showing processing waste (if any) on the sea surface behind the vessel;
3) An extended view from the sides of/or behind the vessel showing any interactions with seabirds or marine mammals (if any), and
4) The effluent sample (showing residues size), in cases where grinding of seafood waste is required under Section V.A.3 of the Permit.

Each picture must be labelled with date, time, name of person taking the picture, and a description of what the picture represents.

Upon consideration of these monitoring requirements, we do not consider them adequate to provide a reasonable estimate of the magnitude of the effects of this action on western DPS Steller sea lions. Additional monitoring requirements are contained in the Incidental Take Statement associated with this biological opinion.

2.2 Action Area

"Action area" means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). For this reason, the action area is typically larger than the project area and extends out to a point where no measurable effects from the proposed action occur.

The action area for this opinion includes all waters of the Gulf of Alaska, Aleutian Islands, and Bering Sea between 3 NM from the Alaska shoreline and the outer limits of the Exclusive Economic Zone (~200 miles from shore).

3. APPROACH TO THE ASSESSMENT

Section 7(a)(2) of the ESA requires Federal agencies, in consultation with NMFS, to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species, or adversely modify or destroy their designated critical habitat. The jeopardy analysis considers both survival and recovery of the species. The adverse modification analysis considers the impacts to the conservation value of the designated critical habitat.

"To jeopardize the continued existence of a listed species" means to engage in an action that would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR 402.02). As NMFS explained when it promulgated this definition, NMFS considers the likely impacts to a species' survival as well as likely impacts to its recovery. Further, it is possible that in certain exceptional circumstances, injury to recovery alone may result in a jeopardy biological opinion (51 FR 19926, 19934 (June 2, 1986)).

Under NMFS's regulations, the destruction or adverse modification of critical habitat "means a direct or indirect alteration that appreciably diminishes the value of critical habitat for the conservation of a listed species. Such alterations may include, but are not limited to, those that alter the physical or biological features essential to the conservation of a species or that preclude or significantly delay development of such features" (50 CFR 402.02).

The designations of critical habitat for Steller sea lions, North Pacific right whales, and Cook Inlet beluga whales use the term primary constituent element (PCE) or essential features. The new critical habitat regulations (81 FR 7414) replace this term with physical or biological features (PBFs). The shift in terminology does not change the approach used in conducting a "destruction or adverse modification" analysis, which is the same regardless of whether the original designation identified PCEs, PBFs, or essential features. In this biological opinion, we use the term PBF to mean PCE or essential feature, as appropriate for the specific critical habitat.

We use the following approach to determine whether the proposed action described in Section 2.1 is likely to jeopardize listed species or destroy or adversely modify critical habitat:

1. Identify those aspects (or stressors) of the proposed action that are likely to have direct or indirect effects on listed species or critical habitat. As part of this step, we identify the action area – the spatial and temporal extent of these direct and indirect effects.
2. Identify the rangewide status of the species and critical habitat likely to be adversely affected by the proposed action. This section describes the current status of each listed species and its critical habitat relative to the conditions needed for recovery. We determine the rangewide status of critical habitat by examining the condition of its PBFs - which were identified when the critical habitat was designated. Species and critical habitat status are discussed in Section 4 of this opinion.
3. Describe the environmental baseline including: past and present impacts of Federal, state, or private actions and other human activities *in the action area*; anticipated impacts of proposed Federal projects that have already undergone formal or early section 7

consultation, and the impacts of state or private actions that are contemporaneous with the consultation in process. The environmental baseline is discussed in Section 5 of this opinion.

4. Analyze the effects of the proposed actions. Identify the listed species that are likely to co-occur with these effects in space and time and the nature of that co-occurrence (these represent our *exposure analyses*). In this step of our analyses, we try to identify the number, age (or life stage), and gender of the individuals that are likely to be exposed to stressors and the populations or subpopulations those individuals represent. NMFS also evaluates the proposed action's effects on critical habitat features. The effects of the action are described in Section 6 of this opinion with the exposure analysis described in Section 6.2 of this opinion.
5. Once we identify which listed species are likely to be exposed to an action's effects and the nature of that exposure, we examine the scientific and commercial data available to determine whether and how those listed species are likely to respond given their exposure (these represent our *response analyses*). Response analysis is considered in Section 6.3 of this opinion.
6. Describe any cumulative effects. Cumulative effects, as defined in NMFS's implementing regulations (50 CFR 402.02), are the effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area. Future Federal actions that are unrelated to the proposed action are not considered because they require separate section 7 consultation. Cumulative effects are considered in Section 7 of this opinion.
7. Integrate and synthesize the above factors to assess the risk that the proposed action poses to species and critical habitat. In this step, NMFS adds the effects of the action (Section 6) to the environmental baseline (Section 5) and the cumulative effects (Section 7) to assess whether the action could reasonably be expected to: (1) appreciably reduce the likelihood of both survival and recovery of the species in the wild by reducing its numbers, reproduction, or distribution; or (2) reduce the value of designated or proposed critical habitat for the conservation of the species. These assessments are made in full consideration of the status of the species and critical habitat (Section 4). Integration and synthesis with risk analyses occurs in Section 8 of this opinion.
8. Reach jeopardy and adverse modification conclusions. Conclusions regarding jeopardy and the destruction or adverse modification of critical habitat are presented in Section 9. These conclusions flow from the logic and rationale presented in the Integration and Synthesis Section 8.
9. If necessary, define a reasonable and prudent alternative to the proposed action. If, in completing the last step in the analysis, NMFS determines that the action under consultation is likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat, NMFS must identify a reasonable and prudent alternative (RPA) to the action.

4. RANGEWIDE STATUS OF THE SPECIES AND CRITICAL HABITAT

Numerous species listed under the ESA under NMFS's jurisdiction may occur in the action area. The action area also includes critical habitat for Steller sea lions, North Pacific right whales, and Cook Inlet beluga whales. This opinion considers the effects of the proposed action on these species and designated critical habitats (Table 2).

Table 2. Listing status and species and critical habitat determinations for this action.

ESA-Listed Species	Status	Is Action Likely to Adversely Affect Species or Critical Habitat?	Is Action Likely To Jeopardize the Species?	Is Action Likely To Destroy or Adversely Modify Critical Habitat?
Blue whale (*Balaenoptera musculus)* Eastern North Pacific	Endangered	No	No	N/A
Sei whale (*Balaenoptera borealis*) Eastern North Pacific	Endangered	No	No	N/A
Beluga whale (*Delphinapterus leucas*) Cook Inlet DPS	Endangered	No	No	No
Fin whale (*Balaenoptera physalus*) Northeast Pacific	Endangered	No	No	N/A
Humpback whale (*Megaptera novaeangliae*) Western North Pacific DPS	Endangered	No	No	N/A
Humpback whale (*Megaptera novaeangliae)* Mexico DPS	Threatened	No[3]	No	N/A
Sperm whale (*Physeter macrocephalus)* North Pacific	Endangered	No	No	N/A
Bowhead whale (*Balaena mysticetus)* Western Arctic	Endangered	No	No	N/A
North Pacific right whale (*Eubalaena japonica)*	Endangered	No	No	No
Gray whale (*Eschrichtius robustus)* Western North Pacific	Endangered	No	No	N/A
Bearded seal (*Erignathus barbatus)*	Threatened	No	No	N/A
Ringed seal (*Phoca hispida)*	Threatened	No	No	N/A
Steller sea lion (*Eumetopias jubatus)* Western DPS	Endangered	Yes[4]	No	No
Green Sturgeon (*Acipenser medirostris*) Southern DPS	Threatened	No	No	No
Chinook salmon (*Oncorhynchus tshawytscha*)				
Lower Columbia River	Threatened	No	No	No
Upper Columbia River Spring	Endangered	No	No	No

[3] EPA did not make an effects determination for the Mexico DPS humpback whale.
[4] EPA made a "not likely to adversely affect" determination for Western DPS Steller sea lions. NMFS does not concur with this determination.

ESA-Listed Species	Status	Is Action Likely to Adversely Affect Species or Critical Habitat?	Is Action Likely To Jeopardize the Species?	Is Action Likely To Destroy or Adversely Modify Critical Habitat?
Puget Sound	Threatened	No	No	No
Snake River Fall	Threatened	No	No	No
Snake River Spring/Summer	Threatened	No	No	No
Upper Willamette River	Threatened	No	No	No
Chum salmon (*Oncorhynchus keta*) Hood Canal summer-run	Threatened	No	No	No
Columbia River	Threatened	No	No	No
Coho salmon (*Oncorhynchus kisutch*) Lower Columbia River	Threatened	No	No	No
Sockeye salmon (*Oncorhynchus nerka*)				
Lake Ozette	Threatened	No	No	No
Snake River	Endangered	No	No	No
Steelhead trout (*Oncorhynchus mykiss*)				
Lower Columbia River DPS	Threatened	No	No	No
Middle Columbia River DPS	Threatened	No	No	No
Snake River Basin DPS	Threatened	No	No	No
Upper Columbia River DPS	Endangered	No	No	No
Upper Willamette River DPS	Threatened	No	No	No
Puget Sound DPS	Threatened	No	No	No
Green turtle (*Chelonia mydas*) Central N. Pacific DPS and East Pacific DPS	Threatened	No	No	N/A
Loggerhead turtle (*Caretta caretta*) North Pacific Ocean DPS	Endangered	No	No	N/A
Olive ridley turtle (*Lepidochelys olivacea*)	Threatened	No	No	N/A
Leatherback turtle (*Dermochelys coriacea*)	Endangered	No	No	No

4.1 Species and Critical Habitat Not Likely to be Adversely Affected by the Action

EPA determined that the proposed action is not likely to adversely affect any threatened or endangered species or critical habitat under NMFS's jurisdiction because all of the effects of the action are expected to be insignificant or discountable. Insignificant effects relate to the size of the impact and are those that one would not be able to meaningfully measure, detect, or evaluate, and should never reach the scale where take occurs. Discountable effects are those that are extremely unlikely to occur. If an action is not likely to adversely affect listed species or critical habitats, further analysis in a Biological Opinion is not necessary.

As described in the following paragraphs, NMFS concurs with EPA's determination for critical habitats and for every listed species except western distinct population segment (DPS) Steller sea lions.

The potential effects of the proposed action on listed species and critical habitat are limited because the discharges authorized by the permit renewal will continue to be comprised mostly of fish waste and seawater, but may also contain disinfectants and gray water. Potential effects include any direct consequences of listed species ingesting the processed fish waste, and indirect effects to listed species that may be attracted to the discharges, such as behavioral modifications that may lead to increased potential for entanglement in fishing gear or other interactions with vessels or humans that could result in takes. For critical habitats, potential effects include any impacts to the PBFs that were identified at the time of designation.

Large Whales

Large whales (blue, sei, fin, humpback, sperm, gray, bowhead, and right whales) primarily feed on schools of krill and small fish, and are not known to be attracted to discarded fish from commercial fishing vessels or seafood processing discharges. Sperm whales may depredate longline fishing gear, apparently selectively choosing and consuming fish from the gear, especially during haul-back (Straley et al. 2005, Sigler et al. 2008). However, NMFS is not aware of any observations of sperm whales feeding on a discharge of fish processing waste, and we do not expect sperm whales to be attracted to such discharges even with the removal of the current grinding requirement. Any effects due to this action experienced by listed large whales will be very unlikely to occur, and if the occur, the effects will be immeasurably small. Therefore, we conclude that the effects are both discountable and insignificant.

North Pacific Right Whale Critical Habitat

Critical habitat for the North Pacific right whale was designated in the eastern Bering Sea and in the Gulf of Alaska on April 8, 2008 (73 FR 19000). The PBFs deemed necessary for the conservation of North Pacific right whales include the presence of specific copepods (*Calanus marshallae*, *Neocalanus cristatus*, and *N. plumchris*), and euphausiids (*Thysanoessa Raschii*) that act as primary prey items for the species, and physical and oceanographic forcing that promote high productivity and aggregation of large copepod patches. The action area includes these two areas of designated critical habitat (see Figure 2).

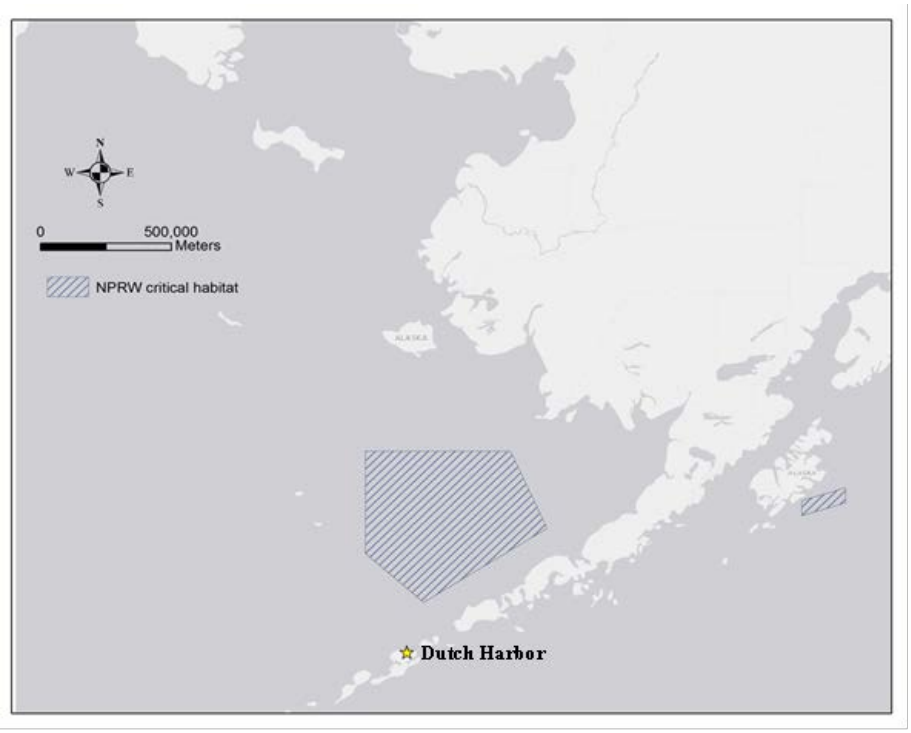


Figure 2. North Pacific right whale critical habitat in the Bering Sea and Gulf of Alaska.

The proposed action primarily involves the discharge of seafood waste. Specifically, it does not change the aggregate biomass, timing, or distribution of waste, but rather the physical form of that waste. It is not expected to alter the physical, chemical, or biological characteristics that support concentrations of copepods or euphausiids because waste will be discharged across a broad area, and will be dispersed by currents. Furthermore, in the case of the seafood processing wastes, there will not be introduction of nutrients or pollutants from outside of the ecosystem; waste is derived from the standing stocks of available biomass within the system. We do not expect that other wastes associated with the proposed action—process disinfectants and other wastewaters—would alter the presence of primary prey items for North Pacific right whales. These wastes have been authorized for discharge into the waters of the Bering Sea and the Gulf of Alaska as part of previous NPDES permits for similar actions. We have not observed impacts to prey items, and would expect that the discharges will rapidly dilute to the point where they are no longer measurable. The proposed action is thus extremely unlikely to affect the presence of primary prey items for North Pacific right whales, nor the physical and oceanographic forcing that promote high productivity and aggregation of large patches of these prey organisms. If any such effects were to occur, we expect they would be too small to detect or measure. Therefore, effects to this critical habitat are insignificant and discountable.

Cook Inlet Beluga Whales and Critical Habitat

Cook Inlet beluga whales exist only in Cook Inlet, and most commonly in the upper portion of the inlet. Although some portions of Cook Inlet are more than three miles from shore, we are not aware of any offshore seafood processing that occurs there. We do not expect the proposed action to result in discharges in or affecting Cook Inlet, and thus it is extremely unlikely that Cook Inlet belugas whales or their critical habitat would be affected in any way. Therefore, such effects are discountable.

Bearded and Ringed Seals

Bearded and ringed seals are opportunistic fish eaters, with bearded seals typically feeding on or near the bottom and ringed seals more apt to feed in the water column. Both species tend to avoid human disturbance rather than be attracted to vessels, and we are not aware of any observations of these seals being attracted to discarded fish from commercial fishing vessels or seafood processing discharges. We do not expect bearded or ringed seals to become food conditioned or attracted to discharges even with the removal of the current grinding requirement. The very low rate of ringed and bearded seals taken as bycatch in fisheries covered by this permit (3.9 ringed seals and 1.4 bearded seals per year from 2010-2014) (Muto et al. 2018), suggests to us that bycatch of these seals may be due to random encounters with fisheries gear, and not due to the animals interacting with the vessels or being attracted by vessel discharge. Therefore, we do not expect an increase in interaction rates between the vessels operating under this proposed permit and these seal species. It is therefore extremely unlikely that bearded or ringed seals would suffer any adverse effects from the proposed action, and any such effects are discountable.

Listed Fish and Sea Turtles

None of the listed fish or sea turtle species and evolutionarily significant units (ESUs) covered in this consultation (green sturgeon, Chinook salmon ESUs, chum salmon ESUs, coho salmon ESUs, sockeye salmon ESUs, steelhead trout ESUs, green sea turtles, olive ridley sea turtles, loggerhead sea turtles or leatherback sea turtles) are known to feed on discarded fish from commercial fishing vessels or seafood processing discharges. If they were to do so, we would expect listed fish or sea turtles to prey upon the discharged waste in much the same manner as they would prey upon any dead organism in the water column, with no adverse consequences. It is therefore extremely unlikely that listed species of fish or sea turtles would suffer any adverse effects from the proposed action, and any such effects are discountable.

Steller Sea Lion Critical Habitat

NMFS designated critical habitat for Steller sea lions on August 27, 1993 (58 FR 45269). In Alaska, designated critical habitat includes the following areas as described at 50 CFR §226.202.

1. Terrestrial zones that extend 3,000 feet (0.9 km) landward from each major haulout and major rookery.
2. Air zones that extend 3,000 feet (0.9 km) above the terrestrial zone of each major haulout and major rookery in Alaska.
3. Aquatic zones that extend 3,000 feet (0.9 km) seaward of each major haulout and major rookery in Alaska that is east of 144º W longitude.
4. Aquatic zones that extend 20 nm (37 km) seaward of each major haulout and major rookery in Alaska that is west of 144º W longitude.
5. Three special aquatic foraging areas: the Shelikof Strait area, the Bogoslof area, and the Seguam Pass area, as specified at 50 CFR §226.202(c).

The action area includes numerous major haulouts and major rookeries, as well as the three designated special foraging areas. The proposed action involves discharges greater than three NM from shore, so would exclude Steller sea lion critical habitat east of 144º W longitude as well as the portions of critical habitat that are closest to major haulouts and major rookeries west

of 144º W longitude. This action will not change the composition, volume, or spatial distribution of discharge within Steller sea lion critical habitat, but rather only the physical attributes of some of the discharge components (non-ground fish carcasses in some areas vs. carcasses ground to less than 0.5 inches diameter). Hence, we expect that any such effects to Steller sea lion critical habitat would be too small to detect or measure, and thus would be insignificant.

Conclusion

We conclude that for all listed large whale species and for North Pacific right whale critical habitat, the effects due to this action are both discountable and insignificant. For the smaller Cook Inlet beluga whale, and for its designated critical habitat, effects due to this action are discountable. Similarly, effects due to this action upon listed bearded and ringed seals are discountable. For Steller sea lion critical habitat, we conclude that adverse effects would be immeasurably small, and thus insignificant. Henceforth, our analysis will focus on effects to western DPS Steller sea lions.

4.2 Status of Listed Species – Western DPS Steller Sea Lion

The Steller sea lion was listed as a threatened species under the ESA on November 26, 1990 (55 FR 49204). In 1997, NMFS reclassified Steller sea lions as two DPSs based on genetic studies and other information (62 FR 24345). At that time, the eastern DPS was listed as threatened, and the western DPS was listed as endangered. On November 4, 2013, the eastern DPS was removed from the endangered species list (78 FR 66139). Information on Steller sea lion biology, threats, and habitat (including critical habitat) is available online at: http://alaskafisheries.noaa.gov/protectedresources/stellers/default.htm and in the revised Steller Sea Lion Recovery Plan (NMFS 2008), which can be accessed at: https://repository.library.noaa.gov/view/noaa/15974.

