Marine Mammal Monitoring & Mitigation Plan

Unalaska Channels Dredging

Unalaska, Alaska

Submitted to:
National Marine Fisheries Service
Office of Protected Resources
1315 East-West Highway
Silver Spring, Maryland 20910-3226

Prepared by:
US Army Corps of Engineers – Alaska District
Civil Works Branch
Environmental Resources Section

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

ACRONYMS AND ABBREVIATIONS

4MP	Marine Mammal Monitoring and Mitigation Plan
dB	Decibel
ESA	Endangered Species
GPS	Global Position System
IHA	Incidental Harassment Authorization
MMPA	Marine Mammal Monitoring Plan
NMFS	National Marine Fisheries Service
NOAA	National Oceanic Atmospheric Administration
Pier	Fuel Pier
PPE	Personal Protective Equipment
SPL	Sound Pressure Level
USAF	United States Air Force

1.0 Introduction

The purpose of this Marine Mammal Monitoring and Mitigation Plan (4MP) is to provide a protocol for monitoring of affected species during the dredging and confined underwater blasting (if necessary) for a dredging project in Unalaska, Alaska (Figure 1-1). This plan was developed to support the Incidental Harassment Authorization (IHA) document for Marine Mammal Protection Act, Section 101(a)(5)(D) permitting.

A Marine Mammal Monitoring and Mitigation Program will be implemented at the start of construction and will follow the protocols outlined in this document. The primary goals of the monitoring program are to:

- Monitor the proposed shutdown (i.e., Level A) and monitoring zones;
- Estimate the number of marine mammals exposed to noise at established thresholds;
- Document marine mammal responses;
- Minimize impacts to the marine mammal species present in the project area by implementing mitigation measures including monitoring, clearing the zones, and shutdown procedures; and,
- Collect data on the occurrence and behavior of marine mammal species in the project area and any potential impacts from the project.

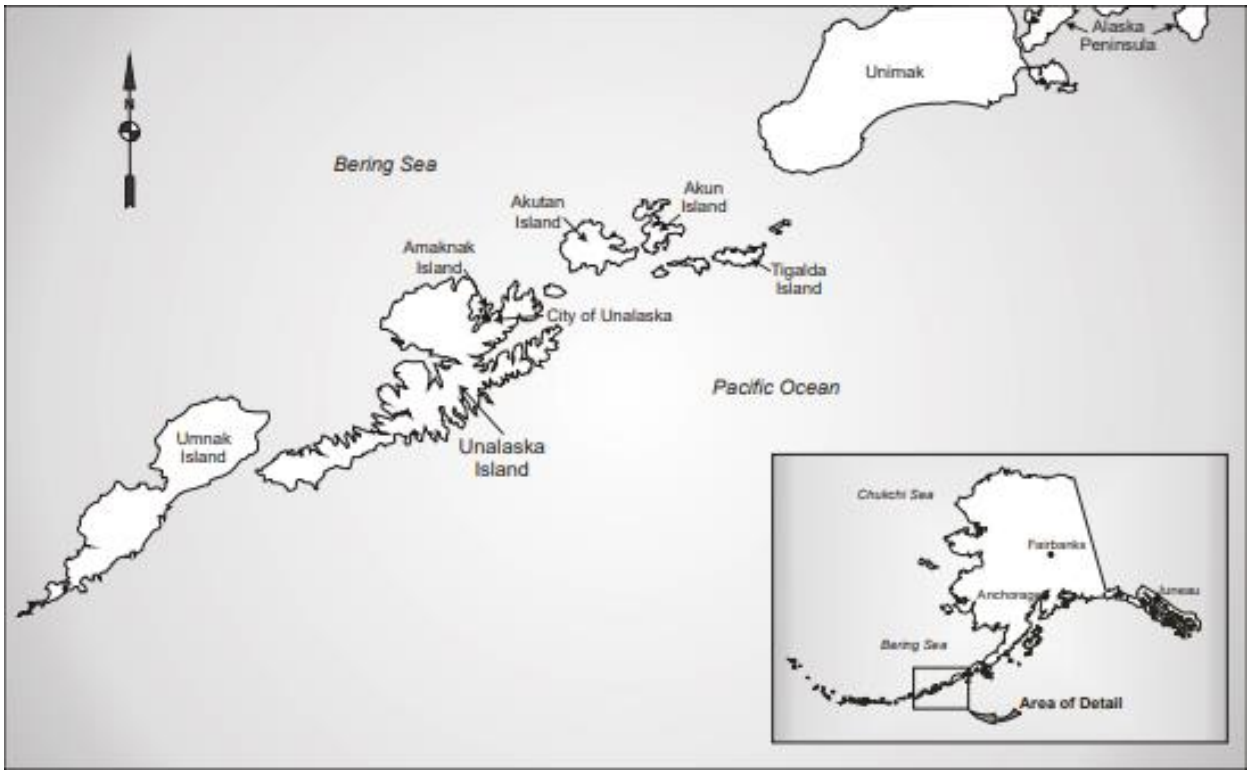

Figure 1-1. Project Location Overview

2.0 Project Description

The project would deepen the existing bar to -58 feet MLLW including 14 feet of under keel clearance. This would provide one-way access vessels with a draft up to 44 feet with waves up to 5.6 feet over the bar with tides about 0 feet MLLW. The channel dimensions are

approximately 600 feet long by 600 feet wide and initial estimates involve dredging approximately 182,000 cubic yards of sediment (Figure 2-1). The bar would be deepened by approximately 16 feet to a depth of -58 feet MLLW. Dredged materials will be placed in the water immediately adjacent to the inside of the bar in 100 feet of water. The main construction activities involved for the project include dredging, disposal, and blasting. These activities are anticipated to result in Level B harassment and this Marine Mammal Monitoring and Mitigation Plan (4MP) will be implemented to reduce the potential for exposure to Level A harassment.

