

**Environmental Assessment of the Promulgation of Regulations
Authorizing Take of Marine Mammals Incidental to Rocket Launches
at Kodiak Launch Complex, Alaska,
and the Issuance of Subsequent Letters of Authorization**

I. INTRODUCTION

On June 26, 2001, the National Marine Fisheries Service (NMFS) received an application from Alaska Aerospace Development Corporation (AADC) requesting NMFS promulgate a 5-year rule and subsequently issue Letters of Authorization (LOAs) under section 101 (a)(5)(A) of the Marine Mammal Protection Act (MMPA). The regulations and associated LOAs would authorize the take of small numbers of marine mammals incidental to rocket launches conducted at the Kodiak Launch Complex (KLC) on Kodiak Island, Alaska.

The Federal Aviation Administration (FAA) conducted an Environmental Assessment (EA) and issued an associated Finding of No Significant Impact (FONSI) in 1996. Since then, the Department of the Air Force has issued two EAs and FONSI's addressing two specific launch vehicle programs, the Quick Reaction Launch Vehicle Program (QRLV) and the atmospheric interceptor technology program (ait). In 2003, the Missile Defense Agency (MDA) finalized their Environmental Impact Statement (EIS) addressing Ground-Based Midcourse Defense (GMD) and Extended Test Range (ETR), which includes rocket launches from KLC. Since 1998, AADC has provided monitoring reports related to noise and marine mammal impacts associated with ongoing rocket launches from KLC. This Environmental Assessment is intended to address impacts to the environment that would result from the promulgation of a rule and the subsequent issuance of LOAs to KLC and will incorporate more recent marine mammal survey data as well as noise measurements presented in the more recent National Environmental Policy Act (NEPA) documents.

II. PURPOSE AND NEED

Section 101(a)(5)(A) of the MMPA (16 U.S.C. 1361 et seq.) directs the Secretary of Commerce to allow, upon request, the incidental, but not intentional, taking of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are made and regulations are issued.

Authorization shall be granted if the Secretary finds that the taking will have a negligible impact on the species or stock(s); will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses; and the permissible methods of taking and requirements pertaining to the monitoring and reporting of such taking are set forth. NMFS has defined "negligible impact" in 50 CFR 216.103 as "...an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival."

Except with respect to certain activities not relevant here, the MMPA defines "harassment" as

"...any act of pursuit, torment, or annoyance which (a) has the potential to injure a marine mammal or marine mammal stock in the wild [Level A harassment]; or (b) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [Level B harassment]."

AADC determined that the rocket launches might potentially disturb marine mammals and submitted an application for LOAs under section 101(a)(5)(A) of the MMPA for the take of marine mammals incidental to rocket launches from KLC on Kodiak Island, Alaska. If the action proposed in the application will have a negligible impact on the species or stock, will not have an unmitigable adverse impact on the availability of the species or stock for subsistence uses, and the permissible methods of taking and required monitoring are set forth, then NMFS must issue the authorization. The purpose of the rule and associated LOAs is to discuss the status of the marine mammals that may be impacted by the action, set forth the types and amount of take that may occur, and list the mitigation and monitoring required to ensure the least practicable impact to marine mammal species.

III. DESCRIPTION OF ACTIVITY COVERED BY PROPOSED AUTHORIZATION

The KLC is a commercial rocket launch complex owned and operated by the State of Alaska through the AADC. Located wholly on state-owned lands, KLC occupies 43 acres (0.174 km²) within a 3,100 acre (12.545 km²) parcel on the eastern side of Kodiak Island on the Narrow Cape peninsula. The KLC was designed to accommodate a variety of small, solid rockets including such vehicles as the Minuteman II, Taurus, Conestoga, and Athena (Lockheed Martin Launch Vehicle). The largest vehicle that can be launched from KLC is the Athena-2 (Lockheed Martin Vehicle-2).

Launch operations at the KLC are authorized under license from the Federal Aviation Administration (FAA), Office of Associate Administrator for Commercial Space Transportation (AST) in accordance with the facility's Environmental Assessment (EA) and stipulations in the EA's Finding of No Significant Impact (FONSI) (see 61 FR 32884, June 25, 1996). These stipulations included a requirement to develop a Natural Resource Management Plan (NRMP) to address monitoring and mitigation activities for protected species in the area. This plan was developed in coordination with NMFS utilizing comparison of anticipated sound pressure levels from rocket motors to be launched from the KLC with documented marine mammal disturbance responses to such noise.

To date there have been eight rocket launches from the KLC; however, the KLC facility is licensed to launch up to nine rockets per year. The first two launches used composite vehicles built from several stages taken from a decommissioned USAF Minuteman II launch vehicle, and

were part of the U.S. Air Force (USAF) ait program. The third and the sixth launches (March 2001 and April 2002) were part of the USAF QRLV program, and comprised of single stage M-56 motors taken from a decommissioned USAF Minuteman II launch vehicle. The fourth launch (September 2001) was a commercial Lockheed/Martin Athena rocket, which is the largest vehicle to be launched from KLC, and it placed four satellites into polar orbit. The fifth, seventh, and eighth launches (November 2001, December 2004, and February 2005) were Department of Defense (DoD) Strategic Target System (STARS) vehicles and consisted of the first two stages of a decommissioned A-3 missile and an Orbis third stage.

Launches from the KLC are expected to be at high inclination with launch azimuths ranging from 125 to 225 degrees in direction (AADC and FAA, 1996). At the easternmost azimuth launch vehicle paths would pass over the eastern edge of Ugak Island; at the westernmost azimuth the vehicle would pass along the southeastern edge of the Kodiak Archipelago. Approximately 70 seconds after launch, a typical launch vehicle would be more than 8 miles high. Spent first-stage rocket motors and fuel casings would impact the ocean's surface from 11 to 314 nautical miles downrange, depending on the launch vehicle (AADC and FAA, 1996). Rocket motor sonic booms are predicted to reach the ocean surface over 20 miles downrange beyond the outer continental shelf over deep ocean.

Launch operations are a major source of noise on Kodiak Island, as the operation of launch vehicle engines produces significant sound levels. Generally, four types of noise occur during a launch. They are: (1) combustion noise from launch vehicle chambers; (2) jet noise generated by the interaction of the exhaust jet and the atmosphere; (3) combustion noise from the post-burning of combustion products; and (4) sonic booms. The principal objective of the KLC rocket motor noise monitoring task within the NRMP was to measure A-weighted Sound Energy Levels (ASELs) at the Ugak Island Steller sea lion haulout. A secondary objective was to monitor sound levels on Narrow Cape close to bald eagle and/or Steller's eider nests when present. ASELs were successfully recorded for the first four and the seventh launches from KLC at the Ugak Island Steller sea lion haulout and on Narrow Cape by the University of Alaska Anchorage's Environment and Natural Resources Institute (ENRI). The Ugak Island haulout is located approximately 2 miles (3.2 km) from Narrow Cape and about 3.5 miles (5.6 km) from the KLC launch pad on a narrow sand spit on the north side of the Island. The data gathered were weighted toward frequencies that humans are more sensitive to (1-6 kHz, A-weighted) and showed a wide variation in sound pressures among rocket motors, with the highest levels being associated with the largest launch vehicle flown. Variations in the KLC sound pressure record are likely due to such variables as engine size, engine bell shape, and local atmospheric conditions. Summaries of the findings for each of the measured rocket launches to date are described below. A complete description of the proposed rocket launches from KLC may be found in AADC's application, which may be viewed at: http://www.nmfs.noaa.gov/prot_res/PR2/Small_Take/smalltake_info.htm#applications. This information is incorporated into this section of the EA by reference.

ait-1

The first launch from KLC occurred in November 1998, and was the first of the USAF ait program. Sound measurements from the ait-1 launch were collected using two sound level monitors (SLMs) that were deployed 26 hours before launch on Ugak Island at the base of the spit used as a haulout by Steller sea lions. The SLMs were set to highlight sounds exceeding 65 dB, which was done after checking real-time sound levels in the field at each site prior to setting them to record data. If the exceedance levels were set too low, the SLMs would be deluged with data, and if they were set too high the SLMs would miss the event of interest. A digital audio tape (DAT) recorder was used to provide redundancy in recording noise frequencies and was placed about 0.75 mi (1.2 km) from the KLC launch pad.