Numbers of Steller sea lions declined dramatically throughout much of the species' range, beginning in the mid- to late 1970s (Braham et al. 1980, Merrick et al. 1987, NMFS 1995). For two decades prior to the decline, the estimated total population was 250,000 to 300,000 animals (Kenyon and Rice 1961, Loughlin et al. 1984). The population estimate declined by 50-60 percent to about 116,000 animals by 1989, and by an additional 15 percent by 1994, with the entire decline occurring in the range of the western DPS (Muto et al. 2017).

The 2017 Stock Assessment Report for the western DPS of Steller sea lions indicates a minimum population estimate of 53,303 individuals in Alaska (Muto et al. 2018). Data collected through 2016 indicate an increase of about 2 percent per year in non-pup and pup counts of the western DPS between 2003 and 2016. This trend varies by region, with positive trends in the eastern portion of the range and negative trends further west in the Aleutian Islands (Muto et al. 2018).

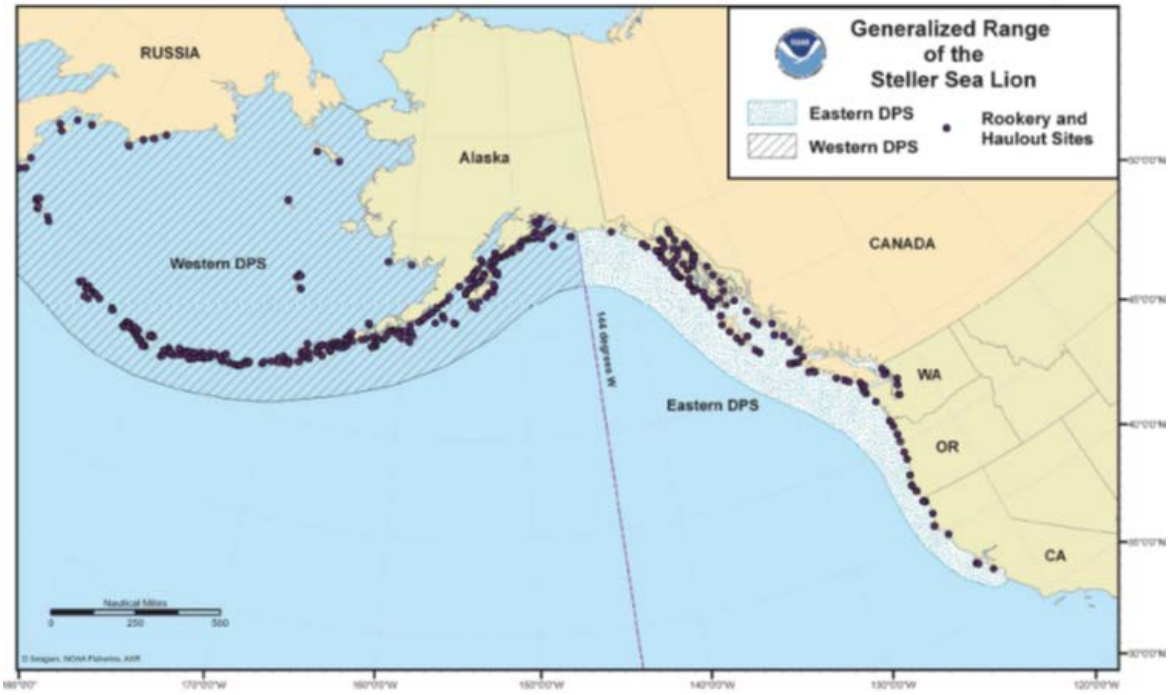


Figure 3. Ranges of the eastern and western DPSs of Steller sea lion.

Steller sea lions range throughout the North Pacific Ocean from Japan, east to Alaska, and south to central California (Loughlin et al. 1984) (see Figure 3). They range north to the Bering Strait, with significant numbers at haul-outs on St. Lawrence Island in the spring and fall (Kenyon and Rice 1961, Sheffield and Jemison 2010). Breeding range extends along the northern edge of the North Pacific Ocean from the Kuril Islands, Japan, through the Aleutian Islands and Southeast Alaska, south to California (Loughlin et al. 1984).

Steller sea lions belong to the family Otariidae, which includes fur seals (*Callorhinus ursinus*). Steller sea lions are the largest otariid and show marked sexual dimorphism with males 2-3 times larger than females. On average, adult males weigh 566 kg (1,248 lb) and adult females are much smaller, weighing on average 263 kg (580 lb) (Fiscus 1961, Calkins and Pitcher 1982, Winship et al. 2001).

Land sites used by Steller sea lions are referred to as rookeries and haulouts. Rookeries are used by adult sea lions for pupping, nursing, and mating during the reproductive season (generally from late May to early July). Haulouts are used by all age classes of both genders but are generally not where sea lions reproduce. Sea lions move on and offshore for feeding excursions. At the end of the reproductive season, some females may move with their pups to other haulout sites and males may migrate to distant foraging locations (Spalding 1964, Pitcher and Calkins 1981). Sea lions may make semi-permanent or permanent one-way movements from one site to another (Chumbley et al. 1997, Burkanov and Loughlin 2005). Round trip migrations of greater than 6,500 km by individual Steller sea lions have been documented (Jemison et al. 2013). Most adult Steller sea lions occupy rookeries during the pupping and breeding season, which extends from late May to early July (Pitcher and Calkins 1981, Gisiner 1985), and exhibit high

site fidelity (Sandegren 1970). During the breeding season some juveniles and non-breeding adults occur at or near the rookeries, but most are on haulouts (Rice 1998, Ban 2005, Call and Loughlin 2005).

The foraging strategy of Steller sea lions is strongly influenced by seasonality of sea lion reproductive activities on rookeries, and the ephemeral nature of many prey species. Steller sea lions are generalist predators that eat a variety of fishes and cephalopods (Pitcher 1981, Calkins and Goodwin 1988, NMFS 2008), and occasionally other marine mammals and birds (Pitcher and Fay 1982, NMFS 2008).

The ability to detect sound and communicate underwater is important for a variety of Steller sea lion life functions, including reproduction and predator avoidance. Loud anthropogenic sounds can interfere with Steller sea lion auditory capabilities. Steller sea lions are categorized in the Otariid pinniped (OW) functional hearing group (Southall et al. 2007). Studies of Steller sea lion auditory sensitivities have found that this species detects sounds underwater between 1 to 25 kHz (Kastelein et al. 2005), and in the air between 0.25 to 30 kHz (Mulsow and Reichmuth 2010).

Stressors/Threats

Complete descriptions of stressors to the western DPS of Steller sea lions are provided in Section IV of the recovery plan (NMFS 2008).

Fisheries Interactions

Between 2011-2015, there were incidental serious injuries and mortalities of western Steller sea lions observed in ten federal fisheries: Bering Sea and Aleutian Islands (BSAI) flatfish trawl, BSAI Pacific cod trawl, BSAI pollock trawl, BSAI Pacific cod longline, Gulf of Alaska Pacific cod trawl, Gulf of Alaska Pacific cod longline, Gulf of Alaska sablefish longline, Gulf of Alaska flatfish trawl, Gulf of Alaska rockfish trawl, and Gulf of Alaska pollock trawl (Muto et al. 2018). In the early 1990s, observers monitoring the state-managed Prince William Sound salmon drift gillnet recorded two Steller sea lion mortalities, with an extrapolated estimate of 15 animals per year (Wynne et al. 1992). The current rate of incidental mortality and serious injury for this salmon fishery is not known. Overall, the estimated mean annual mortality and serious injury rate from federal and state-managed U.S. commercial fisheries is 31 sea lions per year, which is likely an underestimate of the actual level (Muto et al. 2018).

During 2011-2015, the minimum annual mortality and serious injury rate for this stock due to unknown fisheries was estimated at 1.4 animals. This estimate is considered a minimum because not all entangled animals strand and not all stranded animals are found or reported (Muto et al. 2018). The minimum average annual mortality and serious injury rate for all fisheries based on observer data, stranding data, and from other unknown fisheries (recreational, subsistence, or commercial) is 33 animals per year (the 31 from fishery observer bycatch data mentioned in the preceding paragraph plus 0.2 from stranding data that indicate fishery-caused mortality that did not show up in bycatch statistics, and 1.4 from unknown fisheries that may not be covered by this permit) (Muto et al. 2018).

Subsistence Harvest

The mean annual subsistence take (harvested plus struck-and-lost) from this DPS from 2004 through 2008, combined with the mean take over the 2011-2015 period from St. Paul and St.

George, is 204 western DPS Steller sea lions per year (Muto et al. 2018).

Marine Debris or other Human Interactions

Reports from the NMFS stranding database of Steller sea lions entangled in marine debris or with injuries caused by other types of human interaction are another source of mortality data. From 2011-2015, eight animals were documented as illegally shot, ten were observed entangled in marine debris, one was struck by an arrow, and one was entangled in a hatchery net. For 2011-2015, the mean annual mortality and serious injury from other sources of human interactions is 2 per year due to entanglement in marine debris, and 2.6 per year due to other human causes (Muto et al. 2018). Illegal harvest of the western DPS of Steller sea lions is known to occur, but to an unknown extent. Western DPS Steller sea lions with suspected gunshot wounds have been found stranded on shore along the outer Copper River Delta as recently as 2016 (NMFS unpublished data). Two men were convicted and sentenced in federal court in 2018 for harassing and killing Steller sea lions by gunshot and obstructing the government's investigation into their criminal activities.

Research Activities

Mortalities may occasionally occur incidental to marine mammal research activities authorized under MMPA permits issued to a variety of government, academic, and other research organizations. Between 2011-2015, there were three mortalities resulting from research on western DPS Steller sea lions resulting in a mean annual mortality and serious injury rate of 0.6 animals per year (Muto et al. 2018).

Other Stressors

Other stressors may include nutritional stress related to competition with commercial fisheries or climate/environmental change, predation by killer whales, toxic substances, disease and parasitism, disturbance from vessel traffic and tourism, and environmental variability, which may potentially be affecting recovery (NMFS 2008, Muto et al. 2018).

5. ENVIRONMENTAL BASELINE

The "environmental baseline" includes the past and present impacts of all Federal, state, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of state or private actions which are contemporaneous with the consultation in process (50 CFR 402.02).

Climate and Environmental Change

Since the 1950s the atmosphere and oceans have warmed, snow and sea ice have diminished, sea levels have risen, and concentrations of greenhouse gases have increased (IPCC 2013). There is little doubt that human influence has been the dominant cause of the observed warming since the mid-20th century (IPCC 2013). The impacts of climate change are especially pronounced at high latitudes and in polar regions. Average temperatures have increased across Alaska at more than twice the rate of the rest of the United States (EPA 2017). In the past 60 years, average air temperatures across Alaska have increased by approximately 3°F, and winter temperatures have increased by 6°F (Chapin et al. 2014). In the Chukchi Sea, August sea surface temperatures are warming more than 4.5 times faster than other oceans, at a rate of 1.3°F per decade since the 1980s (NOAA 2017). In August 2017, sea surface temperatures in the Barents and Chukchi seas were up to 7.2°F warmer than the 1982-2010 average. Some of the most pronounced effects of climate change in Alaska include disappearing sea ice, shrinking glaciers, thawing permafrost, and changing ocean temperatures and chemistry (Chapin et al. 2014).

The loss of sea ice may alter marine ecosystems and reduce habitat for ice-dependent species such as listed ringed and bearded seals in ways to which they cannot adapt at the rate the changes are occurring. Additionally, the loss of sea ice increases the potential for further anthropogenic impacts as vessel traffic for transportation and tourism and resource extraction activities move into newly ice-free regions.

The impacts of these changes and their interactions on listed species in Alaska are hard to predict. A recent period of especially warm water in the North Pacific Ocean, referred to as "the blob," is likely responsible for poor growth and survival of Pacific cod, an important prey species for endangered Steller sea lions. The preliminary 2017 estimate of Pacific cod biomass is approximately 28 percent of the average biomass since 1984. Biologists also attribute increases in bird die-offs, whale strandings, toxic algae blooms, and poor salmon survival to warmer water conditions (Bernton 2017).

The world's oceans have absorbed approximately one-third of the anthropogenic CO_2 released, which has curtailed the increase in atmospheric CO_2 concentrations (Sabine et al. 2004). Despite the oceans' role as large carbon sinks, in 2016, the mean monthly average CO_2 level exceeded 400 ppm and continues to rise (NOAA 2018). As the oceans absorb more CO_2, ocean acidification is occurring, which reduces the amount of calcium carbonate minerals that many organisms use to form and maintain shells (Reisdorph and Mathis 2014). Shelled zooplankton such as pteropods are prey for many species of carnivorous zooplankton, fishes including salmon, mackerel, herring, and cod, and baleen whales (Orr et al. 2005). Under increasingly acidic conditions, pteropods may not be able to grow and maintain shells, and are often considered an indicator species for ecosystem health. It is uncertain if they may be able to evolve

quickly enough to adapt to changing ocean conditions (Fabry et al. 2009).

Additionally, as the ocean becomes more acidic, low frequency sounds (1-3 kHz and below) travel farther because the concentrations of certain ions that absorb acoustic waves decrease with decreasing pH (Brewer and Hester 2009).

Fisheries

Commercial, subsistence, and recreational fisheries, whether Federally or State managed, may harm or kill listed marine species through direct bycatch, gear interactions (entrapments and entanglements), vessel strikes, contaminant spills, habitat modification, competition for prey, and behavioral disturbance or harassment. Worldwide, more than 97 percent of whale entanglements are caused by derelict fishing gear (Baulch and Perry 2014), and this is likely an underestimate, as many marine mammals that die from entanglement tend to sink rather than strand ashore. Entanglement may also make marine mammals more vulnerable predation and ship strikes by restricting agility and swimming speed.

Additionally, commercial fisheries may indirectly affect whales and seals by reducing the amount of available prey or affecting prey species composition. In Alaska, commercial fisheries target known prey species of ESA-listed whales, sea lions, and seals, such as pollock and cod, and bottom-trawl fisheries may disturb habitat for bottom-dwelling prey species of ESA-listed species.

The NMFS Bycatch Report estimates bycatch of marine mammals (NMFS 2016). Additionally, under the MMPA, NMFS maintains an annual list of fisheries that categorizes U.S. commercial fisheries according to the level of interactions that result in incidental mortality or serious injury of marine mammals. Detailed information on U.S. commercial fisheries in Alaska waters, including observer programs and coverage and observed incidental takes of marine mammals), is presented in the Alaska Stock Assessment Reports (Muto et al. 2018).

Groundfish fisheries (including pollock, cod, flatfish, sablefish, rockfish, and other species) in Alaska are managed under fishery management plans (FMPs) developed by the North Pacific Fishery Management Council (NPFMC). These fisheries incidentally take small numbers of Steller sea lions throughout the Bering Sea (Figure 4). By regulation, up to 2 million metric tons of groundfish may be harvested annually from the BSAI. In 2017, more than 535,000 metric tons of groundfish were authorized for harvest in the GOA. Nearly 80 percent of the halibut apportioned to Alaska is allocated to fisheries in the Gulf of Alaska (including Southeast Alaska). The remainder is allocated and harvested in the BSAI.

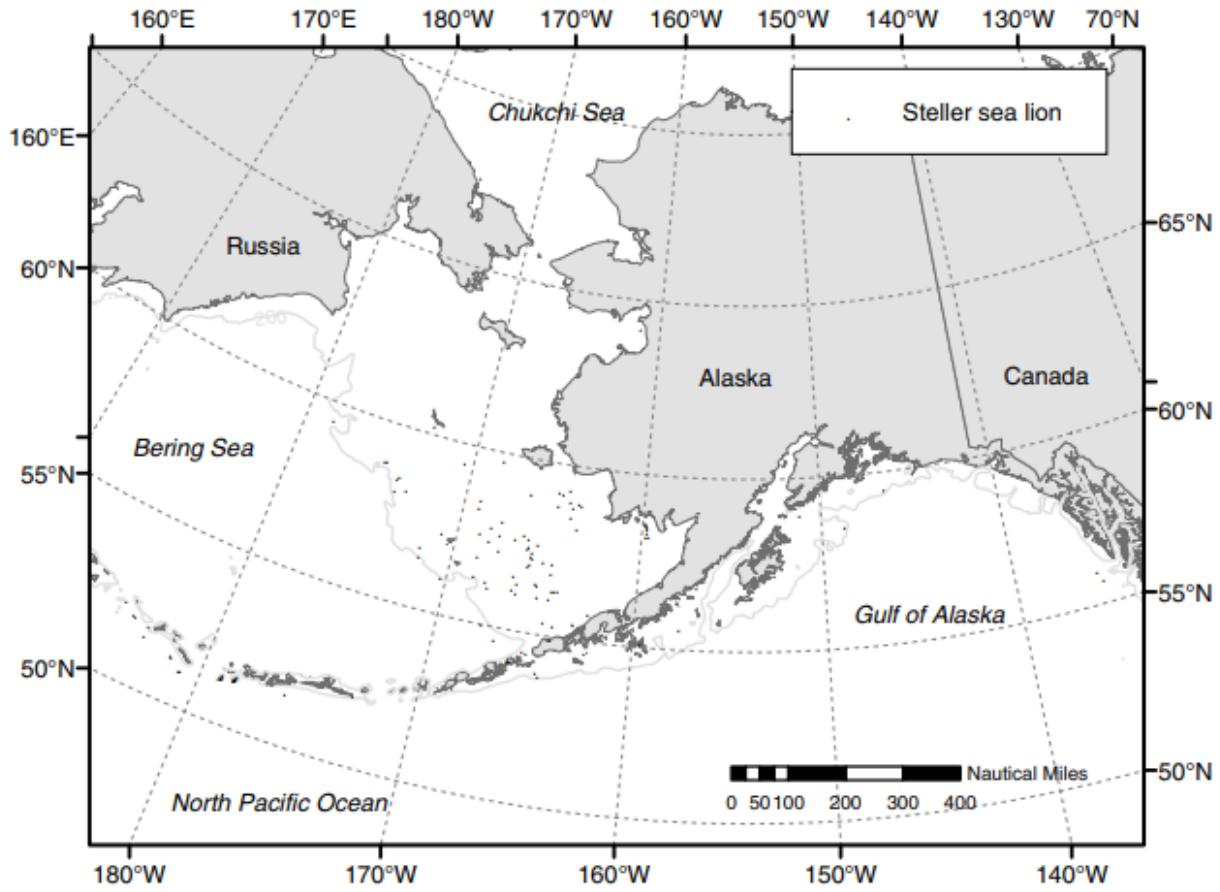


Figure 4. Locations in the Bering Sea, Aleutian Islands, and Gulf of Alaska where Steller sea lions were incidentally taken by domestic and joint venture groundfish fisheries, 1989-2001. Only animals which were either killed or seriously injured during fishing operations are included (Perez 2003).

NMFS manages 10 stocks of crab in the BSAI under an FMP, and the State of Alaska manages the remaining crab stocks. Pot gear is the primary gear type used in the directed crab fisheries. In 2016, more than 29,000 metric tons of crab were harvested in the Federal crab fisheries in the BSAI (Garber-Yonts and Lee 2017).

In 2010, NMFS conducted a formal ESA section 7 consultation on the continued authorization of the groundfish fisheries of the BSAI and GOA, including the state parallel fisheries. In that opinion, NMFS concluded that the groundfish fisheries, as proposed, would result in takes of animals from the Central North Pacific stock of humpback whales, Western North Pacific stock of humpback whales, Northeast Pacific stock of fin whales, North Pacific stock of sperm whales, and both DPSs of Steller sea lions. Take for these stocks and species was authorized, subject to reasonable and prudent measures and the terms and conditions outlined in that opinion (NMFS 2010). NMFS reinitiated consultation in 2013 for only the Aleutian Islands management area to evaluate a new suite of management measures. The resulting 2014 Biological Opinion concluded that the groundfish fisheries under the revised sea lion protection measures were not likely to result in jeopardy or adverse modification of critical habitat (NMFS 2014).