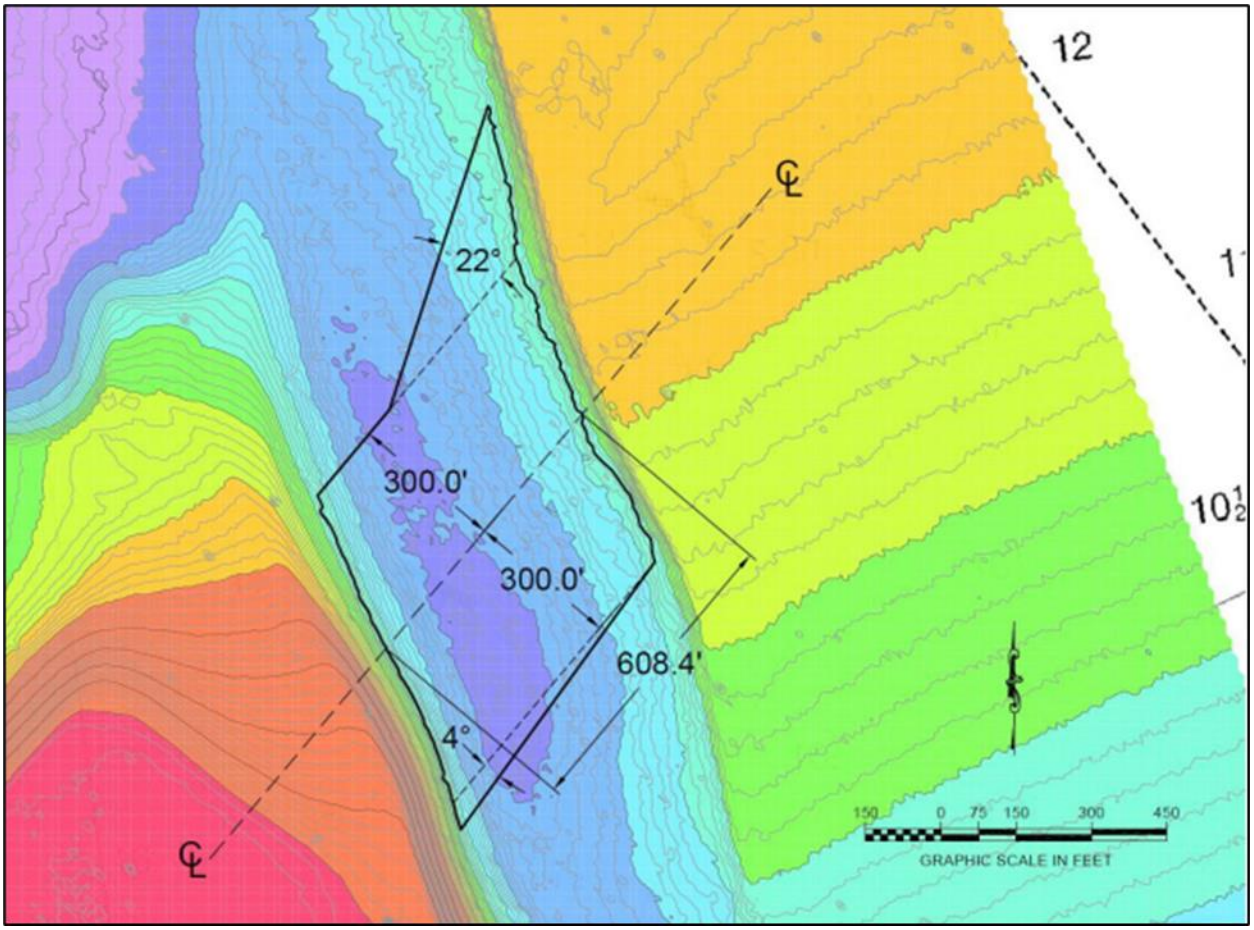

Figure 2-1. Project Location Detail

3.0 Methods

Experienced vessel-based observers will be located on-site before, during, and after in-water construction activity at sites appropriate for monitoring marine mammals approaching and within the Level A and Level B harassment zones (Section 3.4).

During observation periods, observers will continuously scan the area for marine mammals using binoculars and the naked eye. Observers will work shifts of up to 4 consecutive hours maximum followed by an observer rotation or a 1-hour break and will work no more than 12 hours in any 24-hour period. Observers will collect data including, but not limited to, environmental conditions (e.g., sea state, precipitation, glare, etc.), marine mammal sightings (e.g., species, numbers, location, behavior, responses to construction activity, etc.), construction activity at the time of sighting, and number of marine mammal exposures. Observers will

conduct observations, meet training requirements, fill out data forms, and report findings in accordance with this 4MP.