Recorded sound pressure levels (SPLs) of rocket motor noise for the ait-1 at the Ugak Island haulout site were 78.2 dB re 20 microPa with a peak level of 97 dB (Table 1). The associated ASEL at the Ugak Island haulout was 88.4 dB re 20 microPa² s. In addition, the ASEL at the nearest location measured by the DAT recorder was 110 dB for a duration of 59 seconds. The bulk of the sound energy was at low frequencies and generally less than 4000 Hz. Most of the energy was from 100 to 500 Hz.

Of the eight noise events recorded above 65 dB at Ugak Island, ENRI determined that two are attributable to helicopter noise and one to the firing of the ait-1 rocket motor. Sounds at the Ugak Island site were above 65 dB for a total of 33 seconds at the time the rocket motor was firing. Due to the isolation of this site, the remainder of the events are most likely attributable to surf or wind action.

ait-2

USAF launched a second rocket from KLC on September 15, 1999. Based on experience from the first launch, ENRI set the SLMs to highlight sounds exceeding 70 dB and deployed them about 19 hours before the launch. Sound pressures at Ugak Island were slightly higher for the second launch than for the first launch. Recorded maximum SPLs of rocket motor noise for the ait-2 at the Ugak Island haulout site were 81.5 dB, with a peak level of 101.5 dB, and a corresponding SEL of 92.2 dB. The bulk of the sound energy was at low frequencies and generally less than 2500 Hz. Most of the energy was from 25 to 1000 Hz.

There were 15 noise events above 70 dB within the 19 hours of recording at Ugak Island, all of which can be attributed to helicopter, airplane, or rocket noise; none coincides with a stampede of Steller sea lions off the Ugak Island haulout 3.5 hours previous to the rocket launch. Sounds at the Ugak Island site were above 70 dB for a total of 30 seconds at the time the rocket motor was firing. Natural background noise levels above 70 dB were almost nonexistent during this launch.

Launch Vehicle	Location Measured	Duration (second)	ASEL (dB re 20 microPa ² s)	SPL (dB re 20 microPa)	Avg Freq. (Hertz)	Max Freq. (Hertz)
ait-1	Ugak Island	33	88.4	78.2	100-500	4000
	Narrow Cape	391	113.4	104.9	100-500	4000
ait-2	Ugak Island	30	92.2	81.5	25-1000	2500
	Narrow Cape	34	110.7	103.2	25-1000	2500
QRLV-1	Ugak Island	10.9	80.3	73.3	16-2000	2500
	Narrow Cape	32.2	102.4	95.2	16-2000	2500
Athena	Ugak Island	49.6	101.4	90.8	<2000	10000
	Narrow Cape	44.6	115.4	106.7	<2000	10000
STARS IFT-13C	Narrow Cape	51.6	114.3	105.2		5000

Table 1. Sound measurements taken by ENRI during launches at KLC. SPL represents the maximum A-weighted sound pressure level, which is the greatest of averages of root mean square instantaneous sound pressure levels during either 125 ms or 1 s period across the whole sound spectrum. The A-weighted sound exposure level (ASEL) is a composite cumulative energy metric comprising amplitude with duration. "A-weighted" refers to frequency-dependent weighting factors applied to the sound accordance with the sensitivity of the human ear to deemphasize sounds below 1 kHz and above 6 kHz.

QRLV-1

On March 22, 2001, the USAF conducted the third launch from KLC. SLMs set to highlight sounds exceeding 70 dB at the base of the Ugak Island sea lion haulout were again used by ENRI to record sound frequency and intensity, and were deployed 22 hours before the launch. The recorded sound levels at Ugak Island were significantly lower for the QRLV-1 launch than for either of the ait launches. This is likely due to the vehicle being smaller, and possibly to a different trajectory and local atmospheric condition. Recorded maximum SPLs resulting from QRLV rocket motor noise at the Ugak Island haulout site were 73.3 dB, with a peak level of 87.2 dB, and a corresponding SEL of 80.3 dB. The bulk of the sound energy was at low frequencies and generally less than 2500 Hz. Most of the energy was from 16 to 2000 Hz.

There were 17 noise events above 70 dB at Ugak Island. With the exception of the rocket launch, all can be related to helicopter noise. Sounds at the Ugak Island site were above 70 dB for a total of 10.9 seconds at the time the rocket motor was firing. Natural background noise levels above 70 dB were almost nonexistent during this launch. Rocket noise measurements for the QRLV-2 rocket launch on April 24, 2002, the sixth rocket launched from KLC, were not recorded, though most likely they would be similar to those measured during the first QRLV launch.

Athena

The fourth launch from KLC occurred on September 29, 2001, and involved a commercial Lockheed/Martin Athena, which is the largest vehicle to be launched from KLC. SLMs were again set to highlight sounds exceeding 70 dB and were deployed by ENRI at the Ugak Island haulout four hours before the launch. The recorded sound levels at Ugak Island were significantly higher for the Athena launch than for previous launches, which is likely due to the size of the vehicle. Recorded maximum SPLs resulting from Athena rocket motor noise at the Ugak Island haulout site were 90.8 dB, with a peak level of 115.9 dB, and a corresponding SEL of 101.4 dB. The bulk of the sound energy was at low frequencies and generally less than 2000 Hz.

There were three exceedance events above 70 dB at Ugak Island and Narrow Cape within the four hours of recording, two of which can be attributed to helicopter noise and the other to the rocket launch. Sounds at the Ugak Island site were above 70 dB for 49.6 seconds at the time the rocket motor was firing. Natural background noise levels above 70 dB were nonexistent during this launch.

STARS

On November 9, 2001, the Department of Defense launched a STARS vehicle from KLC; however, the rocket was deliberately destroyed over open ocean almost immediately because it lost communication with KLC. The STARS program provides ballistic missile targets to test various sensors and ground-based interceptors. STARS vehicles will include first- and second-stage Polaris A3 boosters and a third-stage Orbus-1 booster. The range of this system is 620 to 3,418 miles.

The seventh launch from KLC, of the STARS IFT 13C, occurred on December 14, 2004. SLMs were set to highlight sounds exceeding 70 dB and were deployed by ENRI only at Narrow Cape (because sea lions were not present at Ugak Island) eight hours before the launch. Narrow Cape is significantly closer to the launch site than Ugak Island (Figure 1). The recorded sound levels at Narrow Cape were higher for this launch than for previous launches, which is likely due to a different trajectory and local atmospheric conditions. Recorded maximum SPLs resulting from rocket motor noise at Narrow Cape were 105.2 dB, with a peak level of 128.8 dB, and a corresponding SEL of 114.3 dB. The bulk of the sound energy was at low frequencies and generally less than 2000 Hz. There were over three hundred exceedance events above 70 dB at Narrow Cape within the eighteen hours of recording, two of which can be attributed to helicopter noise and the other to the rocket launch. With the exception of helicopter noise and the rocket launch, all exceedances at or just above 70 dB can be connected to weather-related noise (wind and rain).