Commercial fisheries' interactions with Steller sea lions in the GOA and BSAI are mitigated by various protection measures put in place to reduce competition for prey and other stressors associated with fishing. These measures aim to protect Steller sea lion prey from potential effects of groundfish fishing by temporally and geographically dispersing commercial catches through a variety of harvest limitations and closure areas. Many of these measures apply specifically to Atka mackerel, Pacific cod, and pollock, which are important prey for Steller sea lions. To protect Steller sea lion prey availability, these measures use a precautionary approach to the management of Steller sea lion prey species by spatially and temporally dispersing catch, particularly in critical habitat, to prevent localized prey depletion. The protection measures regulate fishing through a combination of closed areas, harvest limits, and seasons that reduce fishery competition for Steller sea lion prey when and where Steller sea lions forage.

Sea lions may co-occur with commercial fishing operations for a number of reasons: 1) sea lions may target the same concentrations of fish targeted by catcher vessels and catcher processors; 2) sea lions may be attracted to the odor of seafood waste from motherships and catcher processors; and 3) sea lions may be attracted to whole discards from motherships and catcher processors. Central to the question of how this action may affect Steller sea lions are considerations that include how the different forms of waste (ground and unground) differ with respect to: 1) attracting sea lions; 2) incentivizing sea lions to remain in proximity to fishing vessels for longer periods of time, and 3) effects of prolonged exposure of sea lions to fishing operations when an attractive source of food from humans is available in close proximity.

Sea lions that are attracted to ground waste streams are expected to lose interest in the waste rapidly because ground waste (less than approximately 0.5 inches in size) is presumed to be an inefficient source of forage for such large animals. Sea lions that co-occur with commercial fishing operations due to fish waste attractants may be at heightened risk of being taken either directly by fishing activities, or indirectly as a result of food conditioning or predation that would not otherwise occur but for the activities associated with this action. Animals that are killed or seriously injured as a result of these activities are mostly accounted for in existing bycatch statistics; some sea lions taken by longline gear may fall off of that gear prior to being retrieved. However, sea lions that occur near large fish processing vessels may also make themselves more vulnerable to predation (Loughlin and York 2000).

Entanglement

Entanglement of pinnipeds and cetaceans in fishing gear and other human-made material is a threat to their survival worldwide. Other materials also pose entanglement risks including marine debris, mooring lines, anchor lines, and underwater cables. While in many instances, marine mammals may be able to disentangle themselves (Jensen et al. 2009), other entanglements result in lethal and sublethal trauma to marine mammals including drowning, injury, reduced foraging, reduced fitness, and increased energy expenditure (van der Hoop et al. 2016).

Entangled marine mammals may drown or starve due to being restricted by gear, suffer physical trauma and systemic infections, and/or be hit by vessels due to an inability to avoid them. Entanglement can include many different gear interaction scenarios, but the following have occurred with listed species covered in this opinion:

1. Ingestion of gear and/or hooks can cause serious injury depending on whether the gear works its way into the gastrointestinal (GI) tract, whether the gear penetrates the GI

lining, and the location of the hooking (e.g., embedded in the animal's stomach or other internal body parts)(Andersen et al. 2008).

2. Gear loosely wrapped around the marine mammal's body that moves or shifts freely with the marine mammal's movement and does not indent the skin can result in disfigurement.
3. Gear that encircles any body part and has sufficient tension to either indent the skin or to not shift with marine mammal's movement can cause lacerations, partial or complete fin amputation, organ damage, or muscle damage and interfere with mobility, feeding, and breathing. Chronic tissue damage from line under pressure can compromise a whale's physiology. Fecal samples from entangled whales had extremely high levels of the stress hormone cortisol (Rolland et al. 2017). Extended periods of pituitary release of cortisol can exhaust the immune system, making a whale susceptible to disease and infection.

The NMFS Alaska Marine Mammal Stranding Network database has records of 199 large whale entanglements between 1990 and 2016. Of these, 67 percent were humpback whales. Gray, beluga, bowhead, fin, and sperm whales have also been reported as entangled in Alaska waters over the past decade. Most humpbacks get entangled with gear between the beginning of June and the beginning of September, when they are on their nearshore foraging grounds in Alaska waters. Between 1990 and 2016, 29 percent of humpback entanglements were with pot gear and 37 percent with gillnet gear. Longline gear comprised only 1 - 2 percent of all humpback fishing gear interactions.

There have been 5 reported takes of cetaceans in research activities. One animal was entangled in ADFG test drift gillnet in 1993. In 1999, 2 animals were found dead, entangled in the *R/V Cobb's* pollock research trawl gear. A whale drowned after becoming entangled in ADFG herring research seine gear in 2006, and a whale became entangled in a salmon drift gillnet in 2016, apparently self-releasing from the gear.

Entanglement of pinnipeds in marine debris is common worldwide, and Laist (1997) reported that 79 percent of otariid species and 42 percent of phocid species have been entangled.

Vessel Activity

Traffic from large vessels occurs year-round off Alaska's coast, in both near shore and offshore waters, and includes commercial fishing vessels, freighters/tankers, passenger ferries, etc. In general, there is less vessel traffic off western and northern Alaska compared to other parts of the state, although considerable traffic passes through the Aleutian Islands via the Great Circle Route. These trends are changing with climate change-driven decreases in sea ice in the Bering, Chukchi, and Beaufort seas (Neilson et al. 2012).

Cruise ships comprise 19 percent of large vessel activity (e.g., cruise ships, passenger vessels with overnight accommodations, freighters/tankers, and barges with tugs) in Southeast Alaska and typically operate in the area about five months out of the year. Ferries, passenger vessels with overnight accommodations, and cruise ships comprise 67 percent of the vessel activity. Dry freight cargo barges, tank barges, and freight ships (log and ore carriers) comprise another 30 percent of the vessel activity (Nuka Research and Planning Group 2012). Additionally, 29,267 boats 18'-25' long and 4,540 boats longer than 25' were registered as recreational in the State of Alaska through the Department of Motor Vehicles (Brown May 2006). Freight barges traveling to and from Western Alaska pass through the GOA 150-190 times each year (Nuka Research and

Planning Group 2012).

The Alaska Marine Highway ferry service operated by the State of Alaska services 3,500 mi. of routes that go as far south as Bellingham, Washington and as far west as Unalaska/Dutch Harbor, Alaska. The highway system operates along the south-central coast of the state, the eastern Aleutian Islands, and the Inside Passage of Alaska and British Columbia. There are 32 terminals located in Washington, British Columbia, and Alaska.

The Great Circle Route between western North America and East Asia intersects the Aleutian Island chain. Approximately two thousand (1,961) large vessels (300 gross tonnage (GT) or greater) made 4,615 transits through Unimak Pass in 2012. Most of the ships recorded through Unimak Pass were non-tank vessels: 60 percent of the individual vessels recorded were bulkers, 24 percent container ships, and 13 percent other non-tank vessels. Fifty-two vessels, or 3 percent of the total individual vessels recorded, were tankers. Many more vessels likely traveled through the EEZ south of the Aleutian Islands (Nuka Research and Planning Group 2015).

Studies have estimated an increase in vessel traffic to U.S. Pacific Northwest ports as between 1 percent and 9 percent per year through 2030 for container and bulk dry cargo ships (Nuka Research and Planning Group 2015).

Commercial fishing vessels account for the highest number of transits and the most operational hours in a 2015 Bering Sea Vessel Analysis prepared by Nuka Research. These vessels operate in the southern Bering Sea year-round, and deliver fish to processing plants in coastal communities. Container ships and refrigerated cargo ships transfer the processed seafood to global markets (Nuka Research and Planning Group 2016). Tankers, general cargo ships, and barges move throughout the eastern Bering Sea serving coastal and inland communities. Vessels also support industrial activities and resource extraction in the region, or move goods or materials through the area to European, Asian, and other North American ports. Research vessels, U.S. Coast Guard and other government vessels, recreational vessels and more frequently cruise ships operate here as well.

The number of Bering Strait transits doubled from 2008 to 2015, and vessel traffic is expected to increase through the Bering Strait as Arctic sea ice retreats and both trans-Arctic shipping and the extraction of resources from Arctic countries grows (Nuka Research and Planning Group 2016).

Statewide, marine vessels are a known source of injury and mortality to marine mammals in Alaska, including some of the species considered in this opinion (Laist et al. 2001, Neilson et al. 2012). In addition to the potential for entanglement discussed in the sections above, vessel traffic may affect listed species through collisions (strikes) (Jensen and Silber 2004) and increased ocean noise. Vessel traffic also has the potential to impact species via pollution from discharges and spills, and behavioral disruption (e.g., interference with foraging or migration, disturbance while resting or hauled-out).

Ocean Noise

In addition to vessel noise described above, ESA-listed species in the action area are exposed to several other sources of natural and anthropogenic noise. Natural sources of underwater noise include sea ice, wind, waves, precipitation, and biological noise from marine mammals, fishes,

and crustaceans. Anthropogenic sources of underwater noise of concern to listed species in Alaska include in-water construction activities such as drilling, dredging, and pile driving; oil, gas, and mineral exploration and extraction; Navy sonar and other military activities; geophysical seismic surveys; and ocean research activities. Noise impacts to listed marine mammal species from many of these activities are mitigated through ESA Section 7 consultations.

Levels of anthropogenic (human-caused) sound can vary dramatically depending on the season, type of activity, and local conditions. The combination of anthropogenic and natural noises contributes to the total noise at any one place and time.

Noise is of particular concern to marine mammals because many species use sound as a primary sense for navigating, finding prey, avoiding predators, and communicating with other individuals. Noise may cause marine mammals to leave a habitat, impair their ability to communicate, or to cause stress. Noise can cause behavioral disturbances, mask other sounds including their own vocalizations, may result in injury and, in some cases, may result in behaviors that ultimately lead to death. The severity of these impacts can vary greatly.

Because responses to anthropogenic noise vary among species and individuals within species, it is difficult to determine long-term effects. Habitat abandonment due to anthropogenic noise exposure has been found in terrestrial species (Francis and Barber 2013). Clark et al. (2009) identified increasing levels of anthropogenic noise as a habitat concern for whales because of its potential effect on their ability to communicate (i.e., masking). Some research (Parks 2003, McDonald et al. 2006, Parks 2009) suggests marine mammals compensate for masking by changing the frequency, source level, redundancy, and timing of their calls. However, the long-term implications of these adjustments, if any, are unknown.

Subsistence Harvest of Marine Mammals

Subsistence harvest by Alaska Natives is another source of injury or mortality for endangered and threatened species in Alaskan waters. The minimum mean annual statewide subsistence take from the western DPS stock of Steller sea lions is 204 per year (Muto et al. 2017). This subsistence harvest is managed under co-management agreements between NMFS and Alaska Native organizations.

Illegal Shooting

Illegal shooting of listed species occurs to an unknown extent in the action area. The Steller Sea Lion Recovery Plan (NMFS 2008) ranked illegal shooting as a low threat to the recovery of the WDPS. Illegal shooting of sea lions was thought to be a potentially significant source of mortality prior to the listing of sea lions as threatened under the ESA in 1990. The NMFS Alaska Marine Mammal Stranding Program documented 60 Steller sea lions with suspected or confirmed firearm injuries from 2000–2016 in Southeast and Southcentral Alaska (Wright and Savage 2017).

Marine Debris

Marine debris degrades marine habitat quality, poses ingestion and entanglement risks to marine life, and may introduce invasive species. Marine debris may also leach or absorb hazardous materials which are harmful to marine life. Worldwide, about 80 percent of marine debris is now

made up of plastic items. Plastics are non-biodegradable and persist in the environment. Marine debris entanglement of pinnipeds and whales is described in the section on entanglements above.

Scientific Research

NMFS issues scientific research permits that are valid for five years for ESA-listed species. NMFS conducts section 7 consultations on the issuance of these permits. When permits expire, researchers often apply for a new permit to continue their research. Additionally, applications for new permits are issued on an on-going basis; therefore, the number of active research permits is subject to change. There are more than 30 active permits for research on cetaceans and pinnipeds throughout Alaska. The NMFS database of authorizations and permits for protected species (APPS) is available online at https://apps.nmfs.noaa.gov/.

Species considered in this opinion also occur in Canadian waters. Although we do not have specific information about any permitted research activities in Canadian waters, we assume they are similar to those described below.

Whales are exposed to research activities documenting their biology, behavior, habitat use, stock structure, social organization, communication, distribution, and movements throughout their ranges. Activities associated with these permits occur in the action area, in some cases at the same time as the proposed project activities. Currently permitted research activities include: counting/surveying (aerial and vessel-based), opportunistic collection of sloughed skin and remains, behavioral and monitoring observations, various types of photography and videography, skin and blubber biopsy sampling, fecal sampling, tagging (suction-cup, dart/barb, satellite, and dorsal fin/ridge tagging), recording (acoustic, active playback/broadcast and passive), and acoustic sonar for prey mapping.

Some of these research activities require close vessel approach. The permits also include incidental harassment takes to cover such activities as tagging, where the research vessel may come within 100 yards of other whales while in pursuit of a target whale. These activities may cause stress to individual whales and cause behavioral responses. In some cases, take could occur and is authorized.

Steller sea lions, ringed seals, and bearded seals are exposed to research activities documenting their population status and trends, health, movements, habitat use, foraging ecology, response to recovery activities, distribution and movements throughout their ranges. These include behavioral observations, counting/surveying, photo-identification, and capture and restraint for the purposes of performing the following procedures: sample/data collection (blood, clipped hair, urine and feces, nasal and oral swabs, vibrissae (pulled), skin, blubber, or muscle biopsies, weight and body measurements), injection of sedative, administration of drugs (intramuscular, subcutaneous, or topical), attachment of instruments to hair or flippers, including flipper tagging, and ultrasound. Activities may harass or harm individuals by stressing them during handling, In some instances, animals subjected to research activities may die.

Oil and Gas Development

Offshore oil and gas development in Alaska poses a number of threats to listed marine species, including increased ocean noise, risk of hydrocarbon spills, production of waste liquids, habitat alteration, increased vessel traffic, and risk of ship strike. NMFS reviewed the potential effects of oil and gas development in a Final Environmental Impact Statement for the effects of oil and gas

activities in the Arctic Ocean (NMFS 2013). NMFS has conducted numerous Section 7 consultations on oil and gas activities.

Geophysical seismic survey activity has been described as one of the loudest man-made underwater noise sources, with the potential to harass or harm marine mammals (Richardson et al. 1995). The noise generated from seismic surveys has been linked to behavioral disturbance of wildlife, masking of cetacean communication, and potential auditory injury in the marine environment (Smith et al. 2017). Seismic surveys are often accompanied by test drilling. Test drilling involves fewer direct impacts than seismic exploration, but the potential risks of test drilling, such as oil spills, may have broader consequences (Smith et al. 2017).

The vast majority of oil and gas exploration and development in Alaska occurs in the Arctic. Oil and gas development also occurs within Cook Inlet in the GOA. Information about current lease sales in Alaska is available from the Bureau of Ocean Energy Management at https://www.boem.gov/.

Pollutants and Discharges

The EPA issued a NPDES vessel general permit that authorizes several types of discharges incidental to the normal operation of vessels, such as grey water, black water, coolant, bilge water, ballast, and deck wash (EPA (U.S. Environmental Protection Agency) 2013). The permit applies to owners and operators of non-recreational vessels that are at least 24 m (79 ft) in length, as well as to owners and operators of commercial vessels less than 24 m that discharge ballast water.

The US Coast Guard has regulations related to pollution prevention and discharges for vessels carrying oil, noxious liquid substances, garbage, municipal or commercial waste, and ballast water (33 CFR Part 151). The State of Alaska regulates water quality standards within three miles of the shore.

NMFS conducted Section 7 consultation on the effects of activities associated with the Alaska Federal/State Preparedness Plan for Response to Oil & Hazardous Substance Discharge/Releases (Unified Plan)(NMFS 2015). The Unified Plan Biological Opinion includes a detailed review of oil and other hazardous materials spills in Alaska marine waters from 1995-2012, which helps identify high risk areas and shows that spills have occurred throughout the marine waters of Alaska, but primarily in coastal, nearshore areas.

The Aleutian Islands had the greatest volume of reported oil and other hazardous substance spills in marine waters between 1995 and 2012. The Northwest Arctic and Western Alaska regions reported very few spills >100 gallons (2 and 6, respectively), likely due to a lack of reporting, low human population density, and lack of major development. Cook Inlet is the only region to report crude oil spills during the 1995-2012 time period.

Military Operations

The Department of Defense conducts joint training exercises in the Joint Pacific Alaska Range Complex between April and October. The training area encompasses 42,146 square nm (145,458 km^2) south of Prince William Sound and east of Kodiak Island. Most Navy training activities occur in this area and include gunnery, bombing, sinking, and tracking exercises. Sonar, active acoustic sources, airguns, weapons firing, explosives, and vessel and aircraft noise could result in

Level A or Level B harassment of marine mammals. NMFS conducted a Section 7 consultation that analyzed the effects of military activities on listed species in the Gulf of Alaska (NMFS 2017). Incidental take was authorized for seven listed species of marine mammals and several stocks of listed salmonids (NMFS (2017)).

6. EFFECTS OF THE ACTION

"Effects of the action" means the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline (50 CFR 402.02). Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur.

This biological opinion relies on the best scientific and commercial information available. We try to note areas of uncertainty, or situations where data is not available. In analyzing the effects of the action, NMFS gives the benefit of the doubt to the listed species by minimizing the likelihood of false negative conclusions (concluding that adverse effects are not likely when such effects are, in fact, likely to occur).

We organize our effects analysis using a stressor identification – exposure – response – risk assessment framework for the proposed activities.

We conclude this section with an *Integration and Synthesis of Effects* that integrates information presented in the *Status of the Species* and *Environmental Baseline* sections of this opinion with the results of our exposure and response analyses to estimate the probable risks the proposed action poses to endangered and threatened species.

6.1 Project Stressors

Stressors of western DPS Steller sea lions resulting from the issuance of this revised permit may include:

1) Increased risk of serious injury or mortality due to bycatch in fishing gear;
2) Increased risk of serious injury, mortality, harm or harassment due to gear interaction not reflected in bycatch statistics;
3) Increased risk of serious injury, mortality, harm, or harassment resulting from food conditioning of sea lions, and resulting control of aggressive food-conditioned sea lions;
4) Increased risk of serious injury or mortality due to exposure of Steller sea lions to increased levels of parasites; and
5) Increased risk of serious injury or mortality due to vessel strikes.

This action will not significantly alter the acoustic impact of vessels operating near western DPS Steller sea lions. Except for the lack of sound from seafood grinders, the acoustic impact of activities operating under this permit will remain unchanged.

When humans create unnatural food sources for wildlife, there are often unintended consequences. Waste grains left in fields benefit certain bird species such as waterfowl, but urban trash supports populations of invasive Norway rats (*Rattus norvegicus*) and starlings (*Sturnus vulgaris*) in cities (Linz et al. 2007, Himsworth et al. 2013), creating disease vectors. Fishing boats can be a valuable food source for some species, but can also be a nuisance

attractant that leads to mortality (e.g., seabirds on longlines) (Anderson et al. 2011). In the North Sea, a broad suite of seabirds derived caloric benefits from discards from fishing boats, with up to 66 percent of North Sea avifauna feeding on waste seafood during summer, consuming 255,000 metric tons of unprocessed discards from trawlers and 55,000 metric tons of offal; enough food to support 6 million birds (Mazik et al. 2005). When trawler activity was discontinued, populations of herring gulls (*Larus argentatus*) and great black-backed gulls (*Larus marinus*) around Helgoland (German Bight, North Sea) declined by over 80 percent. In Alaska, attracting seabirds to the vicinity of vessels with offal, discards, and baited hooks has created conservation issues for seabirds, including lethal take of endangered short-tailed albatross (*Phoebastria albatrus*) by longline vessels (USFWS 2008).