Observers will implement mitigation measures including monitoring of the proposed shutdown and monitoring zones, clearing of the zones, and shutdown procedures. They will be in continuous contact with the construction personnel via two-way radio.

An employee of the construction contractor will be identified as the main point of contact for observers at the start of each construction day. Observers will report directly to the monitoring coordinator when a shutdown is deemed necessary due to marine mammals approaching the relevant shutdown zones during a potentially hazardous construction activity.

3.1 Observer Qualifications

Monitoring will be conducted by qualified, trained marine mammal observers (hereafter, "observers"). In order for observers to be considered qualified, the following requirements must be met:

1. Visual acuity in both eyes (correction is permissible) sufficient for discernment of moving targets at the water's surface with ability to estimate target size and distance;
2. Physical capability of performing essential duties, including sitting or standing for periods of up to 4 hours, using binoculars or other field aids, and documenting observations;
3. Experience and ability to conduct field observations and collect data according to assigned protocols;
4. Experience or training in the field identification of marine mammals and marine mammal behavior, including the ability to accurately identify marine mammal species in Alaskan waters;
5. Sufficient training, orientation or experience with the construction operation to provide for identification of concurrent activities and for personal safety during observations;
6. Writing skills sufficient to prepare reports of observations; and,
7. Ability to communicate orally, by radio and in person, with project personnel to provide real-time information on marine mammals observed in the area and the appropriate mitigation response for the circumstances.

3.2 Data Collection

Observers will use a National Marine Fisheries Service (NMFS)-approved Observation Record (Appendix A) which will be completed by each observer for each survey day and location. Observation records will be used by observers to record the following:

- Date and time that permitted construction activity begins or ends;
- Weather parameters (e.g., percent cloud cover, percent glare, visibility) and sea state. (The Beaufort Wind Force Scale will be used to determine sea-state);
- Species, numbers, and, if possible, sex and age class of observed marine mammals;
- Construction activities occurring during each sighting;
- Marine mammal behavior patterns observed, including bearing and direction of travel;
- Specific focus should be paid to behavioral reactions just prior to, or during, soft-start and shutdown procedures;

- Location of marine mammal, distance from observer to the marine mammal, and distance from pile driving activities to marine mammals;
- Record of whether an observation required the implementation of mitigation measures, including shutdown procedures and the duration of each shutdown; and,
- Other human activity in the area. Record the hull numbers of fishing vessels if possible.

3.3 Equipment

The following equipment will be required to conduct observations for this project:

- Appropriate Personal Protective Equipment (PPE);
- Portable radios and headsets for the observers to communicate with the monitoring coordinator and other observers;
- Contact information for the other observers, monitoring coordinator, and NMFS point of contact;
- Daily tide tables for the project area;
- Watch or chronometer;
- Binoculars (7 x 50 or stronger) with built-in rangefinder (rangefinder may be provided separately);
- Hand-held Global Position System (GPS) unit, map and compass, or grid map to record locations of marine mammals;
- Copies of MMMP, IHA, and/or other relevant permit requirement specifications in sealed clear plastic cover; and,
- Notebook with pre-standardized monitoring Observation Record forms on waterproof paper.

3.4 Level A and Level B Harassment Zones

Zones have been established zones to delineate areas where marine mammals would experience Level A or Level B harassment due to exposure to underwater sound from construction activity. Shutdown of construction will occur where the underwater sound pressure levels (SPLs) are anticipated to equal or exceed the Level A harassment thresholds for permitted pinnipeds and cetaceans or where the Level B harassment threshold would be exceeded for a marine mammal not included in the IHA. Where underwater SPLs would exceed the Level B harassment thresholds, observers will monitor and record sightings and behavior of permitted species but will not shut down.

Species with permitted “take” (Level B harassment) under the IHA include 2 cetacean species and 2 pinniped species. The humpback whale and harbor porpoise are the cetaceans, and the harbor seal and Steller sea lion are the pinnipeds. Take of any other marine mammals is not permitted under the IHA.

Determination of harassment radii is discussed fully in Section 5 of the IHA, which is subject to update based on any National Oceanic Atmospheric Administration (NOAA) Technical Memorandum by NMFS for the project’s IHA application. The radii are summarized in Table 3-1 below.

Table 3-1. Effective Underwater Harassment Zones

Underwater Noise						
Source	Level A Harassment Zone (m)					Level B Harassment Zone (meters)
	Low-Frequency (LF) Cetaceans	Mid-Frequency (MF) Cetaceans	High-Frequency (HF) Cetaceans	Phocid (PW) Pinnipeds	Otariid (OW) Pinnipeds	
Dredging	0.5	0.0	0.8	0.3	0.0	108
Blasting	344.6	24.9	553.3	230.34	91.92*	See table 3.2

*conservatively doubled for otariid zones

Table 3.2 Effective Underwater Level B Harassment Zones for Blasting

Underwater Noise					
Source	Level B Harassment Zone (m)				
	Low-Frequency (LF) Cetaceans	Mid-Frequency (MF) Cetaceans	High-Frequency (HF) Cetaceans	Phocid (PW) Pinnipeds	Otariid (OW) Pinnipeds
Blasting	1918	NA	4,435.6	909.1	249.76*