Rocket noise measurements for the STARS IFT 14 rocket launch on February 13, 2005, the eighth rocket launched from KLC, were not recorded, though most likely they would be

similar to those measured during the STAR IFT 13C launch.

IV. ALTERNATIVES INCLUDING THE PROPOSED ACTION

A. Preferred Alternative (Issuance of IHA)

The proposed action is for NMFS to promulgate a 5-year rule, which, if implemented, would allow NMFS to issue 1-year LOAs to AADC that would authorize the take of small numbers of Steller sea lions and Pacific harbor seals incidental to rocket launches from KLC from 2005 to 2010. A description of the activity to be covered by the proposed IHA was provided above. The potential impacts to marine mammals from a 5-yr rule and five associated 1-yr LOAs will be as described in section (VI)(A)(1) of this document. The mitigation measures and reporting requirements described in section (VII) will be incorporated into the rule and any LOAs issued. NMFS has preliminarily determined that the promulgation of this rule and subsequent issuance of LOAs would result in the taking, by harassment, of small numbers of marine mammals, and possibly, the injury or mortality of very small numbers (estimated maximum of 11 annually) of Pacific harbor seal pups, and will have no more than a negligible impact on affected stocks.

B. No Action Alternative

The No Action Alternative consists of not promulgating the rule and not issuing any LOAs. The MMPA prohibits all takings of marine mammals unless authorized by a permit or exempted under the MMPA. If an authorization to incidentally take Stellar sea lions and Pacific harbor seals were denied, the applicant could choose to amend the project to avoid harassing marine mammals or choose not to pursue the project.

C. Issuance of IHA with Time-of-year Restrictions

Another alternative is to promulgate a rule and issue LOAs with additional restrictions on the time of year that the activities may be conducted (mitigation measures proposed in the preferred alternative. The Pacific harbor seal pupping season at Ugak Island consists of an approximately two-week period somewhere between May 15 and June 30. If AADC were to limit all launches to outside of this time period, the potential for injury or death of harbor seal pups could be eliminated, and therefore, potential Level A Harassment could be avoided. While this alternative would also result in no more than a negligible impact on pinnipeds (as described in section (VI)(A)(1), but with no potential mortality), adoption of this alternative could result in adverse economic and logistical impacts to AADC. AADC's launch operations are driven by the needs of the agencies and companies that utilize their facilities and the suggested time of year restrictions would reduce their availability by 12.5%.

V. AFFECTED ENVIRONMENT

A. Project Area

The KLC is located on the southeast facing tip of a small peninsula on the eastern side of Kodiak Island. The rocket launch site is approximately one mile from the southeast shore (Narrow Cape). The primary KLC environmental monitoring study area, and area of anticipated effects, was set in September 1996 at a meeting between AADC and representatives of the U.S. Fish and Wildlife Service, NMFS, the FAA, and the Environmental and Natural Resources Resource Institute (ENRI). The area was chosen based on modeled ASELs and includes the lands and waters within a 6-mile (9.7 km) radius extending out from the KLC launchpad. The only marine mammal haulouts within this area are on Ugak Island.

Ugak Island is a triangular-shaped island located about 3.5 miles southeast of the launch site (Figure 1). The north side of Ugak island culminates in a sandy spit on the west end where most of the sea lions haul out, though some also haul out at the southern tip of the island. The southeastern facing side of the island, where most of the harbor seals haul out, is very rocky, backed by 300-ft cliffs, and is subject to very strong wave action. The west side of the island is steeper than the north side, but not as steep as the east, but does not appear to be used much by either pinniped.

B. Marine Mammals

Narrow Cape, Ugak Island, and the adjacent waters within the primary KLC study area provide habitat for Steller sea lions (Eumetopias jubatus, listed as endangered), Pacific harbor seals (Phoca vitulina), sea otters (Enhydra lutris), gray whales (Eschrichtius robustus), humpback whales (Megaptera novaeangliae, listed as endangered), northern fur seals (Callorhinus ursinus), northern right whales (Eubalaena glacialis), and minke whales (Balaenoptera acutorostrata). Harbor seals and sea otters are common year-round, as are killer whales (Orcinus orca), Dall's porpoise (Phocoenoides dalli), and harbor porpoise (Phocoena phocoena). Other species of cetaceans that may occur in the area, such as Pacific white-sided dolphins (Lagenorhynchus obliquidens), Risso's dolphins (Grampus griseus), northern right whale dolphins (Lissodelphis borealis), pilot whales (Globicephala macrorhynchus), Cuvier's beaked whales (Ziphius cavirostris), Baird's beaked whale (Berardius bairdii), Stejneger's beaked whale (Mesoplodon stejnegeri), sperm whales (Physeter macrocephalus), fin whales (Balaenoptera physalus), sei whales (Balaenoptera borealis) and blue whales (Balaenoptera musculus) are rare as they are primarily pelagic (ENRI, 1995-98). General information on marine mammals can be found in Angliss and Lodge (2004), which are available at the following URL: http://www.nmfs.noaa.gov/pr/PR2/Stock_Assessment_Program/individual_sars.html. Sea otters are managed by the U.S. Fish and Wildlife Service (USFWS). Information on this species may be found at <http://www.fws.gov>. Please refer to those documents and the application for further information on these species.

1. Steller Sea Lions

The Steller sea lion is described by two stocks - those west of 144° west longitude listed as endangered, and the eastern stock listed as threatened. Sea lions hauled out on Ugak Island, the northern spit of which is designated as critical habitat for this species, are of the western stock. The most recent comprehensive estimate (pups and non-pups) of Steller sea lion abundance in Alaska is based on aerial surveys of non-pups in June 2002 and ground based pup counts in June and early July of 2001 and 2002. Data from these surveys represents actual counts at all major rookeries and haulouts. The best available minimum population estimate for the western stock of Steller sea lions is the sum of the total number of non-pups counted in 2002 (26,602) and the number of pups counted in 2001 and 2002 (9,211), which is 34,779 (Angliss and Lodge, 2004). This is considered a minimum estimate because it has not been corrected to account for animals which were at sea during the surveys. Though non-pup numbers increased 5.5-13.7% from 2000-2002, the 2002 count was still 5.4% below the 1998 count and 36.7% below the 1990 count and the long-term, average decline for 1990-02 is 4.3% per year (Angliss and Lodge, 2004).

On Ugak Island sea lions haul out primarily on the northern-most sand spit of the island, but also less frequently on the east/south side of the island. These haulouts are occupied primarily from late June to early October. Opportunistic counts of Steller sea lions conducted at Ugak Island every year since 1993 indicate a maximum of over 350 animals in the fall of 1997 and a steady decrease in numbers to less than 40 since 2001 (Wynne, pers. comm, 2005). Two of the 8 launches have occurred during times when sea lions are typically present, during September of 1999, 60-70 sea lions were seen, and during September of 2001, no sea lions were present on the days before and after the launch.