Research documenting the effects of food-habituated mammalian predators extends back to at least the 1960s. Herrero (2018) and Herrero and Fleck (1990) discuss predatory brown bear (*Ursus arctos*) attacks on humans in Glacier, Yellowstone, and Banff National Parks from 1967-1986. A factor common to fatal attacks that were not the result of sudden encounters included the bears having a history of feeding on human food or garbage (food conditioning). Habituation of bears towards humans can also occur without human injury when food associations are removed from the equation and human behavior is predictable, as evidenced at McNeil River Falls in Alaska. While the risk of human injury due to bears is small (e.g., less than one in 300,000 visitors to Kluane and Denali National Parks), the risk of mortality of bears resulting from human interactions is very high. Seventy one percent of (non-hunting) human-caused mortality of grizzly bears was due to control of problem bears, primarily food conditioned bears (Benn and Herrero 2002). Food-conditioned bears were more than three times as likely to be killed by humans compared to non-food-conditioned bears (Mattson et al. 1992). These human-caused takes are largely preventable; management actions that reduce or prevent food conditioning of bears have been demonstrated as being effective in reducing mortalities of bears (McCrory et al. 1989, Benn and Herrero 2002, Herrero 2018). Likewise, NMFS is aware that Steller sea lions with access to whole fish or fish racks from humans have become emboldened and aggressive nuisances in many Alaskan harbors in recent years, such as Petersburg, Sitka, Gustavus, and Seward, and the elimination or reduction of these human sources of food has tended to reduce conflicts (NMFS unpublished data, Kim Raum-Suryan, NMFS AKR PRD, 2018). For example, Seward Harbor has taken efforts to make sport-caught fish waste unavailable to marine mammals, including western DPS Steller sea lions, by requiring the public to dispose of fish carcasses in secured containers located beneath fish cleaning stations provided to the public within the harbor.

NMFS personnel have provided some anecdotal evidence to indicate that Steller sea lions are generally observed to remain in the vicinity of a vessel discharging offal for the duration of the discharge (NMFS Sustainable Fisheries Division, personal communication September 25, 2018). Under the current 2009 permit, the seafood processing vessels are required to grind all of their seafood waste, and are not authorized to discharge at all in many areas of Steller sea lion critical habitat and closed fishing areas. The proposed revisions to the grind requirement would represent a shift in the type, amount, and location of seafood waste discharged (see Table 1). If Steller sea lions are observed to persist in offal streams now when the discharge is ground, it is reasonable to assume there is an increased risk of food conditioning (and its associated risks) under the proposed removal of the grinding requirement. Under the proposed action, Steller sea lions

would have access to unground fish racks (or frames or carcasses) in the effluent stream, which would be a more efficient and presumably more attractive source of nutrition than ground fish waste.

This proposed permit will result in the removal of measures (i.e., grinding of discharge) that currently prevent at-sea processors from exposing western DPS Steller sea lions to seafood waste in a form that rewards animals that attempt to forage on the waste. While both ground and unground waste represent at least an initial attractant to western DPS Steller sea lions, only unground waste represents an attractant that offers rewards (e.g. intact lipid-rich roe and/or fish livers), and provides an incentive for the animals to forage upon the waste stream. NMFS considers this to be a nuisance attractant in that it increases the exposure of western DPS Steller sea lions to both direct and indirect interactions that could result in take (see section 6.2).

We note that whole discards are not considered seafood processing waste, and discard practices remain unchanged under this proposed permit. The current at-sea processor outfall grinding requirements break up fish carcasses into a size that cannot be efficiently foraged upon by sea lions. In addition, the puncturing or fragmentation of fish swim bladders and livers promotes rapid sinking of fish waste, making even the small pieces of seafood waste less available to the sea lions. Removing the grinding requirement in most areas offshore of Alaska within the range of western DPS Steller sea lions is expected to result in greater availability of fish carcasses, including lipid-rich fish livers, at or near the surface of the water. Depending on the fish species, organs and carcasses that remain attached to intact swim bladders and buoyant lipid-rich liver tissue (an unknown fraction of the anticipated discharges) are expected to remain available at or near the sea surface for long enough to create opportunities for scavengers, including sea lions, to forage on them.

With the removal of seafood processor outfall grinding requirements for smaller-volume dischargers, western DPS Steller sea lions are likely to be attracted to and remain in the vicinity of fishing vessels for longer periods of time due to the availability of unground waste. This creates an increased risk of negative interactions between sea lions and fishing gear, especially the fishing gear deployed by catcher processors, who routinely discharge waste while deploying, towing, and retrieving gear. Sea lions remaining near vessels to feed on unground seafood waste are more likely to be captured by nets and hooks, or harassed, harmed, or killed by cables and lines towed by the vessels. Risk of serious injury and mortality due to vessel strikes may increase. Sea lions feeding in the outfall stream of processors discharging unground waste will likely ingest a higher-than-usual amount of fish entrails due to the higher than natural concentration of internal organs. A given mass of seafood waste will have a higher proportion of internal organs than a similar mass of unprocessed whole fish before fillets are removed. Such sea lions may experience increased parasite loads, which can compromise their health or cause death. Animals that become conditioned to fishing vessels as a source of food may display aggressive behavior around those vessels or other vessels, property, or people. Aggressive food-conditioned sea lions are at increased risk of being harassed, harmed or killed by humans who are defending human life or property.

The draft permit for this action states that the discharge of seafood processing wastes must not create an attractive nuisance situation whereby fish or wildlife are attracted to waste disposal or storage areas in a manner that creates a threat to fish or wildlife or to human health and safety. In NMFS's view, that goal is desirable but not realistic. We contend throughout this biological opinion that discharge of unground seafood waste is likely to create an attractive nuisance that constitutes a threat to the health and safety of western DPS Steller sea lions. Furthermore, we expect that this action will cause or exacerbate food conditioning of some Steller sea lions and increase instances of aggressive behavior, creating an additional threat to the safety of Steller sea lions that may be hazed, injured, or killed as a result of their aggressive behavior. Some Steller sea lions are already food conditioned, but we do not know whether these behaviors are due to activities of vessels at sea (leaving whole discards at sea where they are available to Steller sea lions) or to human activities elsewhere (e.g., feeding animals by hand in harbors and ports). Because unground seafood processing waste will account for about six times the biomass of whole discards (Fissel et al. 2017, EPA 2018), we expect the prevalence of food-conditioned behaviors of Steller sea lions to increase markedly.

Because of the negative consequences that stem from feeding Steller sea lions, NMFS has undertaken outreach actions with Alaskan communities intended to reduce the incidence of negative interactions between sea lions and community members, fishermen, and fishing gear. In 2017, NMFS Alaska Region created and began distributing "Do Not Feed" brochures to educate the public about the negative impacts of feeding sea lions, discouraging the practice when possible. This includes encouraging people to keep a clean dock and boat, and not to leave whole fish or discarded fish pieces where sea lions can reach them. However, our task in this Biological Opinion is to evaluate the effects of the action proposed by EPA, which includes authorizing the discharge of unground fish waste by smaller-volume at-sea processors.

6.2 Exposure Analysis

As discussed in the *Approach to the Assessment* section of this opinion, exposure analyses are designed to identify the listed resources that are likely to co-occur with these effects in space and time and the nature of that co-occurrence. In this step of our analysis, we try to identify the number, age (or life stage), and gender of the individuals that are likely to be exposed to an action's effects and the populations or subpopulations those individuals represent. Throughout our analysis, when we refer to exposure or effects, we refer specifically to environmental changes caused by implementation of EPA's proposed NPDES permit allowing certain offshore seafood processors to discharge unground seafood waste, thereby increasing the current level of attractants and creating a greater risk of interactions between those processors and Steller sea lions. Despite our expectation that this action will cause an increase in the bycatch rate of western DPS Steller sea lions, the increased number of sea lions killed or seriously injured by commercial fishing gear expressed in this opinion will be a result of changes to the composition of seafood processing waste discharges and not due to changes to fishing practices or effects, upon which NMFS has consulted separately (NMFS 2010, 2014).

In attempting to analyze the exposure of western DPS Steller sea lions to unground seafood waste, we acknowledge important gaps in our knowledge, and we note the following estimates (discussed below) which help guide us in assessing exposure:

- 450,000 metric tons of waste/year are discharged in federal fisheries off Alaska (from EPA 2015 data);
- Approximately 93,000 metric tons of waste will be exempted from grinding requirements under the revised permit (derived from EPA 2015 data); this waste can be discharged unground into Steller sea lion critical habitat. We do not know how much of this waste will actually be discharged within critical habitat, but expect most of it will be, because we assume that the smaller volume vessels (exempted vessels) will be operating closer to shore and within critical habitat;
- 88% of waste is discharged by vessels that are not exempted from grinding requirements within critical habitat (derived from EPA 2015 data). These vessels must grind if they are discharging within critical habitat, but not if they are discharging outside critical habitat. These larger non-exempt vessels are more likely to operate outside of critical habitat than are the smaller exempt vessels;
- 12% of waste is discharged from vessels that can discharge unground waste in all waters covered by this permit;
- 28% of catcher/processor catch was landed within critical habitat, while 72% of catcher/processor catch was landed outside critical habitat (Josh Keaton, pers. comm. NOAA Fisheries unpublished data 2016-2019).
- Steller sea lions spend about 63% of their time at sea outside of critical habitat (Himes Boor and Small 2012).

In the revised BE, the EPA provided data from 2015 for the number of vessels discharging seafood waste in each volume category, and the total amount of waste discharged. The EPA also provided some vessel data for 2014, but did not include the total amount of waste discharged for that year. In our analysis, we used the 2015 data.

In 2015, a total of 71 vessels reported discharge and 12 reported no discharge, for a total of 83 vessels reporting. The total amount of discharge from these 71 vessels was 1,123,131,855 pounds. Most of this waste was discharged in the Bering Sea/Aleutian Islands region (96 percent; 1,079,748,081 pounds), with the remainder discharged in the Gulf of Alaska (3.8 percent) and Southeast Alaska (0.1 percent).

Table 3. Estimates of amount of seafood waste potentially subjected to the proposed grinding requirements, based on EPA 2015 annual vessel discharge data from seafood processors in Alaska.

Millions of Pounds	Median Millions of Pounds	Number of Vessels	Proportion of Total Waste Discharged	Amount of Seafood Waste Above or Below the 10 Million Pound Threshold
>0 – 2.5	1,250,000	8	0.0089	205,000,000[1]
>2.5 – 5	3,750,000	16	0.0534	
>5 – 10	7,500,000	18	0.1202	
>10 – 15	12,500,000	6	0.0668	990,000,000[1]
>15 – 20	17,500,000	6	0.0935	
>20 – 40	30,000,000	8	0.2137	
>40 – 80	60,000,000	8	0.4274	
>80 – 100	90,000,000	1	0.0801	

[1]Vessels represented in the first three rows of data (discharging 205 million pounds of waste) would not be subjected to grinding requirements at any authorized discharge location. Vessels represented in rows 4-8 (discharging 990 million pounds of waste) would be subjected to grinding requirements within Steller sea lion critical habitat, but not elsewhere.

Since the revised grinding requirement would apply to vessels based on how much they discharge annually, we needed to estimate how much waste would no longer be ground in order to assess exposure. By using the 2015 data presented in EPA's Biological Evaluation, we were able to approximate the proportion of seafood waste discharged above or below the 10 million pound threshold (Table 3). Based on these limited data, we can estimate that 205,000,000 pounds of seafood waste would be exempt from the grinding requirement annually, such that it could be discharged, unground, at any permitted discharge location, including within Steller sea lion critical habitat. Vessels that discharge more than 10 million pounds annually will still have to grind seafood waste, but only when discharging in certain areas of Steller sea lion critical habitat—between 3 and 20 NM from major haulouts and rookeries and in the special foraging areas. In all other permitted areas, vessels discharging more than 10 million pounds would be able to discharge unground seafood waste. Of the non-exempt 990,000,000 pounds of seafood waste (from vessels discharging more than 10 million pounds of waste per year), the permit would allow unground discharge if it was discharged outside of Steller sea lion critical habitat. We expect that some unknown proportion of it will continue to be ground or retained for use in value-added products, while the remaining unknown portion will be discharged in unground form outside of Steller sea lion critical habitat, but within the range of Steller sea lions.

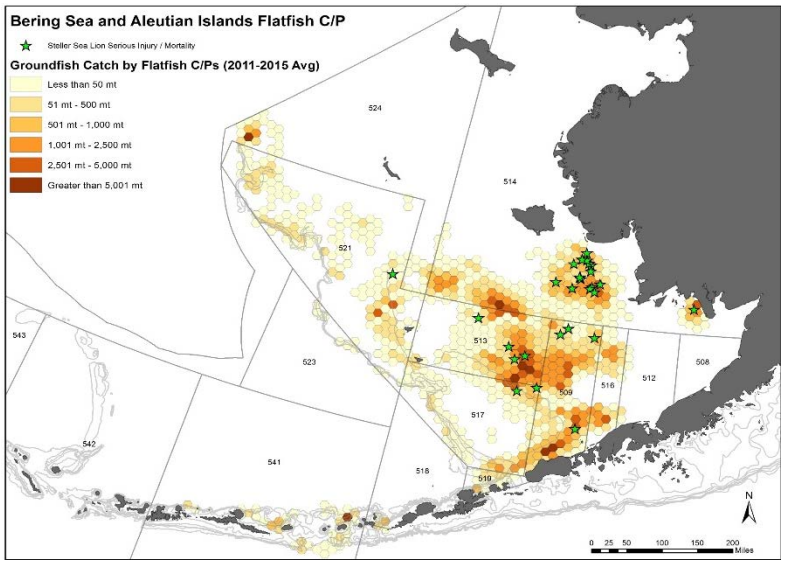
As is shown in Figure 5, much of the commercial catch in the Bering Sea and Aleutian Islands occurs in areas where discharge of unground seafood waste will be authorized for all vessels. Figure 4 shows the locations of serious injury or mortality of Steller sea lions, indicating that sea lions forage far from shore along the Bering Sea shelf break. Figure 10 also shows that Steller

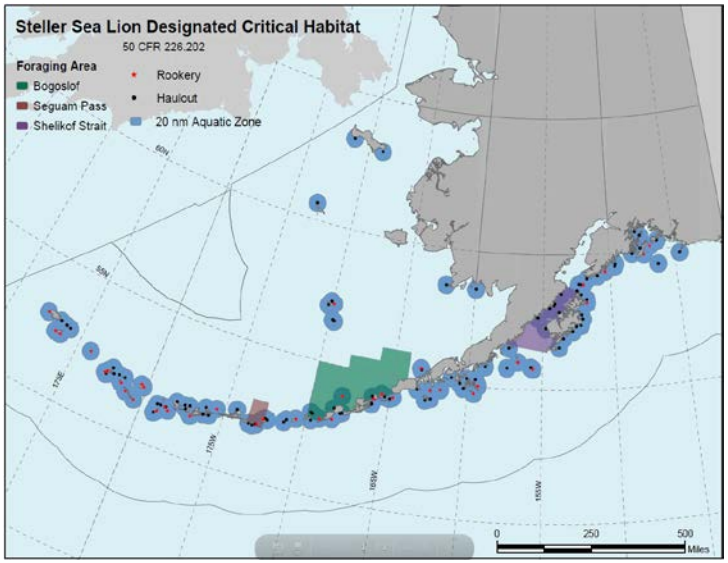
sea lion critical habitat boundaries do not encompass all waters used by Steller sea lions; they commonly use waters far removed from critical habitat (Himes Boor and Small 2012) (Figure 10), where unground waste will be authorized for discharge by all vessels.

Although we are only able to estimate how much unground seafood waste will be discharged under the revised requirement, Figure 5-9 suggests that much of the waste coming from vessels with over 10 million pounds/year of discharge would not be subjected to grinding requirements. That is, larger high-discharge-volume vessels often fish where they will not be required to grind seafood waste (outside sea lion critical habitat). However, some portion of the unground waste from the exempt (under 10 million pounds of waste) vessels may be discharged in locations that would allow for unground discharge for any vessel. So while we cannot assume that this 10 million pound exemption provision will increase the discharge of waste within critical habitat by the full 205,000,000 pounds (93,000 metric tons) of waste discharged by exempt vessels, we can reasonably assume that a substantial portion of the 990,000,000 pounds (450,000 metric tons) of waste from non-exempt large-waste-volume vessels will be discharged as unground waste in locations with no grinding requirements, but within the range of Steller sea lions (e.g., greater than 20 NM from major haulouts and rookeries).

In an effort to understand the potential exposure of Steller sea lions to the effects of this action, we can also examine existing catch statistics for catcher/processors within and outside of Steller sea lion critical habitat, and use catch statistics as a proxy parameter for their discharge location (within vs. outside critical habitat) and mass. There are reasons why catch is an imperfect proxy for discharge volume (e.g., different fishing practices exist between different commercial fishery sectors that result in varying proportions of catch discharged as waste), but catch statistics offer an alternative way to assess exposure of sea lions to the effects of this action. From 2016-2019, catcher processors operating in waters within the EEZ off Alaska reported 28% of their catch as originating within Steller sea lion critical habitat, while 72% came from waters outside of this critical habitat (Pers. Comm. Josh Keaton, NOAA fisheries, Juneau, Alaska, June 25, 2019). Like EPA's self-reported discharge statistics, carefully-measured catch statistics leave us with important unanswered questions, such as:

- How much catch ends up as waste?
- How much of the waste will be discharged in an unground form within critical habitat?
- How much of the waste will be discharged in a form that remains unexploitable by Steller sea lions (i.e. ground or otherwise processed such that sea lions cannot forage on it efficiently)?
- Will reporting requirements and other measures associated with discharging unground waste within Steller sea lion critical habitat drive some portion of the fishery to discharge in waters that lie outside of critical habitat?
- How do the effects of discharging unground waste within and outside critical habitat compare?





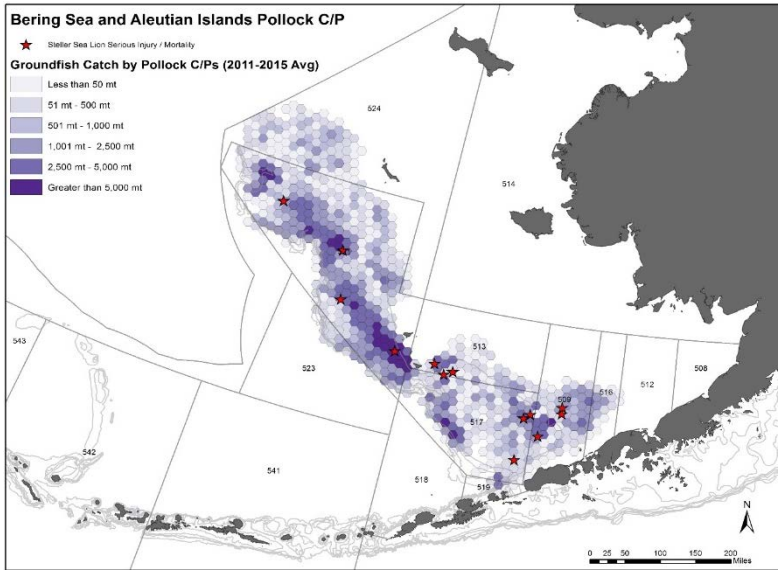


Figure 5. Alaska Groundfish and Flatfish Catch Distribution, 2011 to 2015 in proximity to Steller Sea Lion Critical Habitat

Under the proposed permit, at least 93,000 metric tons of seafood waste (205,000,000 pounds) will no longer be subjected to grinding requirements (based on 2015 data) (EPA 2019). In addition, up to 450,000 metric tons (990,000,000 pounds) may be discharged as unground waste either by vessels exempt from grinding requirements within critical habitat or by non-exempt vessels discharging outside of critical habitat, but within the range of Steller sea lions. Offshore seafood processors that will no longer be subjected to grinding requirements for their seafood processing waste can occur throughout nearly all of the range of the western DPS Steller sea lion. For example, the distribution of pollock fisheries shown in Figure 6, Figure 7, Figure 8, and Figure 9 indicates overlap with all but the furthest north portions of western DPS Steller sea lion habitat in the northern Bering Sea.

In summary, we expect that most of the 450,000 metric tons of seafood processing waste discharged under this permit each year will be authorized to be discharged in an unground form, either within Steller sea lion critical habitat, or outside of critical habitat within waters used by western DPS Steller sea lions (See Figures 4 and 10). We expect this because the permit is written such that, given existing fishing practices, grinding of seafood waste will essentially be limited to large volume catcher/processor trawlers fishing inside critical habitat, and to motherships[5]. Unmeasured and evolving fish processing practices will determine how much of this waste is actually discharged in an unground form.

[5] Catch processed by motherships is about 1/7th of catch processed by catcher/processors (554,311 metric tons vs. 4,057,464 metric tons, respectively).