* conservatively doubled for otariid zones

Table 3.3 Effective Shutdown and Monitoring Zones – Underwater Sources

Source	Shutdown Zone – Permitted Species				Monitoring Zone	Shutdown Zone
	Humpback whales	Harbor seals	Steller sea lions	Harbor porpoise	Permitted Species	Non-Permitted Species
Dredging*	10 m	10 m	10 m	10 m	110 m	110 m
Dredge Disposal*	10 m	10 m	10 m	10 m	10 m	10 m

Table 3.4 Effective Shutdown and Monitoring Zones – Blasting

	Low Frequency Cetaceans (LF)	Mid-Frequency Cetaceans (MF)	High Frequency Cetaceans (HF)	Phocid Pinnipeds (PW)	Otariid Pinnipeds (OW)
Monitoring Zone – Non-Permitted Species	2,500 m	2,500 m	5,000 m	2,500 m	2,500 m
Shutdown Zone – Non-Permitted Species	1,918 m	1,918 m	4,500 m	909 m	249.76 m
Permitted Species	**Humpback whales**	_	**Harbor porpoise**	**Harbor seals**	**Steller sea lions**
Shutdown Zone –	344.6 m	_	1,213.8	230.34 m	91.92 m

Permitted Species					
Level A Monitoring Zone – Permitted Species	750 m	_	1,750 m	560 m	180 m
Level B Monitoring Zone – Permitted Species	2,500 m	_	5,000 m	2,500 m	2,500 m

Table 3.5 Effective Shutdown and Monitoring Zones – Airborne Sources

Airborne Noise			
Source	**Shutdown Zone***	**Monitoring Zone**	
		Harbor seals	**Steller sea lions**
Drilling for blast holes	10 m	35 m	10 m

*Since Level A harassment thresholds do not exist for airborne noise, the 10-meter shutdown zone will be implemented for all hauled-out marine mammals. However, there is no land or other suitable haul-out structures within at least 700 meters of the dredging site, making the airborne noise criteria unlikely to be relevant for this project.

- The harassment zones will be monitored throughout active dredging:
    - If a marine mammal enters the monitoring zone, an exposure will be recorded, and marine mammal behaviors documented. However, dredging would continue without stopping, unless the marine mammal approaches or enters the shutdown zone (10 meters).
    - If a marine mammal approaches or enters the shutdown zone, all dredging activities will be immediately halted.

3.5 Observer Monitoring Locations

In order to monitor the Level A and Level B harassment zones effectively, marine mammal observers will be positioned at the best practicable vantage points, taking into consideration safety, access, and space limitations. Observers will be stationed at locations that provide adequate visual coverage for the Level A and Level B harassment zones. Proposed observation locations are shown in figure 3.X and include both a vessel-based observer as well as a shore-based observer in at least one of the two shore-based locations. Until a contractor is selected, and the work vessels are known, it is not possible to specify an observer location onboard due to different vessel and deck setups. The observer locations will be decided up by the observers based on the work scheduled, visibility and sea state. Observers may select alternate locations that work better for the conditions as necessary.