2. Pacific Harbor Seals

Harbor seals live in the Pacific Ocean from Baja California in Mexico northward to the Aleutian Islands of Alaska. The population is not listed as "endangered" or "threatened" under the Endangered Species Act (ESA); nor is this species listed as "depleted" or as a "strategic stock" under the MMPA. Harbor seals are primarily non-migratory and the seals around KLC are considered part of the Gulf of Alaska stock, which occurs from Cape Suckling to Unimak Pass, including animals throughout the Aleutian Islands. The most recent comprehensive aerial survey of harbor seals in Alaska were conducted in 1994 and 1996. When a correction factor is used to account for animals that were in the water during the counts, a minimum population estimate of this stock of harbor seals is 28,917 (Angliss and Lodge, 2004). The Kodiak Island population is estimated to have increased 7.2% annually from 1992-1996 (Angliss and Lodge, 2004) and survey data from 1992-2004 shows an even steeper increase at Ugak Island (Wynne, pers. comm., 2005), though numbers throughout the Gulf of Alaska are still lower than they were in the 1970s and 1980s.

Harbor seals are present on Ugak Island year round. They are found primarily on the east/south side of the island, backed by high, steep cliffs, but they also sometimes haul out on the north side of the island and on the rock croppings on the north and east sides of the island. Harbor seal pupping occurs on both Ugak between the middle of May and June. Yearly harbor seal counts at Ugak Island taken in August since 1992 show a steady increase from approximately 200 animals in 1992 to over 900 in 2004 (Wynne, pers. comm., 2005). Surveys conducted in 1993 and 1994 found 88 and 96 harbor seal pups, respectively (AADC and FAA, 1996).

3. Northern Fur Seals

The northern fur seal occurs offshore of the KLC site near the continental shelf break from January through April. Because of the distance from the launch site and the fact that they will be swimming through and not stopping (see Cetaceans, below), NMFS believes it unlikely that fur seals will be affected by the launch noise and they will not be addressed further.

4. Cetaceans

As noted above, several species of cetaceans occupy the waters around KLC. However, airborne noise is generally reflected at the sea surface outside of a 26° cone extending down from an airborne source (Richardson *et al.*, 1995). Submerged animals would have to be directly under the noise sources before they could hear it, and, approximately 70 seconds after launch, a typical launch vehicle would be more than 8 miles high. Underwater acoustic transmissions are complex, and affected by the level and frequency of noise, sea state and other surface conditions, and water depth. Given the specific area, within a specific short time that a cetacean would need to be traveling through surface/or close to surface water to be exposed to rocket noise and the measured rocket sound levels and the attenuation that would occur before the noise reached deeper waters, NMFS believes it unlikely that any cetaceans will be impacted by the rocket noise.

C. Endangered Species

The endangered Steller sea lion is the only federally listed marine mammal under NMFS' jurisdiction that is likely to be adversely affected by the proposed action. The status of the Steller sea lion was addressed in a previous section. The humpback whale, also listed endangered, moves north to the Gulf of Alaska in the summer and appears to have an affinity for nearshore waters. However, as indicated in NMFS' November 2003 Biological Opinion, this species is not likely to be adversely affected by launch operations because it would not be expected to occur within several miles of the launch pad and is mostly below the surface of the water; and therefore not exposed to significant launch noise (see section 5(B)(4)).

The northern sea otter, federally listed as threatened under the ESA, may be found in the KLC area throughout the year. The northern sea otter is within the jurisdiction of the USFWS, which is responsible for issuing authorizations and incidental take statements for takes of this

species. AADC is currently in ESA Section 7 consultation with the USFWS regarding the sea otter.

Steller's eider, ESA-listed as threatened and under the jurisdiction of the USFWS, is found in the vicinity of the KLC. Following several years of recommended monitoring of both Steller's eiders and bald eagles (not federally listed in Alaska), the USFWS concurred with AADC that the rocket launches at AADC have no effect on either of these species.

VI. ENVIRONMENTAL CONSEQUENCES

In this section, an analysis of the environmental impacts of promulgating a rule and issuing LOAs to AADC and the alternatives to that proposed action are presented. Steller sea lions and Pacific harbor seals are the marine mammals likely to be affected by this action.

A. Preferred Alternative (Promulgation of Rule and Issuance of LOAs)

1. Impacts on Marine Mammals

As outlined in several previous NMFS documents, the effects of noise on marine mammals are highly variable, and can be categorized as follows (based on Richardson *et al.*, 1995):

(1) The noise may be too weak to be heard at the location of the pinniped (i.e., lower than the prevailing ambient noise level, the hearing threshold of the animal at relevant frequencies, or both);

(2) The noise may be audible but not strong enough to elicit any overt behavioral response;

(3) The noise may elicit reactions of variable conspicuousness and variable relevance to the well being of the pinniped; these can range from temporary alert responses to active avoidance reactions such as stampedes into the sea from terrestrial haulout sites;

(4) Upon repeated exposure, pinnipeds may exhibit diminishing responsiveness (habituation), or disturbance effects may persist; the latter is most likely with sounds that are highly variable in characteristics, infrequent and unpredictable in occurrence (as are vehicle launches), and associated with situations that the pinniped perceives as a threat;

(5) Any anthropogenic noise that is strong enough to be heard has the potential to reduce (mask) the ability of pinnipeds to hear natural sounds at similar frequencies, including calls from conspecifics, and environmental sounds such as surf noise;

(6) If mammals remain in an area because it is important for feeding, breeding or some

other biologically important purpose even though there is chronic exposure to noise, it is possible that there could be noise-induced physiological stress; this might (in turn) have negative effects on the well-being or reproduction of the animals involved; and

(7) Very strong sounds have the potential to cause temporary or permanent reduction in hearing sensitivity. In terrestrial mammals, and presumably marine mammals, received sound levels must far exceed the animal's hearing threshold for there to be any temporary threshold shift (TTS). For transient sounds, the sound level necessary to cause TTS is inversely related to the duration of the sound. Received sound levels must be even higher for there to be risk of permanent hearing impairment.

Solid rocket boosters from KLC launches will fall into the ocean away from any known or potential haul-out sites and do not pose any measurable threat to marine mammals. Launch noise is expected to occur over the coastal habitats of Narrow Cape and Ugak Island during every launch, while sonic booms will occur approximately 40 nautical miles downrange over open ocean, beyond the outer continental shelf and are unlikely to affect marine mammals. Airborne launch sounds will mostly reflect or refract from the water surface and, except for sounds within a diameter of approximately 26 degrees directly below the launch vehicle, will not penetrate into the water column. The sounds that do penetrate will not persist in the water for more than a few seconds.

The primary sea lion haulout on Ugak Island is a spit facing KLC and animals at this location would likely hear a rocket launch. Steller sea lions generally occupy this haulout from late summer to the early fall post-breeding period (late June to early October), historically by up to several hundred sea lions. Small numbers of harbor seals may haul out on the eastern end of the shoreline that extends from the spit. Harbor seals and, less frequently sea lions, also haul out on the southeast side of Ugak Island, but this area is sheltered from direct sight of and sound from KLC by a 300 ft island cliff and, because it receives heavy surf, it already has high ambient noise levels. Because background ambient noise often interferes with or masks the ability of an animal to detect a sound even when that sound is above its absolute hearing threshold (Richardson *et al.*, 1995), it seems unlikely that animals hauled out at this location would hear noise associated with rocket launches from KLC.