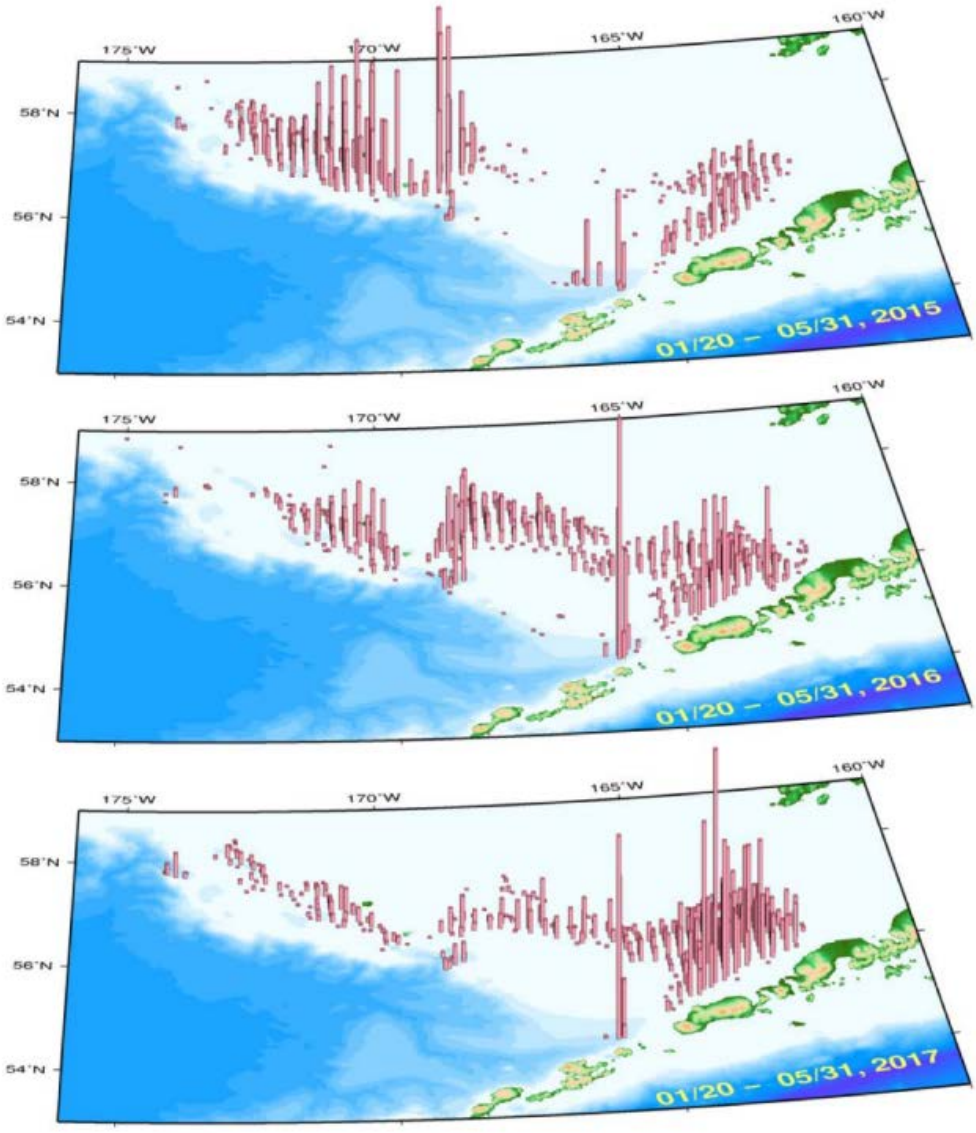


Figure 6. Eastern Bering Sea pollock catch distribution during A-season, 2015-2017. Column height is proportional to catch (Ianelli et al. 2009).

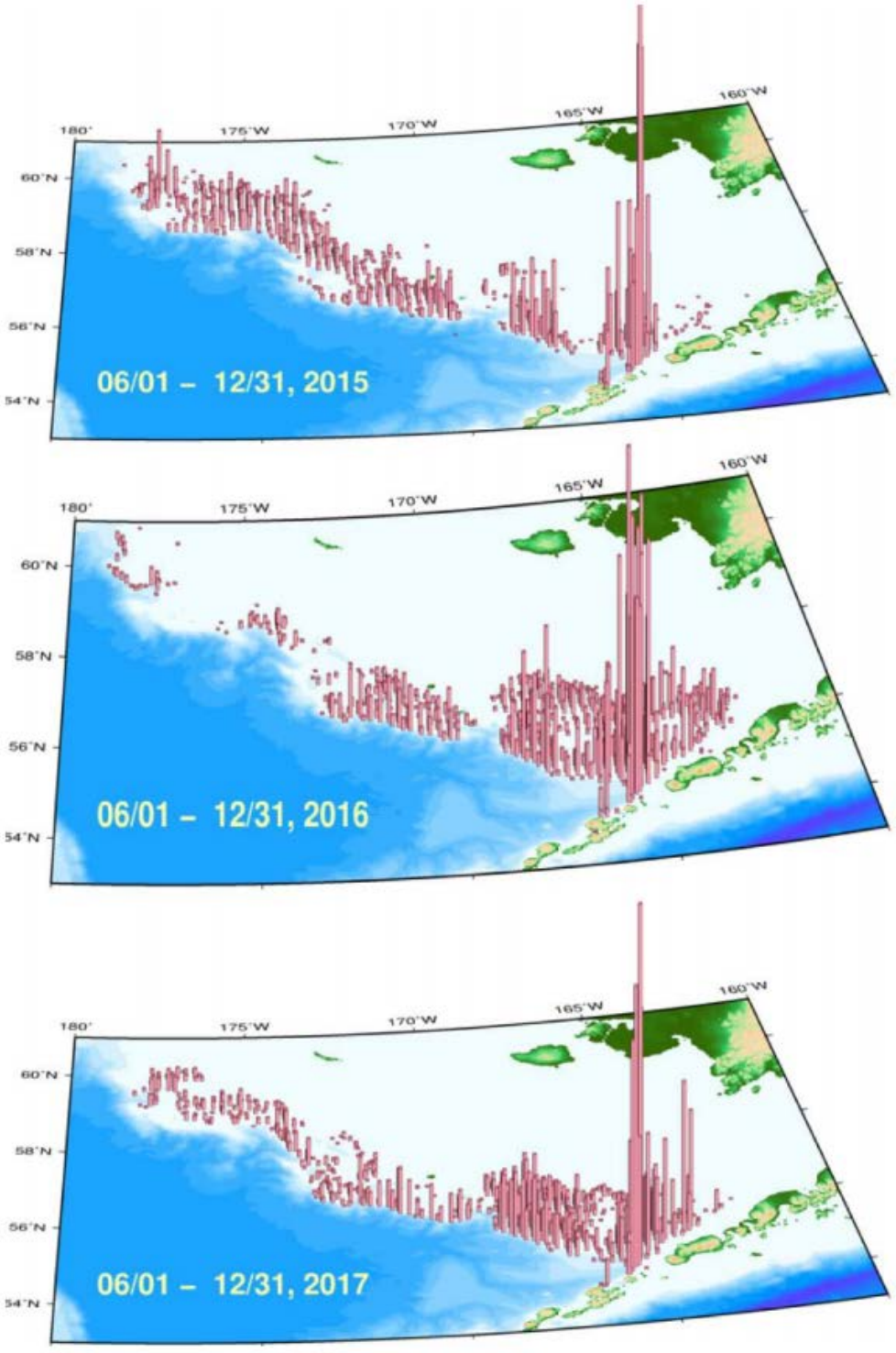


Figure 7. Eastern Bering Sea pollock catch distribution during B-season, 2015-2017. Column height is proportional to total catch.

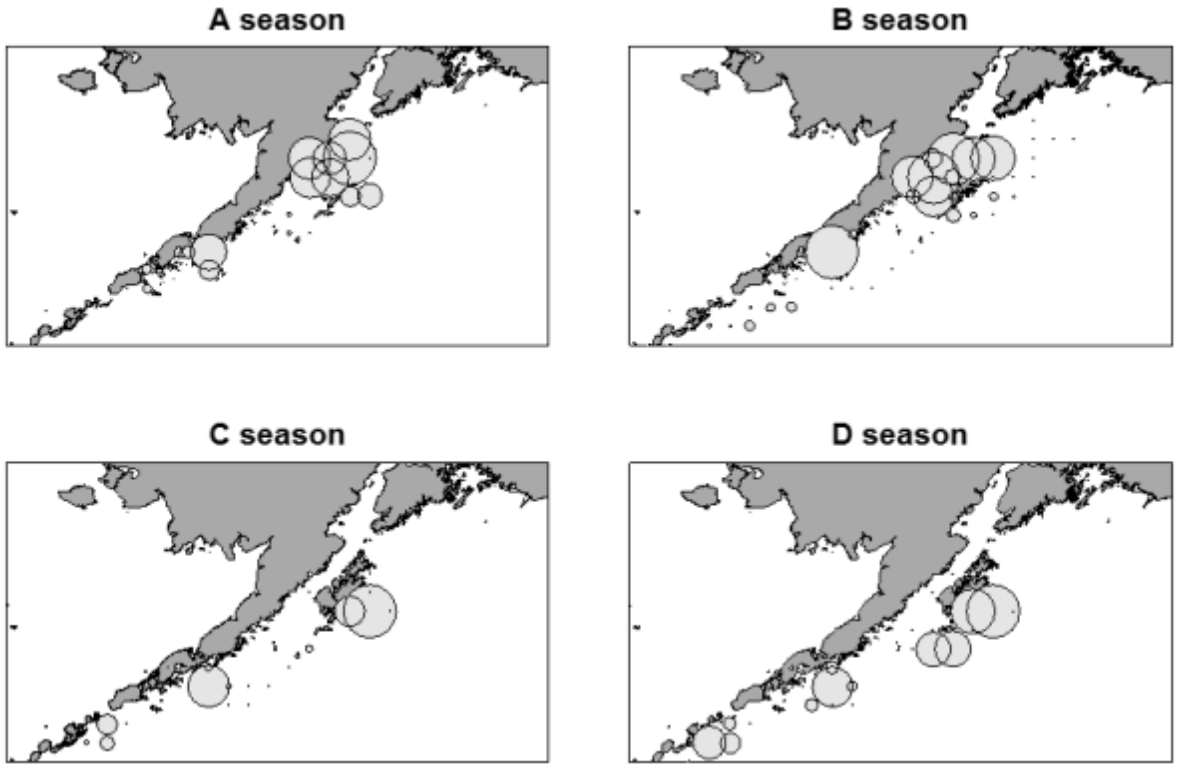


Figure 8. Pollock catch in 2016 for 1/2 degree latitude by 1 degree longitude blocks by season in the Gulf of Alaska. Area of circle is proportional to the catch (Dorn et al. 2005).

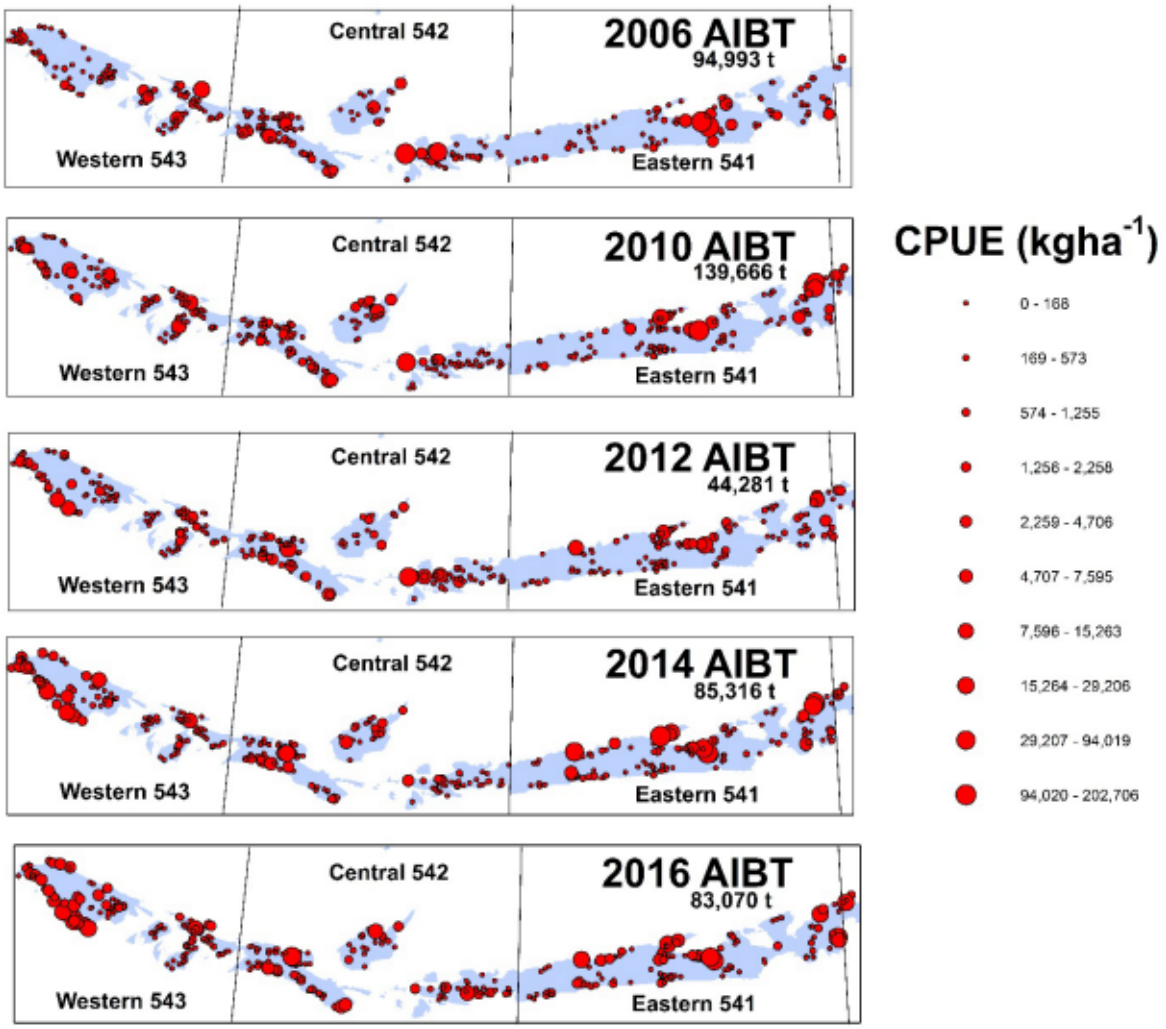


Figure 9. Catch per unit effort for surveys of pollock in the Aleutian Islands Region, 2004-2016 (Barbeaux et al. 2015). Here, we assume that pollock surveys are a fair representation of trawl fishing effort distribution for Pollock in this region.

We assume that most or all western DPS Steller sea lions in waters off Alaska could potentially be exposed to unground fish waste and all associated stressors (e.g., increased bycatch, increased gear interactions, food conditioning and associated effects, and increased parasite loads) as a result of this action. However, some unknown portion of this population may never encounter vessels discharging unground waste.

In our analysis of potential exposure, we considered three different sources of attraction for sea lions that co-occur with commercial fishing vessels: 1) schooling fish targeted by both fishing vessels and sea lions; 2) regulatory and economic discards of unprocessed whole fish; and 3) waste streams from processing vessels. As discussed in the Environmental Baseline section, at present sea lions are likely attracted to fishing vessels by schooling fish, fish in nets or on hooks being hauled back to fishing vessels, and discards of whole fish, which explains much of the

existing bycatch. While the odor of ground seafood waste may serve as a false attractant to that waste, it likely does not cause extended interactions between sea lions and the waste streams of fishing vessels because such waste cannot be efficiently foraged upon by sea lions. Under this proposed permit, unground seafood waste is likely to attract sea lions, and provide an incentive for sea lions to remain in an area (by providing them with a food reward). While they remain in the area, presumably for longer periods of time, they will be at increased risk of gear entanglement, exposure to parasites, and food conditioning, the latter of which may result in negative behaviors towards humans, and resulting lethal or sub-lethal take of animals that are considered a nuisance.

As noted in the Environmental Baseline, Steller sea lions are already attracted to fishing vessels, or co-occur with fishing vessels, likely due to whole discards and to nearby concentrations of fish, as well as fish caught in or on commercial fishing gear. Sea lions that co-occur with catcher vessels and catcher processor vessels may be present not because of the vessels, but despite their presence. If some of these sea lions are subsequently attracted to unground waste plumes from vessels, we expect that the incremental increase in take through bycatch of sea lions will accrue to longline and trawl catcher-processor vessels only; motherships will not deploy gear capable of taking sea lions, and catcher vessels will not have waste plumes that attract sea lions to their fishing gear.

Unground waste may also serve as a new attractant, increasing the rate at which sea lions interact with motherships and catcher processor vessels. Increased interactions with motherships may result in the remote possibility of bycatch by catcher vessels delivering to motherships with gear deployed while the mothership is discharging processing waste. However, such exposure is unlikely to occur and we do not anticipate increased interactions between sea lions and catcher vessels. In contrast, we expect the discharges of unground waste to result in a large increase in exposure of sea lions to bycatch by trawl and longline catcher processors while they are discharging unground waste. NMFS notes that EPA has received public comment indicating that large trawl vessels operating in this area will not change their discharge practices, and do not intend to discharge unground seafood waste, although this permit will authorize them to do so.

Increased Exposure to Risks of Take Not Reflected in Bycatch Statistics

Entangled animals reported as stranded are not reflected in NMFS bycatch statistics. Some of these animals are recovered dead, while others are injured. Entanglement is often, but not always, caused by encounters with active or derelict fishing gear. Entangled animals are almost certainly under-represented in our stranding data. Animals that die at sea may not ever wash up on shore, and will escape detection. Animals that wash up dead on remote sections of shoreline are also unlikely to be detected. We expect nuisance attraction caused by unground seafood waste in proximity to active fishing gear to result in an increase in existing (albeit low) entanglement rates. Stranded animals become entangled in derelict gear or in actively-fished gear that was cut in order to avoid bringing the animal aboard. Animals entangled in actively-fished gear may wash up still entangled in that gear, but the provenance of the gear in which the animal is entangled may not be determinable.

We expect that sea lions will not experience increased exposure to risk of vessel strikes despite our expectation that this permit will result in an increased presence of sea lions in close proximity to groundfish vessels, primarily because sea lions are expected to be able to avoid strikes by these slow moving vessels.

All vessels discharging unground seafood waste are expected to contribute to food conditioning behaviors among Steller sea lions. The proposed permit could result in an increase of 92,986 metric tons of unground, and therefore exploitable, seafood waste per year. Continued efforts to increase the recovery rate of harvested product is expected to reduce the mass of the waste stream in the future, but to an unknown degree. Regardless, we expect a notable increase in exploitable seafood waste as a result of this proposed permit. The easy source of anthropogenic and exploitable food, in the form of unground waste, is expected to exacerbate food conditioning behaviors compared to the current situation, where only whole discards comprise the current exploitable portion of the waste stream. If food conditioning of sea lions is such that they increasingly associate vessels with a source of potential food, we expect an increase in the documented rate of aggressive sea lion behavior that may result in harassment, harm, and sometimes death of those aggressive food-conditioned animals.

Sea lions consuming unground fish carcasses are expected to be at increased risk of exposure to harmful or lethal concentrations of parasites that are present in fish entrails, including nematode lung worms and *anisakis* simplex (Bergeron et al 1997, Dailey 1970, Yanong 2002, Kahn 2005), tapeworms (Levsen 2008), and acanthocephalans (Kahn 2005). This increase in exposure is due to the expected increased concentration of fish entrails (relative to fish flesh) ingested by individual sea lions. Effects of these parasites are varied. Lungworms cause anorexia, coughing, and blood in the mucous (Kahn 2005). They are highly pathogenic in pinnipeds and are probably responsible for significant mortality, especially in young animals. The most cosmopolitan of marine mammal parasites are the anisakine nematodes, *Phocanemu decipiens*, and several species of the genera *Contrucuecum* and *Anisakis*. These nematodes can be found free within the stomach or attached to the gastric mucosa. Penetration by larvae (Young & Lowe, 1969) and adults (McClelland, 1980) can lead to ulcers (Schroeder & Wegeforth, 1935), perforation into the abdominal cavity (Fiscus, Baines & Wilke, 1964), and gastritis, bleeding and peritonitis. Infections are generally not serious to the host, but in some cases, infections by these nematodes can contribute to compromised health parameters that contribute to the infected animal's death. Tapeworms attach to the intestinal wall, and can cause intestinal blockages (Vlasman and Campbell 2005). Tapeworms are usually innocuous (Arundel, 1978), but in extreme circumstances can result in debilitation and death of the host. The parasites can encyst in the colonic wall, or as a mass weighing more than l kg, can obstruct the lumen of the gut (Cordes & O'Hara, 1979). We expect this permit to increase exposure of western DPS Steller sea lions to these parasites.