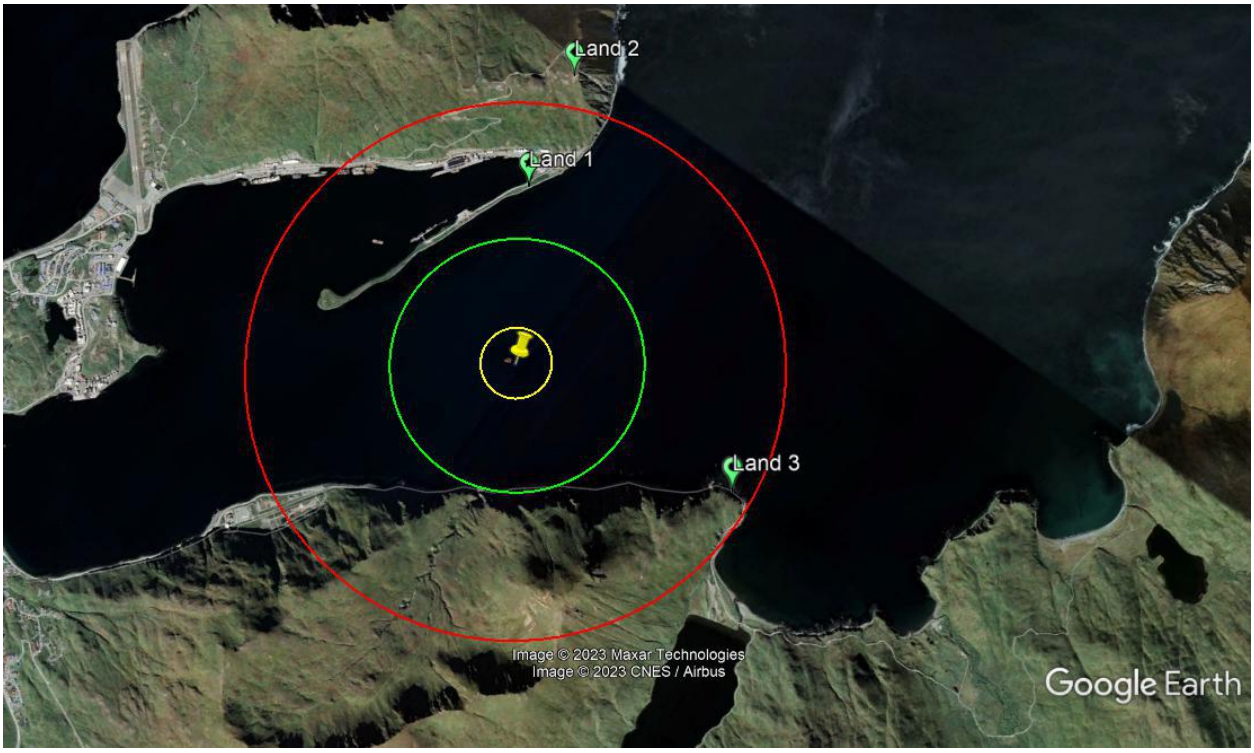

Figure 3.1 Three likely options for a land-based monitoring site. Two would be occupied (Land 1 and Land 3 or Land 2 and Land 3) prior to blasting. The red circle represents 1,918 meters for Level B for LF cetaceans. The green circle is for 909 metes for phocids. The yellow circle is 250 meters for otariids. The yellow pin is the center of the dredging prism.

3.6 Monitoring Techniques

Observers will collect sighting data and behaviors of marine mammal species that are observed in the shutdown and monitoring zones during periods of construction. NMFS requires that the observers have no other construction-related tasks while conducting monitoring. Observation necessitates that daylight is sufficient for observers to visualize the entirety of the monitoring zones, so observations will commence and complete during daylight hours. Monitoring of shutdown and observation zones will take place from 30 minutes prior to initiation through 30 minutes post-completion of all pile driving and removal activities.

3.6.1 Pre-Activity Monitoring

The following survey methodology will be implemented prior to commencing permitted activities:

- Prior to the start of permitted activities, observers will monitor the shutdown and monitoring zones for 30 minutes. They will ensure that no marine mammals are present within shutdown zone before permitted activities begin.
- When all applicable zones have been cleared, the observers will radio the monitoring coordinator. Permitted activities will not commence until the monitoring coordinator receives verbal confirmation the zones are clear.
- If permitted species are present within the Level B monitoring zone, work will not be delayed, but observers will monitor and document the behavior of individuals that remain in the monitoring zone.

- In case of fog or reduced visibility, observers must be able to see the entirety of Level A shutdown zones for the type of activity being undertaken before permitted activities can be initiated.

3.6.2 During-Activity Monitoring

The following survey methodology will be implemented during permitted activities:

- If permitted species are observed within the monitoring zone during permitted activities, an exposure would be recorded, and behaviors documented. Work will not stop unless a marine mammal enters or appears likely to enter the shutdown zone.
- If the Level B harassment zone has been observed for the pre-activity period and non-permitted species are not present within the zone, work can continue even if visibility becomes impaired within the Level B zone.
- If the Level A zone for the type of activity being undertaken is not fully visible, work cannot continue.

3.6.3 Shutdown

If a marine mammal enters or appears likely to enter the shutdown zone:

- The observers shall immediately radio or call to alert the monitoring coordinator.
- All permitted activities will be immediately halted.
- In the event of a shutdown of operations, permitted activities may resume only when:
    - The marine mammal(s) within or approaching the shutdown zone has been visually confirmed beyond the shutdown zone or has not been resighted in the size for 15 minutes (for pinnipeds) or 30 minutes (for cetaceans);
    - Observers will then radio the monitoring coordinator that activities can re-commence.

3.6.4 Breaks in Work

During an in-water construction delay, the shutdown and monitoring zones will continue to be monitored. No exposures will be recorded for permitted species in the monitoring zone if there are no concurrent permitted construction activities.

If permitted activities cease for more than 30 minutes and monitoring has not continued, pre-activity monitoring and soft start procedures must recommence. This includes breaks due to scheduled or unforeseen construction practices or breaks due to permit-required shutdown. Following 30 minutes of monitoring, work can begin according to the pre-activity monitoring protocols. Work cannot begin if a marine mammal is within the shutdown zone or if visibility is not clear throughout the shutdown and monitoring zones.

3.6.5 Post-Activity Monitoring

Monitoring of the shutdown and monitoring zones will continue for 30 minutes following completion of blasting activities. A post-monitoring period is not required for other in-water construction. These surveys will record observations and will focus on observing and reporting unusual or abnormal behavior of marine mammals. Observation Record forms will be used to document observed behavior.

4.0 Reporting

4.1 Modifications

In the event that the USACE needs to modify terms of this MMMP, the NMFS representative will be promptly contacted for discussion of the requested modification.

4.2 Unauthorized Exposure without Injury

If an unauthorized exposure without injury (as described below) occurs, observers will initiate shutdown, observe the marine mammal leaving the shutdown zone, and resume work according to the directions in Section 3.6.4. If this occurs, report of the exposure will be made to NMFS Alaska Region within one business day.