Past Monitoring Results at KLC

ENRI was tasked under contract to the AADC to conduct environmental monitoring studies for rocket launches from KLC. In addition to collecting rocket noise data on the northern spit of Ugak Island, ENRI conducted aerial surveys over and collected real-time video footage at the seasonally occupied northern spit haulout site in conjunction with the three KLC launches when Steller sea lions might have been present at the haulout: *ait*-1 on November 5, 1998; *ait*-2 on September 15, 1999; and Athena on September 29, 2001. The only time Steller sea lions were observed occupying the haulout was during the *ait*-2 launch monitoring period. Sixty to seventy animals were on the haulout about 5 hours pre-launch. Due to below freezing temperatures, the

video system shut off about 4 hours prior to the ait-2 launch. The video data show Steller sea lions fighting or sleeping on the haulout, and then suddenly stampeding into the water and milling about immediately offshore. The cause of the stampede is not apparent in the video and no stimulus could be linked to the response (from the noise recordings or otherwise). When, or if, any of the Steller sea lions returned to the haulout before the ait-2 launch is unknown. Although sea lions may have returned to the rocks and fled the haulout again as a result of rocket noise, a clear-cut stimulus response of sea lion behavior to rocket noise cannot be postulated without video data from the time of the launch. Approximately 1 hour after the rocket was launched, no sea lions were seen hauled out and fifty to sixty sea lions were observed in the water immediately offshore. The day after the launch, sixty to seventy animals were seen hauled out at the same spot. Some of these animals could be the same ones that were flushed from the haulout the day before, though, they could also be different animals. Though sea lions have been shown to acclimate to disturbance from rocket launches at other spaceports (Thorson *et al.*, 1999), it is unlikely that this is the case at KLC considering the infrequency of launches. Alternatively, approximately 280 harbor seals were seen at two locations on the east side of the island (next to the 300-ft cliffs) during the aerial survey flown 5 hours pre-launch. During the one hour post-launch aerial overflight, the same number of harbor seals were hauled out at the same locations, which would suggest that they did not flush into the water, which would further suggest that the sound was blocked or masked by the high cliffs and high ambient noise on that side of the island. Though it is possible that the harbor seals were flushed into the water and then quickly hauled out again before the post-flight aerial survey, it seems unlikely considering that harbor seals are typically significantly more sensitive to noise than sea lions and the sea lions were still in the water.

Unlike at the ait-2 launch discussed above, no Steller sea lions were present at the Ugak Island haulout during the ait-1 and Athena launches and it was not possible to relate any behavioral responses to the recorded noise levels. Harbor seals were present at the other two launches, but monitoring was not required and the surveys were not conducted immediately before and after the launch and could not establish a stimulus response to the rocket launch. For all launches, however, launch noises recorded at the haulout site were within the audible ranges of pinnipeds (Richardson *et al.*, 1995) and both Steller sea lions and harbor seals would have heard them had they been present. Further, recorded sound pressures were at, and sometimes above, levels known to occasionally induce startle responses in pinnipeds (Richardson *et al.*, 1995). Rocket launches will present Steller sea lions and harbor seals with novel visual and possibly tactile stimuli as well as unusually loud sounds and bright lights from the burning rocket and white exhaust plume.

Steller Sea Lions

The behavioral data record for Steller sea lions is small throughout the North Pacific range and typically is focused on reproductive behaviors. In general, studies have shown that responses of pinnipeds on beaches to acoustic disturbance arising from rocket and target missile launches are highly variable. This variability may be due to many factors, including species, age

class, and time of year. Porter (1997) observed Steller sea lions fleeing into the water for a wide variety of reasons such as helicopter overflights, bird flybys, and the presence of nearby humans. He also noted sea lions stampedes into the water that could not be correlated with any observed stimulus. There is also evidence that both time of day and temperature alter the probability of entry into the water (animals are more likely to enter the water when already overheated). Steller sea lions have been seen to mill about just offshore with their heads up in a heightened state of watchfulness (Porter, 1997) and remain close to the haulout until they sense it is safe to go back ashore (Lockheed Martin Environmental Services, 1999).

Noise generated from aircraft and helicopter activities associated with the launches may provide a potential secondary source of incidental harassment, and the physical presence of aircraft or biologists could also lead to non-acoustic effects on marine mammals involving visual or other cues. However, other disturbance-related data collected during the ait-2 study (ENRI, 2000) does not fit well with stimulus response data from other sources. Sea lions are widely thought to be intolerant of helicopter noise (Porter, 1997), yet the animals in question did not appear to respond to multiple exposures of more intense helicopter noise at Ugak Island than that from the rocket (ENRI, 2000). They are also thought to be intolerant of humans on foot, yet a video from the ait-2 study shows hauled-out sea lions on Ugak Island undisturbed by biologists actively engaged in work within 328 ft (100 m) of them. The Ugak Island haulout is also regularly exposed to disturbances from aircraft and fishing vessels transiting Narrow Strait.

Recent studies (Lawson *et al.*, 2002) show that Level B harassment, as evidenced by beach flushing, will sometimes occur upon exposure to launch sounds with ASEL's of 100 dBA (re 20 micro-Pa²-sec) or higher. It is expected that most received noise levels at Ugak Island would be at levels which are likely to cause a temporary disturbance. The infrequent (up to 9 times per year) and brief (no more than one minute as heard from Ugak Island) nature of these sounds that would result from a rocket launch would cause masking for not more than a very small fraction of the time during any single launch day and it is unlikely that pinnipeds will become habituated to launch sounds. In addition, the extremely rapid departure of the rockets means that pinnipeds would be exposed to increased sound levels for very short time intervals, and because launches are conducted relatively infrequently, neither physiological stress nor hearing related injuries are likely. Therefore, NMFS anticipates that the effects of rocket launches from KLC would have no significant effects on the abilities of sea lions to hear one another or to detect natural environmental sounds, and would have no more than a negligible impact on Steller sea lion populations.

Harbor Seals

An ongoing scientific research program has been conducted since 1997 to determine the long-term cumulative impacts of space vehicle launches on the haul-out behavior, population dynamics and hearing acuity of harbor seals at Vandenberg Air Force Base (VAFB) in California. The response of harbor seals to rocket launch noise depended on the intensity of the noise (dependent on the size of the vehicle and its proximity) and the age of the seal. The percentage

of seals leaving the haul-out increases with noise level up to approximately 100 dB ASEL, after which almost all seals leave, although recent data has shown that an increasing percentage of seals have remained on shore, and those that remain are adults (Thorson *et al.*, 1999). Given the high degree of site fidelity among harbor seals, it is likely that those seals that remained on the haul-out site during rocket launches had previously been exposed to launches; that is, it is possible that adult seals have become acclimated to the launch noise and react differently than the younger inexperienced seals. The louder the launch noise, the longer it took for seals to begin returning to the haulout site and for the numbers to return to pre-launch levels. In two past Athena IKONOS launches with ASELs of 107.3 and 107.8 dB at the closest haulout site, seals began to haulout again approximately 16-55 minutes post-launch (Thorson *et al.*, 1999). In contrast, noise levels from an Atlas launch and several Titan II launches had ASELs ranging from 86.7 to 95.7 dB at the closest haulout and seals began to return to the haulout within 2-8 minutes post-launch. Seals returned to the haulouts within 2 to 55 minutes of the launch disturbance and the the haulout usually returned to pre-launch levels within 45 to 120 minutes.

In addition to behavioral disturbance, loud sounds may also cause a temporary (auditory) threshold shift (TTS), which is a slight, recoverable loss of hearing. In order to further determine if harbor seals experience any change in their hearing sensitivity as a result of launch noise, researchers conducted Auditory Brainstem Response (ABR) testing on 10 harbor seals prior to, and after, the launches of 3 Titan IV rockets (one of the loudest launch vehicles at the south VAFB haul-out site). Detailed analysis of the changes in waveform latency and waveform replication of the ABR measurements showed that there were no detectable changes in the seals' hearing sensitivity as a result of the launch noise (SRS Technologies, 2003).