Exposure Analysis Summary

We expect this action to increase exposure of western DPS Steller sea lions to risk of take in trawl and longline catcher processor gear due to the presence of unground waste. Steller sea lions are likely to be encountered throughout the action area to varying degrees, and since vessels would be discharging unground seafood throughout much of this area, we expect that most individuals will be exposed to the discharge (Figure 10), although we lack the information to

estimate what proportion of animals may be so exposed. We expect an increase in the rate of entanglements, noting that this is an increase of a very low rate of reported entanglements. Due to the vessels' slow operating speed (12 knots or less), and the agility and capability of Steller sea lions to avoid vessels, no increase in exposure to vessel strikes is expected. We expect the proposed permit to cause a large increase in the prevalence of food-conditioned sea lions, with a resulting large increase in exposure to human-caused take of sea lions resulting from food-conditioned aggressive behaviors. Finally, we expect an increase in exposure to parasites that cause lethal or sublethal take of sea lions.

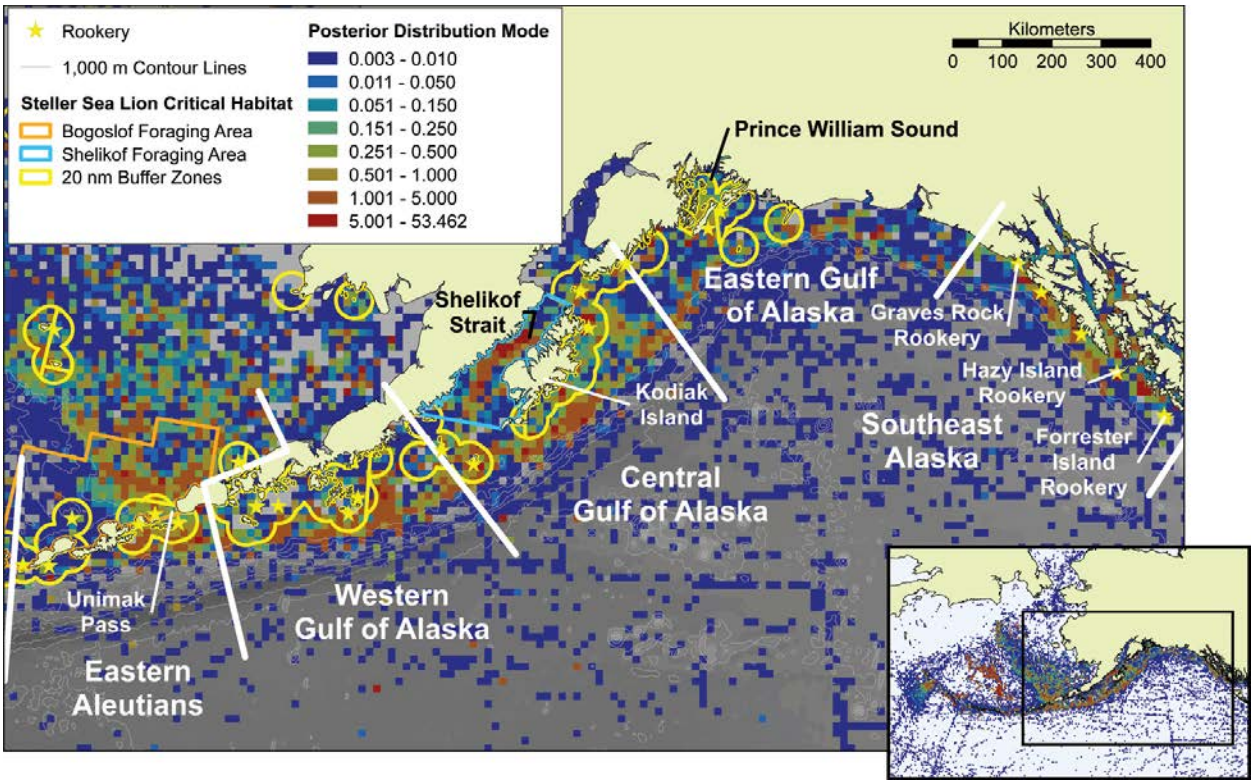


Figure 10. Steller sea lion encounter rate estimates (posterior distribution modes) resulting from the Bayesian inference on Platforms of Opportunity Steller sea lion observations per platform-day (Himes Boor and Small 2012).

6.3 Response Analysis

As discussed in the *Approach to the Assessment* section of this opinion, response analyses determine how listed species are likely to respond after being exposed to an action's effects on the environment or directly on listed species themselves. Our assessments try to detect the probability of lethal responses, physical damage, physiological responses (particular stress responses), behavioral responses, and social responses that might result in reducing the fitness of listed individuals. Ideally, our response analyses consider and weigh evidence of adverse consequences, beneficial consequences, or the absence of such consequences.

Response of Steller sea lions to commercial fisheries

Western DPS Steller sea lions feeding on the surface in the vicinity of motherships and catcher/processors that are exempt from the grinding requirement are expected to realize a caloric benefit due to easy access to unground seafood waste, especially lipid-rich entrails that remain attached to carcasses that float at or near the surface for a period of time. However, we also expect that some sea lions that avail themselves of this food source will have adverse interactions with the fisheries. Under the proposed permit, these fishery interactions are expected to increase in frequency due to the availability of food in the form of unground waste. Food conditioning of Steller sea lions is expected to result in increased attraction to commercial groundfish vessels. We have limited ability to estimate the magnitude of the effects of removal of existing grinding requirements for exempted vessels. In the absence of empirical data to quantify such effects, we made a qualitative assessment of the best available scientific information and determined that the following magnitudes of response represent reasonable estimates of the effects of this action (explanations appear in the text that follows):

1) a 50 percent increase in serious injury and mortality due to incidental bycatch from catcher-processors (50% of 8.4 animals per year yielding 4.2, rounded up to 5 western DPS Steller sea lions per year);
2) a 50 percent increase in serious injury or mortality due to incidental take from gear interactions not represented in fishery observer records (50% of 1.6 animals per year yielding 0.8 , rounded up to 1 western DPS Steller sea lion per year);
3) a five-fold increase in serious injury and mortality due to other human-caused factors such as control of nuisance animals (5 x 2.6 = 13 western DPS Steller sea lion per year);[6]
4) additional serious injury and mortality of five western DPS Steller sea lions per year due to increased parasite loads;
5) no increase in serious injury and mortality due to vessel strikes;
6) harassment or harm of three western DPS Steller sea lions per year as a result of adverse interactions with gear;
7) harassment of 13 western DPS Steller sea lions and harm of 13 western DPS Steller sea lions per year as a result of other human causes related to food conditioning.[6]

The absence of empirical data about the effects of the proposed action has necessitated that we make assumptions about the order of magnitude of potential effects. NMFS's knowledge of existing fishery interactions with Steller sea lions and sea lions' responses to other stressors gives us a reasonable degree of confidence that these assumptions about anticipated effects are realistic. In the face of uncertainty, we make conservative assumptions that give the benefit of the doubt to the species. We anticipate the monitoring proposed by EPA, as augmented by the Terms and Conditions of our Incidental Take Statement (section 10.4), and information from established fishery observer programs, will be sufficient to trigger reinitiation of section 7 consultation if the effects are appreciably different from what we expect. Other information sources documenting unexpected increases in entanglement rates, fishery-related mortalities, or aggressive food-conditioned sea lions (and subsequent instances of take) may also indicate the need to reinitiate consultation.

[6] Though we expect this action to result in takes of food-conditioned sea lions in the form of mortality or serious injury, harassment, and harm, no intentional takes associated with attempts to control perceived nuisance animals are authorized by the ITS for this action (section 10).

Western DPS Steller sea lion incidental take that is reported by fishery observers
From 2011-2015, western DPS Steller sea lions were seriously injured or killed in the following Alaska fisheries: Bering Sea/Aleutian Islands Atka mackerel trawl, Bering Sea/Aleutian Islands flatfish trawl, Bering Sea/Aleutian Islands Pacific cod trawl, Bering Sea/Aleutian Islands pollock trawl, Bering Sea/Aleutian Islands Pacific cod longline, Gulf of Alaska Pacific cod trawl, Gulf of Alaska Pacific cod longline, and Gulf of Alaska sablefish longline fisheries. Of all known causes of serious injury and mortality of western DPS Steller sea lions from 2011-2015 (trawl fisheries, longline fisheries, gillnet fisheries, aquaculture operations, entanglement in marine debris, take by firearms, and research effects), 64 percent resulted from trawl fisheries, 8 percent resulted from longline fisheries, and less than 1 percent resulted from (unobserved) state-managed gillnet fisheries (Helker et al. 2017). The current rate of incidental mortality and serious injury of sea lions in unobserved state-managed salmon gillnet fisheries is unknown; there remains no data on sea lion takes in the Bristol Bay set and drift gill net fishery, or in much of the southeast Alaska salmon gillnet fishery. Among federally-managed commercial fishery-induced serious injury and mortality, the trawl fleet is responsible for 88 percent of the take while longline fisheries cause 11 percent. Overall, the estimated mean annual mortality and serious injury rate from federal and state-managed U.S. commercial fisheries is 31 western DPS sea lions per year (16 from federal fisheries and 15 from state-managed fisheries), which is likely an underestimate of the actual level (Muto et al. 2018); an additional 1.4 animals per year are taken in unknown fisheries (including sport and commercial troll, longline, and other fisheries both commercial and recreational), 0.2/year were taken by longline gear, but were not brought aboard and recorded as a mortality, 2/year were taken by entanglement in marine debris, and 2.6 per year are taken by other human causes (e.g., illegally shot) (Muto et al. 2018). Of the 31 mortalities and serious injuries per year reported from commercial fisheries, 8.4 per year are due to Federal fishery catcher processors; the vessels that are most likely to cause increased take of Steller sea lions as a result of this action.

The existence of unground fish carcasses near at-sea processors is expected to cause behavioral changes in western DPS Steller sea lions as they become food conditioned, with an unknown portion of animals expected to learn to associate fishing vessels with a predictable and easily-exploited food source (unground seafood processing waste). Motherships, trawl catcher processors, and longline catcher processors are expected to contribute to the food conditioning of sea lions because they are expected to discharge unground seafood waste. Unground waste represents an anthropogenic food source that rewards sea lions for their behavior of remaining in close association with vessels. We do not know to what extent sea lions will discern among different classes of vessels. It is likely that odor will be an important cue for them, making it more likely that food conditioned animals will draw a food association with fishing vessels than with vessels engaged in non-fishing-related activities.

Unground waste is also expected to create an attractant that causes sea lions to increase the amount of time they remain associated with unground seafood waste-producing vessels. This association increases exposure of sea lions to fishing gear used by trawl and longline catcher processors, which typically discharge waste while also setting, fishing, and retrieving gear. This association also increases the exposure of sea lions to trawl and longline catcher processor gear in ways that may not result in their mortality or serious injury. This proposed permit will increase the opportunities for sea lions to interact with trawl and longline catcher processor gear

in a way that is expected to result in increased mortality, serious injury, harm and harassment (e.g., getting caught in trawl nets, becoming hooked in longline gear, becoming entangled in gear, being struck by gear).

Unlike seabirds, sea lions are not known to forage upon seafood waste ground to the currently-permitted dimensions of 0.5 inch or less in diameter, and this waste is not known to represent an efficiently exploitable source of food for sea lions. While sea lions may be initially attracted to ground seafood waste outfall plumes by their odor, and may interact with gear during their initial investigation of the odor, NMFS is unaware of data indicating whether sea lions remain within ground seafood waste plumes to forage on that waste. Based on observer data from catcher/processor vessels, there are a few reports of Steller sea lions feeding on discards from longline vessels (three reports from 2011 to 2015 involving six animals), and no reports of foraging in the waste plume. Likewise, we are unaware of how sea lions behave in unground waste plumes, or how their behavior associated with ground and unground waste plumes may differ.

Federal groundfish fisheries are observed by independent and highly trained fisheries observers. Their reported bycatch rates are considered to accurately reflect actual bycatch rates in trawl fisheries because bycaught animals are retained in the gear and brought on board vessels. Trawl interactions typically result in sea lion mortality (the animal was already dead by the time it was observed) and non-lethal injuries are rare (Breiwick 2013). Some unknown portion of animals reported as trawl bycatch may have already been dead prior to their capture in trawl nets.

Observer-recorded sea lion bycatch rates for the longline sector may be an underestimate of the actual bycatch rate because animals injured or killed by longline gear are likely under-reported. Animals may become hooked by, or entangled in, longline gear when they are attracted by outfall close to that gear while it is being set and retrieved. Animals near vessels discharging unground waste may investigate baited hooks or hooked catch, or may swim closely enough to the gear to become snagged or entangled in the hooks and gangions. Unlike animals captured in trawl nets, sea lions hooked or entangled by longline gear are less likely to be retained by that gear until it is hauled aboard; hooked animals may escape the gear by breaking gangions or ripping free of hooks, and animals killed in the gear may fall off while the gear is soaking or being retrieved.

We expect additional take of western DPS Steller sea lions that is attributable to the discharge of unground waste from vessels participating in groundfish fisheries off Alaska. This additional take is due to changes in seafood waste processing practices, not to changes in fishing practices.

Compared to the status quo, in which sea lions do not typically forage in outfall plumes of ground seafood waste, we expect that when sea lions do forage in unground waste plumes, the total bycatch rates will be higher than the existing bycatch rates and this additional bycatch will be due to changes in seafood waste processing practices alone. As explained in our exposure analysis, trawl catcher vessels are unlikely to experience an increase in their sea lion bycatch rate. Trawl and longline catcher/processor vessels are expected to see an increase in their bycatch rates.

Although we lack empirical data to compare bycatch with and without grinding of seafood processing waste, we determined, based on our best professional judgment and using the best scientific information available, that a 50 percent increase in take due to fisheries bycatch (among catcher-processors) is a reasonable estimate of the effects of the proposed permit on fisheries bycatch rates. In deriving this estimate, we considered all of the factors that contributed to our exposure analysis, including fishing practices, contributions of trawl and longline sectors to total catch, existing bycatch rates, and the expected attraction of some sea lions to discharges and discards. This results in our estimate of an additional 5 sea lions killed or seriously injured per year due to increased bycatch rates that result from this action (Table 4). We note that the magnitude of this increase in take may not be fully realized for several years after the proposed permit is implemented because the practice of sea lions cuing in on unground waste plumes will not occur instantaneously.

Mortality or serious injury due to gear interactions not reflected in fishery observer data
Western DPS Steller sea lions feeding on the surface in the vicinity of motherships and catcher/processors are expected to be at increased risk of adverse interactions with commercial fishing gear in ways that are not necessarily reflected in bycatch rates. This is expected to occur when sea lions, while feeding on unground processor waste or while interacting with other wildlife that is feeding on processor waste, fail to detect approaching fishing gear that can cause injury or death by striking or killing the animals. It may also be due to increased instances of entanglement in longline gear that go undetected by federal fisheries observers.

Trawler warp, paravane and net sonde cables being towed through unground outfall plumes of trawler catcher processors may strike sea lions distracted by unground waste, and may cause injuries or death. Seabirds are sometimes struck by trawl warp cables or net sonde cables, and are dragged underwater and drowned. We know of this source of mortality only because the feathers and wings of some struck birds become tangled in exposed wires at cable splices or at junctions with other hardware, and the bird carcasses are subsequently lifted out of the water and brought on board. We expect carcasses of dead marine mammals that may be pinned against these cables would not be similarly retrieved and detected because their carcasses would drop off the gear prior to being hauled on board. However, because trawl vessels towing gear are moving slowly (2-5 knots), we expect that sea lions, even if struck by trawl or net sonde cables, would not be injured by the strike, and would be able to avoid entanglement or escape from being pinned against the gear. Take by longline fisheries that is not reflected in bycatch statistics remains a concern, however.

Of the 386 non-listed eastern DPS Steller sea lions known to have become entangled in marine debris and fishing gear from 2000-2007, most were entangled in state-managed salmon sport and commercial salmon trolling gear that uses flashers (80 percent), while 12 percent were entangled in commercial longline gear (Raum-Suryan et al. 2009). Few endangered western DPS Steller sea lions are taken in troll gear because troll effort within the overwhelming majority of their range is very low, and is dwarfed by longline effort in that region. Even so, few western DPS Steller sea lions are reported taken in longline fisheries (8 percent human-caused takes from 2011-2015) (Helker et al. 2017).

Among known stranded Steller sea lions (both eastern and western DPS), very few show evidence of interaction with longline gear. However, effort to detect stranded western DPS Steller sea lions is very low. Based on available information, we expect that the majority of western DPS animals that are killed or seriously injured by hook and line fishing gear are taken in commercial longline fisheries (as opposed to commercial troll or recreational fisheries). Sea lions that may be hooked or entangled in longline fisheries, but escape or fall off gear prior to being observed, are likely underreported in bycatch statistics and largely undetected by humans.

We expect that the increase in mortality of western DPS Steller sea lions due to gear interactions not reflected in fishery observer records or bycatch statistics will be commensurate with the expected increase in sea lion take due to bycatch in trawl and longline fisheries; that is, we expect a 50 percent increase in take associated with this stressor. Because the current annual rate of take due to this stressor is 1.6 animals, we expect the proposed permit will result in an additional 0.8 (rounded to 1) western DPS Steller sea lion per year hooked or entangled in longline fishing gear in a way that avoids their inclusion in bycatch statistics (Table 4). Proposed monitoring measures associated with this action (see section 2.1.2) may not be adequate for verifying the additional magnitude of incidental take by commercial fisheries but not reflected in bycatch statistics that will be caused by this action. Therefore, we included additional parameters in the Terms and Conditions and Conservation Recommendations of the Incidental Take Statement (section 10.4).

Mortality or serious injury due to other human causes

Food conditioning in some species of wildlife is well documented (see section 6.1). Among large mammals, factors that result in development of associations between food and humans often result in otherwise preventable loss of human life and property and mortality of the food-conditioned mammals. Steller sea lions have been known to act aggressively towards humans, especially in harbors containing fishing vessels. In 2017, a Sand Point, Alaska, fisherman working on his boat was knocked down and severely bitten by a Steller sea lion that boarded his boat and attempted to drag him back into the water. Also in 2017, a child in British Columbia that had been feeding a sea lion was dragged off of the dock and into the water by the sea lion. In 2018, NMFS received complaints from the public about Steller sea lions' behavior at Clover Pass Resort and Knudson Marina near Ketchikan, Alaska, where unground fish waste is discarded at fish cleaning stations. In January, 2019, a Steller sea lion near Sand Point lunged onto a the stern ramp of a fishing vessel as it was hauling gear, biting a crew member on the leg and attempting to pull the crewmember into the water (https://whdh.com/news/sea-lion-bites-alaska-fisherman-tries-to-drag-him-into-sea/). This was the third report of sea lions biting legs of fishermen from Sand Point in the past two years. These events resemble accounts of human-bear interactions brought about by food conditioning of bears, and we consider such events to be the result of abnormal behavior of sea lions brought about by food conditioning. NOAA's Office of Law Enforcement typically receives one or two reports of aggressive Steller sea lions per year, and only since 2017, has begun to keep records of such incidents (Kim Raum-Suryan, NOAA Fisheries Protected Resources Division). As with bears, food conditioning of sea lions is ill-advised and preventable. In light of the increase in seafood waste that is in an exploitable for, we expect an increase in adverse encounters between humans and food-conditioned Steller sea lions as a result of this action. Human-caused mortality of food-conditioned, nuisance sea lions due to this proposed permit is inevitable, but would not likely manifest to its full magnitude for a

number of years, as animals become increasingly food conditioned and learn new nuisance behaviors. Such nuisance behaviors could manifest anywhere throughout the animals range, including within harbors and ports, where animals could occur in close proximity to people. Associations learned at sea (e.g., there is easily obtainable food around large boats that smell like petroleum and fish) are certainly transferrable to a typical Alaska boat harbor, where there are many large boats that smell like petroleum and fish. We do not assume that all, or even a significant proportion of sea lions in boat harbors are food conditioned. But the small number that are pose a risk to humans and to themselves.