4.3 Injured or Dead Marine Mammal

If Observers or a contractor finds an injured, sick, or dead marine mammal, a USACE representative will notify NMFS and provide the species or description of the marine mammal(s), condition of the marine mammal or carcass, location, date and time of first discovery, observed behaviors (if alive), and photo or video (if available).

- If marine mammal's condition is a direct result of the project, notification will be made, and work will stop until NMFS is able to review the circumstances of the prohibited take.
- If the lead observer determines that the injury or death is not associated with or related to the activities authorized in the IHA (e.g., previously wounded marine mammal, carcass with moderate to advanced decomposition, scavenger damage), the USACE shall report the incident within 24 hours of the discovery. Construction activities may continue while NMFS reviews the circumstances of the incident and makes a final determination on the cause of the reported injury or death.
- If cause of death is unclear, the USACE shall immediately report the incident. Construction activities may continue while NMFS reviews the circumstances of the incident and makes a final determination on the cause of the reported injury or death. NMFS will work with the USACE to determine whether additional mitigation measures or modifications to the activities are appropriate.

Care should be taken in handling dead specimens to preserve biological materials in the best possible state for later analysis of cause of death, if that occurs. In preservation of biological materials from a dead marine mammal, the finder (i.e., marine mammal observer) has the responsibility to ensure that evidence associated with the specimen is not unnecessarily disturbed.

Reports will be made to the Office of Protected Resources and the Alaska Regional Stranding Coordinator.

4.4 Annual Report

A comprehensive annual marine mammal monitoring report documenting marine mammal observations will be submitted to NMFS at the end of the in-water work season. The draft comprehensive marine mammal monitoring report will be submitted to NMFS within 90 calendar days of the end of the in-water work period. The report will include marine mammal

observations (pre-activity, during-activity, and post-activity) during pile driving days. A final comprehensive report will be prepared and submitted to NMFS within 30 calendar days following resolution of comments on the draft report from NMFS.

The reports shall include at a minimum:

- General data:
    - Date and time of activity
    - Water conditions (e.g., sea-state)
    - Weather conditions (e.g., percent cover, percent glare, visibility)
- Specific pile driving data:
    - Description of the pile driving activity being conducted (pile locations, pile size and type), and times (onset and completion) when pile driving occurs.
    - The construction contractor and/or marine mammal monitoring staff will coordinate to ensure that pile driving times and strike counts are accurately recorded. The duration of soft start procedures should be noted as separate from the full power driving duration.
    - Description of in-water construction activity not involving pile driving (location, type of activity, onset and completion times)
- Pre-activity observational survey-specific data:
    - Date and time survey is initiated and terminated
    - Description of any observable marine mammals and their behavior in the immediate area during monitoring
    - Times when pile driving, or other in-water construction is delayed due to presence of marine mammals within shutdown zones.
- During-activity observational survey-specific data:
    - Description of any observable marine mammal behavior within monitoring zones or in the immediate area surrounding the monitoring zones, including the following:
        - Distance from marine mammal to pile driving sound source.
        - Reason why/why not shutdown implemented.
        - If a shutdown was implemented, behavioral reactions noted and if they occurred before or after implementation of the shutdown.
        - If a shutdown was implemented, the distance from marine mammal to sound source at the time of the shutdown.
        - Behavioral reactions noted during soft starts and if they occurred before or after implementation of the soft start.
        - Distance to the marine mammal from the sound source during soft start.
- Post-activity observational survey-specific data:
    - Results, which include the detections and behavioral reactions of marine mammals, the species and numbers observed, sighting rates and distances,
    - Refined exposure estimate based on the number of marine mammals observed. This may be reported as a rate of take (number of marine mammals per hour or per day) or using some other appropriate metric.

Appendix A.

Marine Mammal Observation Record

MARINE MAMMAL OBSERVATION RECORD

Project Name: Eareckson Air Station Long-term Pier Repair

Monitoring Location: ________

Date: ________

Time Effort Initiated: ________

Time Effort Completed ________

Page ___ of ___

Time	Visibility	Glare	Weather Condition	Wave Height	BSS	Wind Dir.	Swell Dir.
:	B - P - M - G - E	%	S - PC - L - R - F - OC - SN - HR	Lt / Mod / Hvy		N S E W	N S E W
:	B - P - M - G - E	%	S - PC - L - R - F - OC - SN - HR	Lt / Mod / Hvy		N S E W	N S E W
:	B - P - M - G - E	%	S - PC - L - R - F - OC - SN - HR	Lt / Mod / Hvy		N S E W	N S E W
:	B - P - M - G - E	%	S - PC - L - R - F - OC - SN - HR	Lt / Mod / Hvy		N S E W	N S E W
:	B - P - M - G - E	%	S - PC - L - R - F - OC - SN - HR	Lt / Mod / Hvy		N S E W	N S E W
:	B - P - M - G - E	%	S - PC - L - R - F - OC - SN - HR	Lt / Mod / Hvy		N S E W	N S E W
:	B - P - M - G - E	%	S - PC - L - R - F - OC - SN - HR	Lt / Mod / Hvy		N S E W	N S E W