The launches at VAFB do not appear to have had long-term effects on the harbor seal population in this area. The total population of harbor seals at VAFB is estimated to be 1,040 animals and has been increasing at an annual rate of 12.6 percent. Since 1997, there have been 5 to 7 space vehicle launches per year and there appears to be only short-term disturbance effects to harbor seals as a result of launch noise (SRS Technologies, 2003). Harbor seals will temporarily leave their haul-out when exposed to launch noise; however they generally return to the haul-out within one hour.

Harbor seals use Ugak Island as a pupping site. Though no launches have as yet taken place during the pupping period at Ugak Island (late May through Mid-June), they may at some point in the future. There has been little systematic study of the reactions of pinnipeds to rocket launches or aircraft overflights during pupping periods. Pinnipeds hauled out for pupping or molting are generally the most responsive to aircraft overflights (Richardson *et al.*, 1995). Harbor seals often leave beaches when aircraft fly over and then sometimes haulout at a different site afterwards, which results in permanent separation if pups are unable to follow their mothers into the water. Very young pups may also be pushed into the water as the adults flush and subsequently drown. One study showed more than 10% of approximately 2000 pups born on one Alaskan island died as a result of disturbance from low-flying aircraft (Richardson *et al.*, 1995). The same study found that aircraft were more disturbing on calm days, when at low altitudes, and

after recent disturbances. Since harbor seals have been shown to flush into the water in response to rocket launch noise of a level similar to that occurring at Ugak Island, one can infer that separation of pups from their mothers could occur if the launch occurred during a pupping period and the harbor seals were using the north side of the island to pup on.

Rocket launches at KLC have associated security overflights that occur an approximate total of 5 to 10 times in the days preceding and following the launch. Several studies of both harbor seals and Steller sea lions cited in Richardson *et al.*, 2005, suggest that these animals respond significantly less to overflights of both planes and helicopters that occur above 305 m (.21 mi). One mitigation requirement to be included in the rule is that security overflights immediately associated with the launch will not approach occupied pinniped haulouts on Ugak Island by closer than 1/4 mile, and will maintain a vertical distance of 1000 ft from the haulouts when within 1/2 of a mile, unless indications of human presence or activity warrant closer inspection of the area to assure that national security interests are protected in accord with law. Monitoring flights will not approach closer than 1/4 mile from the island. It is unlikely that either of these overflights will add noticeably to the harassment of pinnipeds surrounding the rocket launches.

Harbor seals primarily use the east side of Ugak Island, though they sometimes use the north side of the island both for hauling out and for pupping. For several reasons, NMFS believes that the seals using the east side of the island will not be harassed by rocket launch noise: the eastern shoreline faces away from the point the rocket noise is emanating from and is backed up by a 300-500-ft cliff; the rough seas hitting rocks make the ambient noise very loud on the eastern shoreline; and data collected during the ait-2 launch showed that one hour after the launch, when sea lions were swimming immediately off the rocks on the north shore, the harbor seals were still hauled out in the same numbers and at the same locations that they were 5 hours before the launch. NMFS believes that harbor seals hauled out on the north beach will be temporarily behaviorally disturbed and possibly temporarily displaced from their haulouts immediately following rocket launches. If launches occur during the harbor seal pupping period and harbor seals have also chosen to pup on the north beach, it is possible that harbor seal pups could die as a result of the adults flushing in response to the rocket noise. NMFS believes that the proposed action may result in the temporary behavioral disturbance or, less likely, mortality (pups only) of small numbers, in relation to the population numbers, of harbor seals. NMFS anticipates that these impacts will have no more than a negligible effect on the species stock.

Estimated Levels of Incidental Take

The highest number of Steller sea lions seen at one time on Ugak Island since 1993 is approximately 375 (1997). However, based on both dedicated and opportunistic surveys of one researcher, approximately 160 were seen in 1999 and numbers have decreased since then (Wynne, pers. comm., 2005). Approximately 50 were seen in 2001 and numbers have further decreased since then. Steller sea lions seasonally use the Ugak island sites (the northern spit, and occasionally the southwest tip) as haulout sites from late June to early October. While not

logistically optimal for the applicant, the fastest that KLC can prepare the facilities for a new launch right after a launch is four weeks, which means that at most it would be physically possible to have four launches a year within the time that the sea lions are using Ugak Island as a haulout. Based on the maximum number seen and the sea lion trend over the last several years, NMFS anticipates that the most sea lions likely to be harassed during one launch is 300. This translates to the potential harassment of 1,200 Steller sea lions in one year. However a mitigation measure would be required that will limit the number of launches within the time that sea lions are present to three, which would lower the number of potential harassments to 900 animals annually (4,500 over the life of the 5-yr regulations).

Harbor seal numbers have steadily increased at Ugak Island since 1992, and just over 900 were counted during the molt in 2004 (Wynne, pers. comm., 2005). The last pupping season counts showed 290 adults and 88 pups in 1993, and 292 adults and 96 pups in 1994. According to local researchers, the primary haulout for harbor seals is on the east side of the island (where NMFS does not believe there are likely to be any effects from the rocket launch noise) and the majority of the seals may be found there. In three days of her 1994 survey, Wynne (2005) found that an average of approximately 25% of both adults and pups were hauled out on the north side of the beach. Therefore, NMFS estimates that of a maximum of 900 harbor seals present during any launch, 275 of them may be located on the north side of the island and exposed to the rocket launch noise. Harbor seals are present at Ugak all year, which means that if there were nine launches in one year, a maximum of 2,475 harbor seals could be exposed to the noise and potentially harassed in one year (12,375 over the life of the 5-yr regulations). The harbor seal pupping season runs from mid-May through June. Since it takes a minimum of four weeks to prepare for a new launch, it would be physically possible to have two launches during that time. The highest number of pups seen at Ugak was 96 in 1994. Though numbers of pups have probably increased with the numbers of adults since 1994 (by a factor of three), only a minority of pups (estimated one fourth) will likely be present on the north side of the island and exposed to the noise and potential flushing of adults. One scientist reported that more than 10% of 2000 harbor seal pups died on an Alaskan Island following disturbance from exposures to low flying aircrafts (Richardson *et al.*, 1995). NMFS estimates that if 72 pups (highest number seen (96) multiplied by three for population increase and divided by four to account for number exposed on north side of island) were twice exposed to rocket noise sufficient to flush the adults, up to 20 harbor seal pups (15%) might die. However, a mitigation measure that would be required would limit AADC to one launch during the pupping season, which would lower the potential mortality of harbor seal pups to 11 annually (55 over the life of the regulations).

2. Impacts on Marine Mammal Habitat or Subsistence Use

Solid rocket boosters would fall into the ocean away from any known or potential haulouts and the chances of a cetacean being in the wrong place at the wrong time are discountable. All sonic booms that reach the earth's surface would be expected to be over open ocean beyond the outer continental shelf. Airborne launch sounds would mostly reflect or refract from the water surface and, except for sounds within a diameter of approximately 26 degrees

directly below the launch vehicle, would not penetrate into the water column. The sounds that do penetrate would not persist in the water for more than a few seconds. Overall, rocket launch activities from KLC would not be expected to cause any impacts to habitats used by marine mammals, including pinniped haulouts, or to their food sources.

There are no subsistence uses of pinniped species in Alaska waters within the KLC primary study area, and, thus, there are no anticipated effects on subsistence needs.

