



**Marine Mammal Monitoring Plan**  
**UniSea G1 Dock Replacement Project**

**UniSea, Inc.**

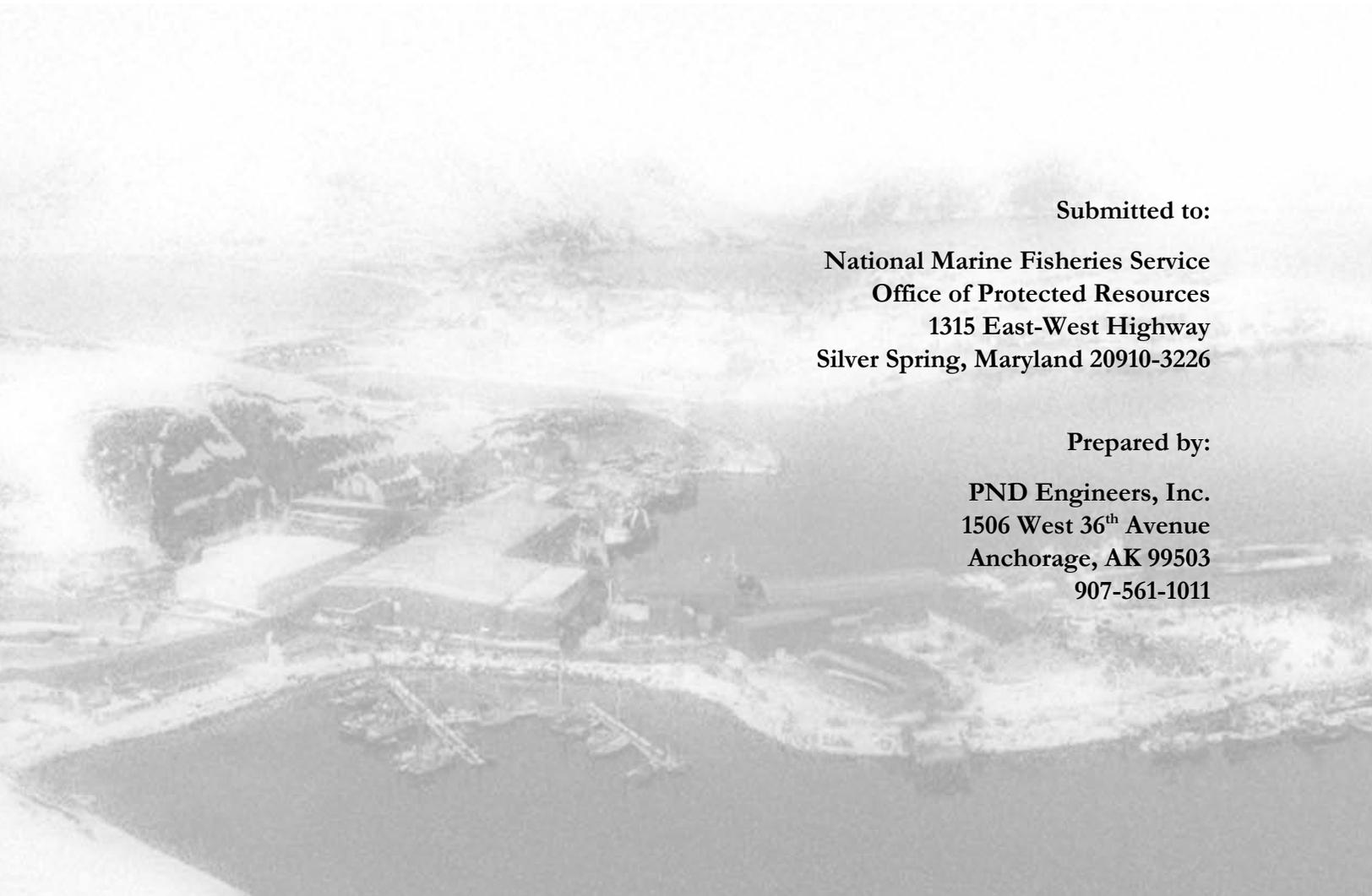
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## TABLE OF CONTENTS

SECTION	PAGE
1 Introduction.....	1
2 Project Description.....	1
3 Methods.....	3
3.1 Observer Qualifications.....	3
3.2 Data Collection .....	3
3.3 Equipment .....	4
3.4 Shutdown and Monitoring Zones.....	4
3.4.1 Shutdown Zones and Zone of Influence.....	4
3.4.2 Shutdown Zone (In-water construction activities not involving a pile driving hammer) .....	5
3.5 Observer Monitoring Locations.....	5
3.6 Proposed Monitoring Techniques .....	6
3.6.1 Visual Survey Protocol – Pre-Activity Monitoring.....	7
3.6.2 Visual Survey Protocol – During Activity Monitoring .....	8
3.6.3 Visual Survey Protocol – Post-Activity Monitoring.....	8
4 Interagency Notification.....	9
5 Reporting.....	9
5.1 Annual Report.....	9

## LIST OF TABLES

<b>Table 1.</b> Zones of Exclusion and Influence .....	7
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## LIST OF FIGURES

<b>Figure 1.</b> Project location.....	2
<b>Figure 2.</b> Observer monitoring locations. ....	6

## LIST OF APPENDICES

- Appendix A.** Marine Mammal Observation Record Forms
- Appendix B.** Zone of Influence and Zone of Exclusion Figures
- Appendix C.** Beaufort Sea Scale

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## 1 Introduction

The purpose of this marine mammal monitoring plan is to provide a protocol for marine mammal monitoring during the proposed UniSea, Inc. (UniSea) G1 Dock replacement project in Iliuliuk Harbor, Unalaska. This plan was developed to support the Incidental Harassment Authorization (IHA) document for MMPA permitting. The IHA document provides a more in-depth discussion on the calculations for the project.