Event Code	Sight # (1 or 1.1 if resight)	Time/Dur. (Start/ End time if cont.)	WP/ Grid #/ Dir. of Travel	Zone/ Radius/ Impact Pile #?	Obs.	Sighting Cue	Species	Group Size	Behavior Code(s)	Construction Type	Mitigation Type	Exposure?	Behavior Change/ Response to Activity/ Comments/ Human Activity/ Vessel Hull # or Name/ Visibility Notice
E ON - PRE - POST - CON - S - M - OR - E OFF		: :	____ GRID N or S W or E			BL - BO - BR - DF - SA - OTHER		MIN: MAX: BEST:		SSV - SSI - V - DR - I - DP - ST - OWC - NOWC - NONE	SS - BC - DE - SD - NONE	Y / N	
E ON - PRE - POST - CON - S - M - OR - E OFF		: :	____ GRID N or S W or E			BL - BO - BR - DF - SA - OTHER		MIN: MAX: BEST:		SSV - SSI - V - DR - I - DP - ST - OWC - NOWC - NONE	SS - BC - DE - SD - NONE	Y / N	
E ON - PRE - POST - CON - S - M - OR - E OFF		: :	____ GRID N or S W or E			BL - BO - BR - DF - SA - OTHER		MIN: MAX: BEST:		SSV - SSI - V - DR - I - DP - ST - OWC - NOWC - NONE	SS - BC - DE - SD - NONE	Y / N	
E ON - PRE - POST - CON - S - M - OR - E OFF		: :	____ GRID N or S W or E			BL - BO - BR - DF - SA - OTHER		MIN: MAX: BEST:		SSV - SSI - V - DR - I - DP - ST - OWC - NOWC - NONE	SS - BC - DE - SD - NONE	Y / N	
E ON - PRE - POST - CON - S - M - OR - E OFF		: :	____ GRID N or S W or E			BL - BO - BR - DF - SA - OTHER		MIN: MAX: BEST:		SSV - SSI - V - DR - I - DP - ST - OWC - NOWC - NONE	SS - BC - DE - SD - NONE	Y / N	
E ON - PRE - POST - CON - S - M - OR - E OFF		: :	____ GRID N or S W or E			BL - BO - BR - DF - SA - OTHER		MIN: MAX: BEST:		SSV - SSI - V - DR - I - DP - ST - OWC - NOWC - NONE	SS - BC - DE - SD - NONE	Y / N	
E ON - PRE - POST - CON - S - M - OR - E OFF		: :	____ GRID N or S W or E			BL - BO - BR - DF - SA - OTHER		MIN: MAX: BEST:		SSV - SSI - V - DR - I - DP - ST - OWC - NOWC - NONE	SS - BC - DE - SD - NONE	Y / N	
E ON - PRE - POST - CON - S - M - OR - E OFF		: :	____ GRID N or S W or E			BL - BO - BR - DF - SA - OTHER		MIN: MAX: BEST:		SSV - SSI - V - DR - I - DP - ST - OWC - NOWC - NONE	SS - BC - DE - SD - NONE	Y / N	
E ON - PRE - POST - CON - S - M - OR - E OFF		: :	____ GRID N or S W or E			BL - BO - BR - DF - SA - OTHER		MIN: MAX: BEST:		SSV - SSI - V - DR - I - DP - ST - OWC - NOWC - NONE	SS - BC - DE - SD - NONE	Y / N	

BEHAVIOR CODES

CODE	BEHAVIOR	DEFINITION
BR	Breaching	Leaps clear of water
CD	Change Direction	Suddenly changes direction of travel
CH	Chuff	Makes loud, forceful exhalation of air at surface
DI	Dive	Forward dives below surface
DE	Dead	Shows decomposition or is confirmed as dead by investigation
DS	Disorientation	An individual displaying multiple behaviors that have no clear direction or purpose
FI	Fight	Agonistic interactions between two or more individuals
FO	Foraging	Confirmed by food seen in mouth
MI	Milling	Moving slowly at surface, changing direction often, not moving in any particular direction
PL	Play	Behavior that does not seem to be directed towards a particular goal; may involve one, two, or more individuals
PO	Porpoising	Moving rapidly with body breaking surface of water
SL	Slap	Vigorously slaps surface of water with body, flippers, tail, etc
SP	Spyhopping	Rises vertically in the water to "look" above the water
SW	Swimming	General progression in a direction. Note general direction of travel when last seen (Ex, "SW (N)" for swimming north)
TR	Traveling	Traveling in an obvious direction. Note direction of travel when last seen (Ex, "TR (N)" for traveling north)
UN	Unknown	Behavior of animal undetermined, does not fit into another behavior
AWA	Approach Work	Approaching the area where work is being conducted
LWA	Leave Work Area	Leaving the area where work is being conducted
PINNIPED ONLY		
EW	Enter Water (from haulout)	Enters water from a haul-out for no obvious reason
FL	Flush (from haulout)	Enters water in response to disturbance
HO	Haulout (from water)	Hauls out on land
RE	Resting	Resting onshore or on surface of water
LO	Look	Is upright in water "looking" in several direction or at a single focus
SI	Sink	Sinks out of sight below surface without obvious effort (usually from an upright position)
VO	Vocalizing	Animal emits barks, squeals, etc
CETACEAN ONLY		
LG	Logging	Resting on surface of water with no obvious signs of movement