3. Impacts to Endangered Species

The endangered Steller sea lion is the only federally listed marine mammal under NMFS' jurisdiction that is likely to be adversely affected by the proposed action. The FAA and NMFS have consulted with the Endangered Species Division of the NMFS Alaska Region. A Biological Opinion (BO) issued in November, 2003 found that the proposed action is not likely to jeopardize the continued existence of listed species nor result in the destruction or adverse modification of critical habitat. The BO concluded that the proposed action may result in behavioral reactions among Steller sea lions that are present on Ugak Island during launches, including temporary site abandonment. The BO further stated that sound pressure levels are not expected to result in any hearing loss or impairment (temporary threshold shift) due to the distance of the haul out from the pad, the recorded and predicted sound pressure levels, and the transient nature of launch noise.

The humpback whale, also listed as endangered, moves north to the Gulf of Alaska in the summer and appears to have an affinity for nearshore waters. This species is not likely to be adversely affected by launch operations, however, because it would not be expected to occur within several miles of the launch pad and is mostly below the surface of the water; and therefore not exposed to significant launch noise (see (V)(B)(1)(4)).

The northern sea otter is within the jurisdiction of the USFWS which is responsible for issuing authorizations and incidental take statements for takes of this species. AADC is currently in consultation with USFWS regarding the sea otter.

Steller's eider, federally listed threatened and under the jurisdiction of the USFWS, is found in the vicinity of the KLC. Following several years of recommended monitoring of both Steller's eiders and bald eagles (not federally listed in Alaska), the USFWS concurred with AADC's conclusion that the rocket launches at AADC have no effect on either of these species.

4. Cumulative Impacts

Cumulative effects are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such other actions" (40 CFR §1508.7).

With the exception of regular boat (commercial fishing) and air traffic, NMFS is aware of no activities occurring in the action area that may affect the marine mammal species addressed here. It is known that stress from long-term cumulative sound exposures can result in physiological effects on reproduction, metabolism, general health and disease resistance in marine mammals. These effects are not expected to be incurred, however, due to the infrequency and short duration of the proposed rocket launches.

B. No Action Alternative

If the rule were not promulgated and LOAs not issued, any takes resulting from rocket launch noise at Ugak Island would be unauthorized and potentially in violation of the MMPA. If KLC were to not launch any rockets, there would be no adverse impacts to marine mammals, but their entire purpose would be undermined and they would suffer significant adverse economic impacts. Additionally, multiple DOD missions that utilize KLC would be compromised if they were unable to test their systems using KLC.

C. Issuance of IHA with Time-of-year Restrictions

If NMFS were to issue an IHA for the proposed rocket launches, but limit the launch times to outside of May 15 to June 30, the potential for Level A harassment or mortality of harbor seal pups would be eliminated. The anticipated Level B harassment of adult Steller sea lions and harbor seals would be the same as that of the preferred alternative. The adoption of this alternative, however, could result in adverse economic impacts and logistical difficulties for AADC, as the suggested time of year restrictions would reduce their availability by 12.5%. Rocket launches are scheduled to meet AADC's customer need, which are dependent on many variables not in AADC's control. Missions are very expensive to stage and mission planners work with many suppliers scattered around the globe who are held to contractual timelines that require them to deliver at certain dates. Additionally, missions require downrange coordination, which includes scheduling around support of other missions flown from other ranges.

VII. MITIGATION, MONITORING and REPORTING

A. Mitigation

Under Section 101(a)(5) of the MMPA, takings are to be reduced to the lowest level practicable. Due to the nature of the rocket launches and the pinnipeds responses, the main practicable way to mitigate for the effects of the rocket launch noise is to decrease the number of launches that the Steller sea lions and harbor seals are exposed to. This sort of mitigation is logistically difficult for AADC, as their launch operations are driven by the needs of the agencies and companies that utilize their facilities, but NMFS and the applicant have worked out a way to reduce the potential Level B Harassment of sea lions by 25% and to reduce the potential Level A Harassment or mortality of harbor seal pups by 50%.

In their application, AADC asked for authorization to take marine mammals during 9 rocket launches annually. The quickest that the launch pad can be turned around for another launch is four weeks. This means that it would be physically possible to launch 4 rockets during the season that the Steller sea lions are using Ugak Island, and physically possible to launch 2 rockets during the harbor seal pupping season. As a mitigation measure, NMFS proposes to incorporate into the rule and LOAs a requirement that not more than an average of 3 launches per year could occur within the sea lion season, and not more than an average of 1 launch per year could occur during the harbor seal pupping season. Therefore, no more than 15 launches would occur within the sea lion season (June 15 - September 30) over the course of the five-year rule, and no more than 5 launches would occur during the harbor seal pupping season (May 15 - June 30) over the course of the five-year rule.

Though in the video monitoring of Steller sea lions at Ugak Island they did not flush in response to helicopter or noise recorded during the same time period, the scientific literature shows that pinnipeds will often have an adverse response to low-flying aircraft. AADC typically flies several security overflights in conjunction with a rocket launch. NMFS proposes to incorporate a mitigation measure wherein the security flights would not approach closer than 1/4 mile from Ugak Island unless indications of human presence or activity warrant closer inspection of the area to assure that national security interests are protected in accord with law.

B. Monitoring

Marine Mammal Monitoring

The objective of monitoring Steller sea lions and Pacific harbor seals is to detect any indications of disturbance that result from KLC rocket launches to individuals at the Ugak Island haulout site. Monitoring would be conducted on Ugak Island for launches that take place between June 15 and September 30, an observation period that includes the seasonal occupation of the Steller sea lions as well as the molting period of the harbor seals (when their numbers are higher and their responses to disturbance potentially greater). Launches occurring during the harbor seal pupping season (May 15 - June 30) would also be monitored. All haulout areas on Ugak Island would be monitored before, during, and after launch operations to document and characterize any observed responses. Monitoring would be designed to determine the type of disturbance reactions and their relationship to noises associated with rocket launches. Fixed-wing aerial surveys would be flown for any launches taking place from June 15 through September 30 using a minimum flight altitude of 152.5 m (500 ft) above sea level (ASL) to be flown at low tide or, with consultation, toward evening. The aircraft would come no closer than one-quarter mile to the haulout. Depending on aircraft availability, one or two biologist observers would accompany the pilot. Data would be gathered both visually and on 35-mm color film with a camera having a zoom lens. A total of five surveys would be flown, if weather conditions permit. The first would occur the day prior to a scheduled launch and the second as soon after the launch as possible. Replicate surveys would be flown the following three successive days to determine post-launch haulout-use patterns.

For any launches that occur from June 15 through September 30, a real-time video record would be made of sea lion reactions to launch-related noises. This would be accomplished by the installation of a remote custom-designed, closed-circuit, weatherproof, time-lapse video camera system at the base of the Ugak Island sea lion haulout before a launch, which would be retrieved post-launch. Results of the aerial and video surveys would be compared, providing information on startle effects and durations. In addition, video data would be time-correlated with rocket motor noise measurements to provide objective information on any startle responses or indications of disturbance reactions that may occur resulting from rocket launches. Comparisons would also be made with baseline data assembled by AADC to help gauge any natural trends that may be occurring.

The majority of harbor seals haul out on the eastern side of Ugak Island, which is completely inaccessible to pedestrian or boat traffic due to the high cliffs and violent surf, so it is not possible to set up video recorders there. However, approximately 25% of the harbor seals haul out on the eastern end of the north-facing shore of Ugak Island (Figure 1). Though it has not yet been attempted, it may be possible to set up a camera with a zoom lens on the accessible western end of the north-facing shore that will be able to record harbor seal behavior on the middle or eastern end of the shore, or on the rocks off shore. At some time prior to the first launch that occurs between May 15 and June 30, when harbor seals are present (perhaps immediately before or after the camera has already been set up to record sea lions), AADC would test the efficacy of using the camera on the harbor seal haulout and report their findings to NMFS. If successful, the same real-time video and acoustic measurements (see below) would be conducted when launches occur during the harbor seal pupping season as occur when the sea lions are present.