There has been little research on food conditioning in marine mammals. Rather, there are reports of aggressive animals attacking humans, primarily in harbors. While it is possible that these aggressive animals learned to act aggressively towards humans based solely on the actions that occurred in the harbor; it is equally likely that the animals first learned to associate food with the sounds and smells of human industrial operations (commercial fishing operations) while they were foraging at sea.

The proposed action will increase the amount of anthropogenic food available to sea lions by about 5 times. While very few animals will develop food conditioned behaviors, we expect that a five-fold increase in incentive (exploitable anthropogenic food in association with human activity) will result in a five-fold increase in these uncommon behaviors; behaviors that occur in places where humans come into closer contact with the animals, such as within boat harbors.

Moreover, our estimate of the current level of death or serious injury of Steller sea lions due to other human causes (2.6 per year) is likely a gross underestimate. Our estimate derives from the few animals that happen to be found or reported to us that also display evidence of human-caused injury or death. We expect that most animals that are subjected to human control are not reported, nor are those control efforts reported (e.g., Steller sea lions with gunshot wounds along Copper River Delta discovered on NMFS aerial surveys over the past few years). Most animals killed or seriously injured as a result of human activity likely die and decompose prior to human detection; the notable exception being the estimate of the number of animals directly killed or injured by commercial fishing gear. Because we assume that most takes due to other human causes go unreported and undiscovered, it is reasonable to attribute the low level of existing and observed baseline takes (2.6 animals per year) to the commercial fisheries affected by this permit, due particularly to food conditioning behaviors caused by discards of seafood waste.

When one accounts for grizzly or brown bear attacks that are due to surprise encounters, nearly all remaining fatal bear attacks on humans are caused by food-conditioned bears (Herrero 1985). In the absence of food conditioning, bears almost never become a nuisance such that it results in their death. In Yellowstone National Park, at a time when food-conditioned bears were a problem (1974-1985), illegal killing of bears was the highest source of mortality, and was at its most pronounced during years of low natural food availability (Knight et al. 1988). As with bears, we expect annual variability in interactions between humans and food-conditioned western DPS Steller sea lions, due in part to: 1) variability in natural prey abundance, and 2) prevalence of food-conditioned sea lions in the population. Existing permit conditions preclude most opportunities for teaching Steller sea lions to associate vessels with food, the exceptions being food-conditioning caused by whole discards and the discharge of fish carcasses near sea lions

that frequent harbors used by fishing vessels (e.g., Dutch Harbor, Kodiak, Sand Point). This proposed permit will create a situation in which up to 450,000 metric tons of seafood waste that is exploitable by sea lions will suddenly become available in close proximity to commercial fishing vessels and humans. Given evidence that Steller sea lions are capable of becoming food conditioned (as demonstrated by sea lions in aquaria, known accounts of aggressive sea lions in several Alaska ports, and analogous situations involving large mammals such as bears that become conditioned to human sources of food), we expect an increase in western DPS Steller sea lion mortality due to other human factors, such as control of nuisance animals. Such control measures could take place anywhere within the animals range, including within harbors and ports.

In the absence of nuisance attractants from at-sea processors, at least 9 western DPS Steller sea lions were shot between 2011 and 2015 (Helker at al. 2017). The mean annual mortality and serious injury of western DPS Steller sea lions caused by other sources of human interactions for 2011-2015 (excluding entanglement in marine debris) is 2.6 animals (Muto et al. 2018). This estimate may not adequately consider localized illegal killing of Steller sea lions, such as occurred recently near Cordova, Alaska (Wright and Savage 2016). Even though shooting Steller sea lions is illegal with limited exceptions (e.g., for subsistence use by Alaska Natives), lethal take of nuisance western DPS Steller sea lions is expected to increase as a result of this action.

Food conditioning-related behaviors are expected to take at least several years to develop before their effects are fully realized. In the absence of data upon which to base a quantitative estimate of the increase, we used professional judgment, considering the best available scientific information, to estimate the amount of additional take due to food conditioning.

Ground waste does not provide a mechanism for food conditioning because there is no food reward. Unground waste provides a reward to sea lions that avail themselves of the foraging opportunity (primarily lipid rich organs), and thus it provides a mechanism for food conditioning by providing a food reward. Although longline catch on gear that is being hauled may provide a food reward for Steller sea lions, we consider discards to represent the primary source of anthropogenic food that may lead to food conditioning of Steller sea lions under the previous permit. We recognize the conservative nature of some of our assumptions because we did not consider the mass of discarded sport-caught fish waste or the mass of fish waste from state commercial fisheries; however, we are unaware of any data that would allow us to adequately compare these sources of anthropogenic food to that provided by federal commercial fisheries. We therefore consider such information qualitatively but lack a reliable means of incorporating such information into our quantitative analysis.

In the absence of data indicating how much of the waste under the new permit will be of a form that is exploitable (i.e., because some operators may continue to grind or otherwise process fish waste even if not required to do so), we make the conservative assumption that there will be a five-fold increase in exploitable anthropogenic seafood biomass as a result of this action because the mass of seafood waste is roughly six times the mass of whole (regulatory) discards, the only existing source of exploitable waste. Because some portion of discharged seafood waste (not whole discards) will likely continue to be ground, we have assumed a five-fold increase rather than a six-fold increase in mass of exploitable waste due to this permit). Thus, we conclude that

there will be a corresponding five-fold increase in take due to human interactions that result from food conditioning and associated sea lion behavior changes. Under baseline conditions, there are at least 2.6 animals per year killed or seriously injured due to other human causes (such as illegal shooting). Therefore, under the new permit, we expect an additional 5 x 2.6 = 13 animals per year seriously injured or killed due to other human causes (i.e., human actions taken as a result of food conditioning and associated sea lion behaviors brought about as a result of the proposed permit) (Table 4). We note that this take of sea lions resulting from control of nuisance animals enters into our jeopardy analysis, but is not included in our authorization for take of listed species for this permit.

Parasites

Sea lions that become food conditioned and regularly feed in at-sea processor seafood waste plumes may accumulate higher parasite burdens compared to sea lions that feed exclusively on natural sources of free-swimming live prey. While sea lions that co-occur with at-sea processors are unlikely to be exposed to novel parasites that are not encountered in their typical diet, sea lions feeding in unground seafood waste plumes will need to ingest a much higher number of fish carcasses and associated entrails to achieve the nutritional benefit of a much smaller number of whole fish. Consequently, sea lions feeding on carcasses may be exposed to several times more gut-dwelling fish parasites than a sea lion feeding on live prey in order to achieve the same caloric input. Lungworms and tapeworms reside in the viscera of many species of marine fish (Bergeron et al. 1997, Dailey 1970, Levsen 2008, Yanong 2002). These parasites infect sea lions and can become a health issue among individuals that have compromised health, suffer from poor or inadequate nutrition, or are otherwise stressed. Elevated levels of parasites can result in compromised health parameters that can harm or kill sea lions (Stroud and Dailey 1978, Stroud and Roffe 1979). We are unaware of reports of western DPS Steller sea lions where the cause of death has been attributed to elevated parasite loads, although necropsies of stranded sea lions represent a very small and unrepresentative sample of all sea lion mortalities.

Although we lack evidence of western DPS Steller sea lions dying or being seriously injured due to parasites, we know that such effects can occur (Stroud and Dailey 1978, Stroud and Roffe 1979). Under the existing permit conditions, sea lions are not subjected to scenarios where they may ingest an unnaturally high amount of parasites that reside in fish viscera. As a result of this action, sea lions will have access to an estimated 93,000-450,000 metric tons of seafood waste containing higher concentrations of parasites that reside in fish viscera compared to a similar mass of whole fish. While we lack information to accurately predict the magnitude of western DPS Steller sea lion take due to increased ingestion of parasites that will result from this action, we expect that a small number of sea lions will experience serious injury or mortality due to this stressor. We know from published literature that parasitic infections can be harmful or fatal to Steller sea lions (Stroud and Dailey 1978, Stroud and Roffe 1979). However, recent stock assessments do not report fatalities due to parasitic infection. We assume that in the absence of targetted research, deaths or serious injuries due to parasitic infections go almost entirely undetected. Rarely, animals are found dead and undergo necropsies as part of an Alaska marine mammal stranding network response. But many of these animals have typically undergone sufficient decay to render detection of parasitic infections unlikely. Therefore, we assume that there exists some take of sea lions due to parasitic infections. We assume that some of this largely undetected take is due to sea lions encountering and ingesting parasites from fish waste

and discards that it would not otherwise ingest, or would ingest at far lower rates. We furthermore assume that the level of this take is greater than zero, which we conservatively round up to a single animal per year.

We estimate that take (as mortality or serious injury) due to parasitic infection resulting from this action will increase by five fold. We estimate a five-fold increase because the mass of unground seafood waste, a vector for ingestion of higher concentrations of parasites, is about 6 times that of whole discards, the vector for ingestion of parasites from fish waste and discards prior to issuance of this permit. We assumed a 5-fold increase, rather than a six-fold increase, to account for the likelihood that some portion of this waste will continue to be ground or discharged in unexploitable form. This is based on the fact that a kilogram of processed fish contains the gut parasites from more fish than a kilogram of wild or discarded fish. Thus, this action will increase both the exposure and severity of response to parasites among sea lions. While we do not have reliable estimates of how much more exposed sea lions will be to these parasites due to their higher concentrations in the waste stream, it is reasonable to assume that the exposure will increase by at least a factor of 5, simply because this permit will make available to sea lions about 5 times as much unground fish waste. As a result, we conservatively estimate there will be five takes due to parasite infection resulting from this action.

Response to increased risk of vessel strikes

Western DPS Steller sea lions attracted to unground at-sea processor waste are expected to spend more time in close proximity to fishing vessels, especially if they learn to associate them with a predictable source of food. We expect that this increase in interactions between sea lions and fishing vessels could increase the risk of vessels striking sea lions. Commercial fishing vessels typically discharge waste while operating at speeds under 12 knots, and vessels travelling slower than 12 knots are less likely to strike most species of whales (Neilson et al. 2012). Because sea lions are more agile than whales, we expect them to be able to avoid collisions with fishing vessels traveling at speeds less than 12 knots, including at-sea processors that are discharging waste. Therefore, we conclude that any increase in vessel strikes resulting from this action is unlikely to occur.

Harassment or Harm Due to Interactions with Fishing Gear

About 1.6 (here, rounded up to 2) western DPS Steller sea lions per year are killed or seriously injured due to fishing gear interactions and gear entanglement (Muto et al. 2018). We estimated that 1 additional western DPS Steller sea lion will be killed or seriously injured as a result of this action due to adverse interaction with fishing gear in a way that is not captured in bycatch statistics. In other words, these additional sea lions may die or suffer harm in a way that precludes their inclusion in bycatch statistics (i.e., adverse interactions that are unreported or unobservable). Because sea lions that are only harassed or not seriously harmed by interactions with fishing gear do not show up in bycatch or stranding samples, and because these non-lethal interactions are not systematically surveyed or recorded, we have limited ability to estimate the current magnitude of such take. This makes projecting additional levels of harassment or harm extremely difficult. It is reasonable to assume that for every animal killed due to gear interactions, at least an equal number are merely harassed or harmed. It is likely that animals that unintentionally make contact with gear will either survive that contact relatively unscathed or be killed in the gear. For example, animals that get bumped by net sonde cables moving through the water at a speed of a few knots will probably suffer no ill effects whatsoever, but animals that

become hooked in longline gear are likely to drown. If, after drowning, their carcass becomes detached from the gear that would become an instance of an adverse impact with gear that is not captured in fishery observer bycatch statistics. Animals that become hooked on or entangled in longline gear and escape it prior to drowning may suffer non-life-threatening injuries that are never recorded by humans.

Sources of harassment due to interactions with trawl gear are less obvious. Animals may become captured in nets and drown (become bycatch), may collide with slow moving gear in a non-injurious manner, or may voluntarily contact trawl gear in an effort to obtain food (also assumed to be non-injurious gear interaction). Therefore, the only obvious vector for harassment or harm (short of serious injury) due to groundfish gear interactions is likely due to interactions with longline gear. Sea lions could become hooked by longline gear and tear themselves free, or become entangled in gear and extract themselves in a way that causes non-serious injury.

Helker (2017) identified 8 instances of western DPS Steller sea lions killed or seriously injured in longline gear over a 5 year period, or 1.6 animals per year. We assume an equivalent rate of sea lion harassment or harm from interactions with commercial fishing gear over this same time period. If we assume the rate of harassment or harm by gear is commensurate with the increased rate of bycatch, then we would expect to see an additional 50 percent increase in the existing rate of harassment or harm due to gear interactions. Rounding up fractional takes, this yields an estimate of 0.8 (rounded up to 1) animals per year harassed or harmed by the gear in a manner that is not considered to be a serious injury.

Harassment or Harm Due to Hazing of Food-conditioned Animals

An estimated 2.6 western DPS Steller sea lions are killed or seriously injured each year due to other human causes, including shooting (Muto et al. 2018). Information on non-lethal measures taken against aggressive Steller sea lions (or non-aggressive sea lions perceived as competitors for available fish) is anecdotal and extremely limited. NMFS is aware of several examples of hazing or lethal take of potentially threatening sea lions in recent years. One aggressive animal was killed in Sitka harbor, and another presumably aggressive animal was injured with, and swam off with a gaff embedded in its flesh. The fate of a very aggressive animal that bit a fisherman after it boarded the fishermen's vessel in Sitka remains unknown, while a fourth sea lion in Sitka acted aggressively towards a fisherman cleaning halibut, but retreated after a single approach; its fate is also unknown. A California sea lion was successfully hazed off of a dock in Auke Bay after several attempts to frighten it away. A food-conditioned and aggressive male Steller sea lion in the Petersburg harbor was hazed repeatedly. Eventually, it failed to return to the harbor, although its fate remains unknown; it may have left the area, been harvested by subsistence hunters, or been illegally taken. Most of these animals are known to have received food from humans. This extremely limited set of observations suggests that for each aggressive sea lion that is killed, another animal is harmed while yet another is harassed. By extension, since we have determined that 13 animals per year will be killed or seriously injured by humans as a result of their unwelcomed behavior (5 times the current estimate of 2.6 animals per year), then we also estimate that about 13 food-conditioned animals per year are expected to be harassed and 13 are expected to be harmed.

Proposed monitoring methods may be ineffective in estimating the amount of take that occurs away from fishing vessels.

7. CUMULATIVE EFFECTS

"Cumulative effects" are those effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area (50 CFR 402.02). Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

Vessel traffic headed towards the Arctic has increased in recent years, most notably during years of exploratory oil and gas exploration activities in the Chukchi Sea. However, when accounting for these observed vessel traffic increases within the range of the western DPS Steller sea lion, we also take into consideration the changes in total volume of vessel traffic. Within this area, vessel traffic that is related to authorized federal activities (e.g., oil and gas exploration, commercial fishing, research) is very large compared to vessel traffic related to activities with no federal nexus (commercial shipping). Future changes in non-federally authorized vessel traffic are expected to be minimal compared to federally authorized vessel traffic volumes. We are not aware of any other non-Federal activities causing adverse effects to western DPS Steller sea lions that are reasonably certain to occur in the action area.

8. INTEGRATION AND SYNTHESIS

The Integration and Synthesis section is the final step of NMFS's assessment of the risk posed to species and critical habitat as a result of implementing the proposed action. In this section, we add the effects of the action (Section 6) to the environmental baseline (Section 5) and the cumulative effects (Section 7) to formulate the agency's biological opinion as to whether the proposed action is likely to: (1) result in appreciable reductions in the likelihood of the survival or recovery of the species in the wild by reducing its numbers, reproduction, or distribution; or (2) result in the adverse modification or destruction of critical habitat as measured through potential reductions in the value of designated critical habitat for the conservation of the species. These assessments are made in full consideration of the status of the species (Section 4).

As we discussed in the *Approach to the Assessment* section of this opinion, we begin our risk analyses by asking whether the probable physical, physiological, behavioral, or social responses of endangered or threatened species are likely to reduce the fitness of endangered or threatened individuals or the growth, annual survival or reproductive success, or lifetime reproductive success of those individuals.

The western DPS Steller sea lion population increased at about 2 percent per year in non-pup and pup counts between 2003 and 2016. This trend varies by region, with larger positive trends in the eastern portion of the range and negative trends further west in the Aleutian Islands (Muto et al. 2017). Steller sea lions are generalist predators that eat a variety of fishes and cephalopods (Pitcher 1981, Calkins and Goodwin 1988, NMFS 2008), and occasionally other marine mammals and birds (Pitcher and Fay 1982, NMFS 2008). Throughout the year, western DPS sea lions forage across a broad swath of ocean in the Gulf of Alaska and Bering Sea, both within and outside of designated critical habitat. They essentially co-occur with the geographic extent of at-sea processor activities in Alaska. As a result of this action, seafood grinding requirements will be removed for all vessels outside of Steller sea lion critical habitat areas, and within Steller sea lion critical habitat areas that are more than 3 NM from the Alaska coast, vessels that discharge less than 10 million pounds annually will not be required to grind seafood waste prior to discharge.

Between 2011-2015, observed serious injuries and mortalities of western DPS Steller sea lions occurred as follows: 67 in trawl fisheries, 9 due to gunshot or arrow injuries, 5 in longline fisheries, 5 in troll fisheries, 3 due to research, 1 in fishing gear, and 10 in marine debris (possibly including some fishing gear) (Helker et al. 2017). Note that these are not estimates of annual mortality, but a tally of observed records from 2011-2015. Mortalities and serious injuries attributable to fisheries occurred during prosecution of ten federal fisheries: BSAI flatfish trawl, BSAI Pacific cod trawl, BSAI pollock trawl, BSAI Pacific cod longline, Gulf of Alaska Pacific cod trawl, Gulf of Alaska Pacific cod longline, Gulf of Alaska sablefish longline, Gulf of Alaska flatfish trawl, Gulf of Alaska rockfish trawl, and Gulf of Alaska pollock trawl (Muto et al. 2017). Known causes of serious injury and mortality of western DPS Steller sea lions during that time include trawl fisheries, longline fisheries, state-managed gillnet fisheries, aquaculture operations, entanglement in marine debris, gunshot wounds, and research effects. Of these sources of take, 68 percent (67 of 98 western DPS Steller sea lions killed or seriously injured) resulted from trawl fisheries, 7 percent (7 of 98) resulted from longline fisheries, and 1 percent (1 of 98) resulted

from (unobserved) gillnet fisheries (Helker et al. 2017). Causes of western DPS Steller sea lion serious injury and mortality not directly attributable to commercial fisheries include aquaculture (1 of 98), entanglement in longline gear (1 of 98), entanglement in marine debris (which may include unidentified fishing gear) (10 of 98), gunshot (or arrow) wounds (9 of 98) and research activities (3 of 98). In considering these records, it is important to keep in mind that different fisheries have different rates of observer coverage, with trawl fisheries more heavily observed (near complete or complete coverage) than other fisheries; one should not directly compare the number of animals reported taken in trawl fisheries with the number taken in the less heavily-observed longline fisheries.

While the current rate of incidental mortality and serious injury of sea lions in unobserved salmon gillnet fisheries is unknown, the estimated annual mortality and serious injury rate from U.S. commercial fisheries, as reflected in bycatch statistics, is 31 western DPS Steller sea lions per year, which is likely an underestimate of the actual level (Muto et al. 2017).

We expect the incidental take of western DPS Steller sea lions in commercial fisheries will increase in areas where discharge of unground waste is authorized (see Figure 1). We determined that a 50 percent increase in take among catcher-processor vessels is a reasonable estimate of the effects of the proposed action on fisheries bycatch rates (Table 4). We note that the magnitude of this increase in take would not likely be fully realized for a number of years after the implementation of the proposed permit, as animals become increasingly food-conditioned over the course of several years.