VISIBILITY

CODE	DISTANCE VISIBLE
B	Bad (<0.5km)
P	Poor (0.5-0.9km)
M	Moderate (0.9-3km)
G	Good (3-10km)
E	Excellent (>10km)

WEATHER CONDITIONS

CODE	WEATHER CONDITION
S	Sunny
PC	Partly Cloudy
L	Light Rain
R	Steady Rain
F	Fog
OC	Overcast
SN	Snow
HR	Heavy Rain

WAVE HEIGHT

CODE	WAVE HEIGHT
Lt	Light (0-3ft)
Mod	Moderate (4-6ft)
Hvy	Heavy (>6ft)

GLARE

Percent glare should be the total glare of observers' area of responsibility. Determine if observer coverage is covering 90 degrees or 180 degrees and document daily. Then assess total glare for that area. This will provide needed information on what percentage of the field of view was poor due to glare.

BEAUFORT SEA SCALE (BSS)

Use Beaufort Sea State Scale for Sea State Code located in Appendix C. This refers to the surface layer and whether it is glassy in appearance or full of white caps. In the open ocean, it also takes into account the wave height or swell, but in inland waters the wave height (swells) may never reach the levels that correspond to the correct surface white cap number. Therefore, include wave height for clarity.

WIND DIRECTION

Wind direction should also be where the wind is coming from.

SWELL DIRECTION

Swell direction should be where the swell is coming from (S for coming from the south). If possible, record direction relative to fixed location (pier). Choose this location at beginning of monitoring project.

SPECIES

CODE	MARINE MAMMAL SPECIES
BBW	Baird's Beaked Whale
BW	Blue Whale
DP	Dall's Porpoise
FW	Fin Whale
GW	Gray Whale
HP	Harbor Porpoise
HS	Harbor Seal
HW	Humpback Whale
KW	Killer Whale
MW	Minke Whale
NFS	Northern Fur Seal
NPRW	North Pacific Right Whale
PWSD	Pacific White-Sided Dolphin
RS	Ribbon Seal
SW	Sperm Whale
SBW	Stejneger's Beaked Whale
SSL	Steller Sea Lion
NSO	Northern Sea Otter
UW	Unknown Whale
UP	Unknown Pinniped
UNK	Unknown

SIGHTING CUES

CODE	ACTIVITY TYPE
BL	Blow
BO	Body
BR	Breach
DF	Dorsal Fin
SA	Surface Activity
OTR	Other

EVENT CODES

CODE	ACTIVITY TYPE
E ON	Effort On
E OFF	Effort Off
PRE	Pre-Construction Watch
POST	Post-Construction Watch
CON	Construction (see types)
S	Sighting
M	Migration (see types)
OR	Observer Rotation

CONSTRUCTION TYPE

CODE	ACTIVITY TYPE
V	Vibratory Pile Driving
I	Impact Pile Driving
DP	Dead pull
ST	Stabbing
DR	Drilling
OWC	Over-Water Constrcution
NOWC	No Over-Water Construction
NONE	No Construction

MITIGATION TYPE

CODE	ACTIVITY TYPE
SS	Soft Start
BC	Bubble Curatin
DE	Delay onset of in-water work
SD	Shut down in-water water

Appendix B.

Level A and Level B
Harassment Zone Figures

This is a draft 4MP. These figures will be developed once the distances to various zone for the relevant species are solidified as the IHA development process moves forward. Distances in the application are subject to change as it is reviewed by NMFS staff.

Appendix C.

Beaufort Sea Scale

Beaufort Number (Wind Force)	Wind Velocity (Knots)	Wind Description	Sea Conditions	Heights of Waves (Feet)	Photographic Example
0	<1	Calm	Sea surface smooth and mirror-like	0	
1	1-3	Light Air	Scaly ripples, no foam crests	0-1	
2	4-6	Light Breeze	Small wavelets, crest glassy, no breaking	1-2	
3	7-10	Gentle Breeze	Large wavelets, crests begin to break, scattered whitecaps	2-3.5	

4	11-16	Moderate Breeze	Small waves, becoming longer, numerous whitecaps	1-4	
5	17-21	Fresh Breeze	Moderate waves, taking longer form, many whitecaps, some spray	4-8	
6	22-27	Strong Breeze	Larger waves, whitecaps common, more spray	8-13	
7	28-33	Near Gale	Sea heaps up, white foam streaks off breakers	13-19	
8	34-40	Gale	Moderately high, waves of greater length, edges of crests begin to break into spindrift, foam blown into streaks	18-25	

9	41-47	Strong Gale	High waves, sea begins to roll, dense streaks of foam, spray may reduce visibility	23-32	
10	48-55	Storm	Very high waves, with overhanging crests, sea white with densely blown foam, heavy rolling, lowered visibility	29-41	
11	56-63	Violent Storm	Exceptionally high waves, foam patches cover sea, visibility more reduced	37-52	
12	64+	Hurricane	Air filled with foam, sea completely white with driving spray, visibility greatly reduced	45+	

Images obtained from an online webpage titled, “The Seas of the Beaufort Scale,” at http://www.meiotic.co.uk/my/research/beaufort-seas/.