To maintain security in relation to rocket launches, AADC flies a total of approximately 5 to 10 overflights per day in the days immediately preceding and following the launch. Because these flights will not approach occupied pinniped haulouts by closer than 1/4 mile (unless indications of human presence or activity warrant closer inspection of the area to assure that national security interests are protected in accord with law), NMFS believes it unlikely that the overflights would result in the harassment of marine mammals. However, when pinnipeds are present at haulouts during security overflights associated with rocket launches, a member of the flight crew would note and record whether pinnipeds appeared to flush as a result of the overflight and estimate a number, if so.

Acoustic Measurements

Rocket motor noise monitoring would be done concurrently with video monitoring at the Ugak Island haulouts. These data would be synchronized to the video data to document correlations between noise signatures and pinniped responses. Sound intensity and frequency metrics would be recorded before, during, and after a launch by an SLM mounted on a permanent stanchion upon the Ugak Island haulout one day or more before a launch and retrieved within one day post-launch. The SLM would be set to highlight sounds greater than 70 dBA.

C. Reporting

In the event that any cases of pinniped injury or mortality are judged to result from launch activities at any time during the period covered by these regulations, this event would be reported to NMFS immediately.

Data from monitoring activities would be analyzed, summarized, and reported to NMFS within 90 calendar days following cessation of field activities for each launch. The report would include the timing and nature (vehicle type, azimuth, measured sound data) of launch operations as well as the times of the monitoring flights. The report would include sea lion and harbor seal counts (separated into adult and pup), as well as observations of any other marine mammals seen during monitoring or security overflights. The report would summarize behavioral observations in relation to recorded, or other known, stimuli (launches or aircraft), and estimate the amount and nature of take by harassment. AADC would also include this information in its Annual Environmental Monitoring and Natural Resources Management Report.

An interim technical report is proposed to be submitted to NMFS 60 days prior to the expiration of each annual LOA issued under these regulations, along with any request for a subsequent annual LOA. This interim technical report would provide full documentation of methods, results, and interpretation pertaining to all monitoring tasks for launches during the period covered by the LOA. However, only preliminary information would be available to be included for any launches during the 60-day period immediately preceding submission of the interim report to NMFS.

In addition to annual interim LOA reports, NMFS proposes to require AADC to submit a draft comprehensive final technical report to NMFS 180 days prior to the expiration of the regulations. This draft technical report would provide full documentation of methods, results, and interpretation of all monitoring tasks for launches during the first four LOAs, plus preliminary information for launches during the first 6 months of the final LOA.

VIII. CONCLUSION

As a result of this environmental review, NMFS has determined that the implementation of any of the three alternatives (the promulgation of a rule and subsequent issuance of LOAs, the promulgation of a rule with time-of-year restrictions and subsequent issuance of LOAs, or the denial of the permit) would not significantly affect the quality of the human environment. Additionally, the issuance of these authorizations is not controversial and would not set a precedent for future actions with significant effects. Therefore, an environmental impact statement is not required.

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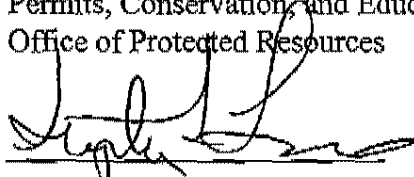


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Permits, Conservation, and Education Division
Office of Protected Resources

12/07/05

Date

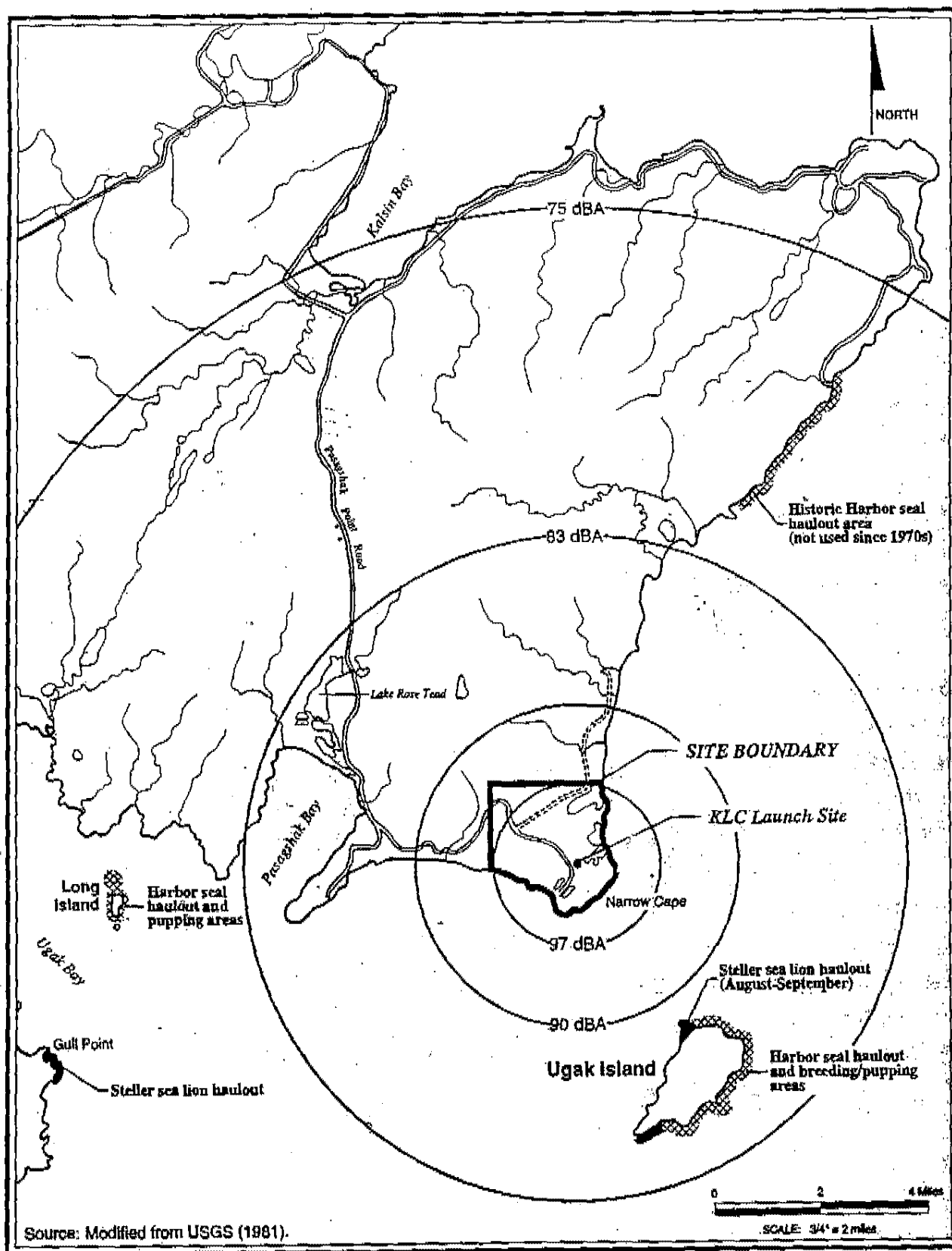
Recommended by:



Jolie Harrison
Permits, Conservation, and Education Division
Office of Protected Resources

12/07/05

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Figure 1. Pinniped haulouts in the vicinity of the proposed KLC. (Concentric circles represent launch noise isopleths.).