Entanglement or other interactions with fishing gear currently results in a minimum estimated mortality of two western DPS Steller sea lions per year (Muto et al. 2017). We expect an increase in serious injury and mortality of western DPS Steller sea lions due to gear interactions as a result of this action. We estimated that the increase in mortality of western DPS Steller sea lions due to gear interactions not reflected in bycatch statistics will be commensurate with the expected increase in bycatch; that is, we expect a 50 percent increase in take associated with this stressor. Because the current annual rate of take due to this stressor is two animals, we expect one additional western DPS Steller sea lion may be hooked or entangled in fishing gear in a way that avoids inclusion in bycatch statistics.

Sea lions act aggressively towards humans when they associate humans with food. Existing permit conditions prevent most opportunities for food conditioning of western DPS Steller sea lions, the exception being among a small proportion of the population that resides in harbors used by fishing vessels. In the absence of nuisance attractants from at-sea processors, at least 9 western DPS Steller sea lions were shot between 2011 and 2015 (Helker et al. 2017). We expect an increase in opportunities for sea lions to become food-conditioned as a result of this action. The mean annual mortality and serious injury of western DPS Steller sea lions caused by other sources of human interactions for 2011-2015 is 2.6 animals (Muto et al. 2017). This estimate may not adequately consider localized illegal killing of Steller sea lions, such as occurred recently near Cordova, Alaska (Wright and Savage 2016). Lethal take of nuisance western DPS Steller sea lions is expected to increase as a result of this action, an expected result of food conditioning-related behavior changes that are likely to occur among western DPS Steller sea lions. We determined that this action will represent about a five-fold increase in exploitable

anthropogenic waste discharged at sea (unground waste plus whole discards). We therefore determined that this action is likely to cause a five-fold increase in food conditioning-related mortality or serious injury due to other sources of human interaction, which is an additional 13 western DPS Steller sea lions killed or seriously injured each year as a result of other human causes (5 times the current estimate of 2.6 animals per year).

Although we lack evidence of western DPS Steller sea lions dying or being seriously injured due to parasites, we know that such effects can occur. Under the existing permit conditions, sea lions are not subjected to scenarios where they may ingest an unnaturally high amount of parasites that reside in fish viscera. The proposed permit creates conditions where sea lions may feed on carcasses that have a higher concentration of parasites relative to the mass of food (in this case, unground carcasses with associated viscera). We expect that the five-fold increase in discarded biomass that is exploitable as food (using whole discards as the baseline for amount of exploitable discarded biomass, and knowing that unground seafood waste may be up to six times that biomass). This unground waste contains elevated concentrations of gut-dwelling fish parasites. We know from existing literature that parasitic infections likely cause some sea lion deaths. If we assume greater than zero deaths or serious injuries of sea lions due to parasites facilitated by human activities that bring sea lions into contact with novel or elevated amounts of parasites, and round that fractional take up to one animal, and apply a five fold increase to that baseline rate of serious injury or mortality, we get 5 x 1 = 5 western DPS Steller sea lions per year experiencing serious injury or mortality from parasites as a result of this action.

We expect western DPS Steller sea lions will be attracted to unground at-sea processor waste, and will spend more time in close proximity to fishing vessels, especially if they learn to associate fishing vessels with a predictable source of food in the form of unground waste. While near the vessels, the risk of vessels striking sea lions may increase. However, commercial fishing vessels typically discharge waste while operating at speeds under 12 knots, and sea lions are expected to be capable of avoiding collisions with vessels traveling at such speeds. Therefore, we conclude that an increase in vessel strikes resulting from this action is unlikely to occur.

We expect the number of animals harassed or harmed (short of serious injury) as a result of this action and associated food-conditioned aggressive behaviors will be commensurate with the number of western DPS Steller sea lions killed or seriously injured due to other human causes (a five-fold increase of 2.6 animals per year, or 13 animals per year). Likewise, we assume the number of animals harassed will also be 13 per year. An additional three animals per year are expected to be harassed or harmed due to gear interactions (a 50 percent increase of the current estimate of 1.6 animals per year, which is commensurate with the rate of increase for bycatch).

The proposed permit is expected to result in the serious injury or mortality of 24 endangered western DPS Steller sea lions per year (Table 4). This take due to mortality or serious injury is in addition to the estimated 241 western DPS Steller sea lions currently taken each year by mortality or serious injury by all forms of human activity each year (including that reported by federal fishery observers and those animals taken by subsistence hunters) (Muto et al. 2017). In addition, the proposed permit is expected to result in the harassment or harm of an additional 27 endangered western DPS Steller sea lions per year (Table 5).

We do not expect any take of listed species to result due to cumulative effects. The 2017 potential biological removal for western DPS Steller sea lions is 320 animals. Factors (other than natural mortalities) that remove animals from a marine mammal stock in amounts that exceed the potential biological removal may preclude the stock from reaching its optimal sustainable population. Exceeding potential biological removal thresholds may prevent recovery of a stock.

Table 4. Existing take and projected take due to the proposed action. Estimated fractional takes associated with this action are rounded up.

Source of take	Existing reported magnitude of take	Estimated take due to this action (mortality/serious injury)	Estimated take due to this action (harass/harm)
Incidental take due to catcher/processors in federally-managed commercial fisheries	8.4	5	0
Incidental take in fisheries not represented in fishery observer records (gear interactions)	1.6	1	1
Other human causes (e.g., control of nuisance animals)	2.6	13[1]	13 harass[1] 13 harm[1]
Human-facilitated parasite loads	0	5	0
Total	12.6	24	27
[1]While these takes are included in our jeopardy analysis, they are not authorized by the Incidental Take Statement associated with this Biological Opinion.			

We additionally estimate that three animals per year will be harassed or harmed by fishing gear interactions to an extent that does not cause serious injury or mortality, while 13 animals per year that have become food-conditioned as a result of this action are expected to be harassed and 13 are expected to be harmed.

9. CONCLUSION

After reviewing the current status of the listed species, the environmental baseline within the action area, the effects of the proposed action, and cumulative effects, it is NMFS's biological opinion that the proposed action is not likely to jeopardize the continued existence of western DPS Steller sea lions.

NMFS also concurs with EPA's determinations that the proposed action is not likely to adversely affect blue whales, sei whales, Cook Inlet beluga whales, fin whales, Western North Pacific DPS humpback whales, Mexico DPS humpback whales, sperm whales, bowhead whales, North Pacific right whales, Western North Pacific gray whales, Beringia DPS bearded seals, Arctic ringed seals, green sturgeon, Chinook salmon ESUs, chum salmon ESUs, coho salmon ESUs, sockeye salmon ESUs, steelhead trout ESUs, Central N. Pacific DPS and East Pacific DPS green turtles, North Pacific Ocean DPS loggerhead turtles, olive ridley turtles, leatherback turtles, or critical habitats for Steller sea lions, North Pacific right whales, or Cook Inlet beluga whales.

10. INCIDENTAL TAKE STATEMENT

Section 9 of the ESA prohibits the take of endangered species unless there is a special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. "Incidental take" is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity (50 CFR 402.02). Based on recent NMFS guidance, the term "harass" under the ESA means to: "create the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering" (Wieting 2016).

Under the terms of Section 7(b)(4) and Section 7(o)(2) of the ESA, taking that is incidental to an otherwise lawful agency action is not considered to be prohibited taking under the ESA, provided that such taking is in compliance with the terms and conditions of an Incidental Take Statement (ITS).

Section 7(b)(4)(C) of the ESA provides that if an endangered or threatened marine mammal is involved, the taking must first be authorized by Section 101(a)(5) of the Marine Mammal Protection Act (MMPA). Incidental take of ESA-listed marine mammals in commercial fishing operations (including seafood processing at sea, per section 3(16)(D) of the Magnuson-Stevens Fishery Conservation and Management Act) is authorized under section 101(a)(5)(E) of the MMPA. Absent such authorization, this incidental take statement is inoperative.

The terms and conditions described below are nondiscretionary. EPA has a continuing duty to regulate the activities covered by this ITS. In order to monitor the impact of incidental take, EPA must monitor the progress of the action and its impact on the species as specified in the ITS (50 CFR 402.14(i)(3)). If EPA (1) fails to require its permittees to adhere to the terms and conditions of the ITS through enforceable terms that are added to the authorization, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

10.1 Amount or Extent of Take

Section 7 regulations require NMFS to estimate the number of individuals that may be taken by proposed actions or utilize a surrogate (e.g., other species, habitat, or ecological conditions) if we cannot assign numerical limits for animals that could be incidentally taken during the course of an action (50 CFR § 402.14 (i)(1); see also 80 FR 26832 (May 11, 2015).

We expect implementation of the proposed permit to result in the take of western DPS Steller sea lions due to mortality or serious injury, or harassment and harm. Take levels for each stressor are shown in Table 5.

Derivation of these estimates is discussed in sections 6.2 and 6.3 of this opinion. Should monitoring indicate that our estimates of take are exceeded, consultation on this permit must be reinitiated immediately. NMFS will assume any take reasonably traceable to discharges of unground seafood waste was caused by the proposed new NPDES permit. In addition,

consultation must be reinitiated if future stock assessment reports establish a potential biological removal level that is lower than the magnitude of take resulting from this action plus existing actions. Proposed monitoring included as part of the description of this action is inadequate to assess the effects of this action on western DPS Steller sea lions. Additional monitoring requirements are indicated in the reasonable and prudent measures and terms and conditions of this Incidental Take Statement.

Table 5. Authorized take of western DPS Steller sea lions due to effects of this action, indicated by stressor type.

Stressor	Take (animals/year) due to serious injury or mortality	Take by harassment or harm (not considered serious injury or mortality)
Federally-managed fisheries incidental take (mortality or serious injury)	5	0
Fishing gear interactions not represented in fishery observer records (mortality or serious injury), including entanglement in unidentified fishing gear	1	0
Increased parasite loads (mortality or serious injury)	5	0
Fishing gear interactions not represented in fishery observer records (harass or harm)	0	1
TOTAL	11	1

10.2 Effect of the Take

Based on the best available scientific information, we conclude that the magnitude of take expressed in this opinion is reasonably certain to occur.

We note that section V(A)(9)[7] of the draft permit states that the discharge of seafood processing wastes must not create an attractive nuisance situation whereby fish or wildlife are attracted to waste disposal or storage areas in a manner that creates a threat to fish or wildlife or to human health and safety. Throughout this biological opinion, we have presented evidence and drawn conclusions that the implementation of this permit is likely to create a nuisance situation that constitutes a threat to the health and safety of western DPS Steller sea lions. The introduction of unground seafood waste is expected to introduce a nuisance attraction to Steller sea lions whereas the previous NPDES permit for commercial groundfish fisheries off Alaska likely did not; ground seafood waste provides negligible exploitable food reward for Steller sea lions, and

[7] Section V(A)(9) of the draft permit states: Nuisance discharge. The discharge of seafood processing wastes must not create an attractive nuisance situation whereby fish or wildlife are attracted to waste disposal or storage areas in a manner that creates a threat to fish or wildlife or to human health and safety.

poses minimal risk of causing food conditioning of Steller sea lions. Although the draft permit was crafted in a manner intended to avoid injury or mortality to wildlife, we have concluded that up to 24 western DPS Steller sea lions per year are likely to be seriously injured or killed as a result of this action. An additional 27 western DPS Steller sea lions are expected to be harassed or harmed in a non-serious manner.

Steller sea lions are well known to associate fishing vessels with food if fish or consumable sizes of seafood waste are discarded or otherwise available to them, and they may become emboldened and aggressive. They are also known to become entangled and die during interactions with commercial fisheries. We assume that such interactions with catcher-processor vessels and with humans would become more frequent with the proposed action, and in this opinion we explain our assumptions about the frequency and magnitude of those interactions and the resulting levels of increased serious injury or mortality.

In Section 9 of this opinion, NMFS determined that the level of anticipated take, coupled with other effects of the proposed action, is not likely to result in jeopardy to the species. The consequences of this expected take could increase stress for the western DPS of Steller sea lions at the population level as the total annual incidental take in commercial fisheries draws closer to the Potential Biological Removal level under the MMPA.

10.3 Reasonable and Prudent Measures (RPMs)

"Reasonable and prudent measures" are nondiscretionary measures to minimize the amount or extent of incidental take (50 CFR 402.02).

The RPMs included below, along with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. NMFS concludes that the following RPMs are necessary and appropriate to minimize or to monitor the incidental take of western DPS Steller sea lions resulting from the proposed action.

1. EPA must implement a monitoring and reporting program that allows NMFS to evaluate the amount or extent of interactions between listed species and vessels operating under this proposed permit.
2. EPA must include a condition in the proposed permit that reduces exposure of western DPS Steller sea lions to unground waste.

RPMs, along with the terms and conditions that implement them, cannot alter the basic design, location, scope, duration, or timing of the action and may involve only minor changes, per 50 CFR 402.14(i)(2). NMFS considered including an RPM for EPA to require permittees to grind effluent to a maximum of 0.5 inch in any dimension while they are located within Steller sea lion critical habitat. Likewise, NMFS considered including an RPM for EPA to prohibit permittees from discharging unground seafood processing waste while setting or hauling fishing gear in order to reduce the risk of capturing, entangling, or hooking Steller sea lions that may be attracted to unground waste. However, such measures may constitute more than minor changes to the proposed action, insofar as the principal component of the action is to waive the existing grinding requirement for smaller-volume dischargers, and catcher-processors indicate that their

operations depend upon being able to fish, process, and discharge simultaneously. We therefore include such measures as nonbinding Conservation Recommendations in section 11 below.

10.4 Terms and Conditions

"Terms and conditions" implement the reasonable and prudent measures (50 CFR 402.14). These must be carried out for the exemption in section 7(o)(2) to apply.

In order to be exempt from the prohibitions of section 9 of the ESA, EPA or its permittees must comply with the following terms and conditions, which implement the RPM described above and the mitigation measures set forth in Section 2.1.2 of this opinion. EPA or its permittees have a continuing duty to monitor the impacts of incidental take and must report the progress of the action and its impact on the species as specified in this incidental take statement (50 CFR 402.14).

Partial compliance with these terms and conditions may result in more take than anticipated, and may invalidate this take exemption. These terms and conditions constitute no more than a minor change to the proposed action because they are consistent with the basic design of the proposed action.

1) To carry out RPM #1, EPA must undertake the following:

   a) Include in the permit a condition requiring that the prescribed sea surface visual monitoring must include provisions that require permittees or their designee to observe the waters within the 250 m radius hemisphere astern of the vessel throughout periods of discharge of unground waste, reporting the date, time, starting and stopping geographic coordinates and time of each observation effort, the number of sea lions observed within that 250 m radius zone, and whether sea lions were observed engaged in foraging behavior while in that zone. Accounts of sea lion lethal and non-lethal interactions with fishing gear must also be recorded, indicating the nature of the interaction, the date, time and location of the contact, the number of animals interacting with the gear, and the outcome of the interaction, including sea lion behavior during and following gear interaction and whether entanglement or entrapment in gear occurred or was suspected to have occurred. All instances of aggressive behavior of sea lions towards vessels and humans must also be reported, noting the date, time, location, number of animals involved, and the nature and outcome of the aggressive interaction. Observers addressing this term and condition (1a) may be captains or crew members provided they have a clear view of the waters astern of the vessel, and are able to visually discern sea lions at a distance of 250 m.

   b) Prepare and submit annual monitoring reports that summarize information gathered in response to term and condition 1a for each calendar year. These reports will be submitted along with a queryable digital database containing all observer data described in term and condition 1a. Reports for each calendar year must be provided to the NMFS Alaska Region Protected Resources Division by March 31 of the subsequent year.

2) To carry out RPM #2, EPA must undertake the following:
   Include in the permit a condition requiring that, in waters west of 144^{o} west longitude, the discharge of unground waste must cease whenever Steller sea lions occur within 250

meters of vessels operating under this proposed permit. Observers carrying out RPM #1 must monitor for Steller sea lion presence within 250 m of the vessel in any direction, and order the immediate cessation of discharge of unground waste until no Steller sea lions have been observed within 250 m of the vessel for at least 15 consecutive minutes following the cessation of discharge of unground waste.

The taking of any marine mammal in a manner other than that described in this ITS must be reported immediately to the NMFS Protected Resources Division at 907-271-5006 and to greg.balogh@noaa.gov.

In the event that serious injury or mortality of Steller sea lions associated with the implementation of the proposed permit exceeds the take authorized for this action (see Table 3), EPA must immediately reinitiate consultation with NMFS.

11. CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Specifically, conservation recommendations are suggestions regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information (50 CFR 402.02).

1. EPA should conduct a study, using independent, trained, and experienced Protected Species Observers, to quantify the effects of this action on Steller sea lions. Study design should be approved by NMFS Alaska Region.
2. EPA should include a permit condition prohibiting discharge of waste greater than 0.5 inch in any dimension within 1 NM of Steller sea lion critical habitat (similar to permit conditions prohibiting discharge of unground waste within 1 NM of critical habitat of threatened eider species).
3. EPA should include a permit condition prohibiting discharge of unground waste greater than 0.5 inches in any dimension while vessels are setting or retrieving gear in order to reduce risk of capturing, entangling, or hooking Steller sea lions that may be attracted to unground waste.
4. EPA should include a permit condition prohibiting discharge of unground waste greater than 0.5 inches in any dimension while catcher vessels are within 250 m of processor vessels in order to reduce risk of capturing, entangling, or hooking Steller sea lions that may be attracted to unground waste from the processor vessel.
5. EPA should include in the permit a condition requiring that if listed species are observed within 500 m of the vessel, permittees must either grind effluent to a maximum of 0.5 inch in any dimension or cease all discharge of seafood waste while listed species remain within 500 m of the vessel.

In order to keep NMFS informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, EPA should notify NMFS of any conservation recommendations it implements in the final action.

12. REINITIATION OF CONSULTATION

As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded, (2) new information reveals effects of the agency action on listed species or designated critical habitat in a manner or to an extent not considered in this opinion, (3) the agency action is subsequently modified in a manner that causes an effect on the listed species or critical habitat not considered in this opinion, or 4) a new species is listed or critical habitat designated that may be affected by the action. If incidental take authorized by this biological opinion is exceeded, including all forms of take resulting from this action, section 7 consultation must be reinitiated immediately.

13. DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

Section 515 of the Treasury and General Government Appropriations Act of 2001 (Public Law 106-554) (Data Quality Act (DQA)) specifies three components contributing to the quality of a document. They are utility, integrity, and objectivity. This section of the opinion addresses these DQA components, documents compliance with the DQA, and certifies that this opinion has undergone pre-dissemination review.

13.1 Utility

This document records the results of an interagency consultation. The information presented in this document is useful to agencies of the Federal government and the general public. These consultations help to fulfill multiple legal obligations of the named agencies. The information is also useful and of interest to the general public as it describes the manner in which public trust resources are being managed and conserved. The information presented in these documents and used in the underlying consultations represents the best available scientific and commercial information and has been improved through interaction with the consulting agency.

This consultation will be posted on the NMFS Alaska Region website http://alaskafisheries.noaa.gov/pr/biological-opinions/. The format and name adhere to conventional standards for style.

13.2 Integrity

This consultation was completed on a computer system managed by NMFS in accordance with relevant information technology security policies and standards set out in Appendix III, 'Security of Automated Information Resources,' Office of Management and Budget Circular A-130; the Computer Security Act; and the Government Information Security Reform Act.

13.3 Objectivity

Standards: This consultation and supporting documents are clear, concise, complete, and unbiased; and were developed using commonly accepted scientific research methods. They adhere to published standards including the ESA Consultation Handbook, ESA Regulations, 50 CFR 402.01 et seq.

Best Available Information: This consultation and supporting documents use the best available information, as referenced in the literature cited section. The analyses in this opinion contain more background on information sources and quality.

Referencing: All supporting materials, information, data and analyses are properly referenced, consistent with standard scientific referencing style.

Review Process: This consultation was drafted by NMFS staff with training in ESA implementation, and reviewed in accordance with Alaska Region ESA quality control and assurance processes.

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