A marine mammal monitoring program will be implemented at the start of construction and will follow the protocols outlined in the marine mammal monitoring plan. The primary goals of the monitoring program are:

- To monitor the proposed shutdown and monitoring zones (190, 160 and 120 dB), estimate the number of marine mammals exposed to the 190, 160 and 120 dB established thresholds, and document responses;
- To minimize impacts to the marine mammal species present in the project area by implementing mitigation measures including monitoring of the shutdown and monitoring zones, clearing the zones and shutdown procedures; and
- Collect data on the occurrence of marine mammal species in the project area and any impacts from the project.

## 2 Project Description

UniSea proposes to replace its existing G1 Dock located in Unalaska, which is currently partially condemned. As part of UniSea's only marine facility, the G1 dock plays an important role in the existing seafood processing facility in Iliuliuk Harbor, Unalaska. The UniSea processing facility has the capacity to process more than 2.5 million pounds of fish per day. The adjacent G2 facility is "one of the most efficient, highest volume Pollock processing facilities in the world" (AIRA, 2009).

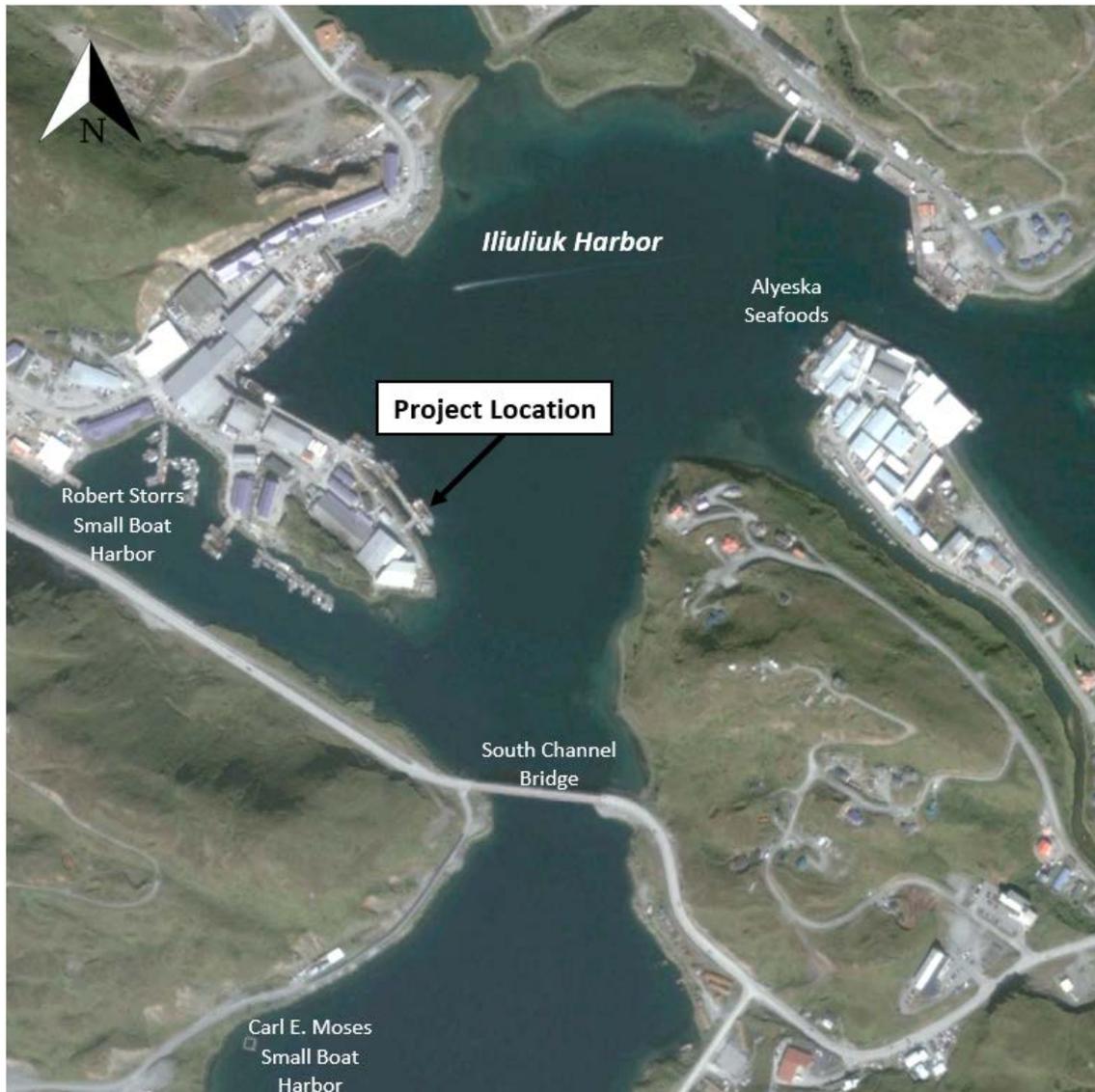
The proposed project will occur in marine waters that support several marine mammal species. The Marine Mammal Protection Act of 1972 (MMPA) prohibits the taking of marine mammals, which is defined as to "harass, hunt, capture or kill, or attempt to harass, hunt, capture or kill," except under certain situations. Section 101 (a) (5)(D) allows for the issuance of an Incidental Harassment Authorization (IHA), provided an activity results in negligible impacts to marine mammals and would not adversely affect subsistence use of these animals.

The project's timing along with the duration of pile removal and installation activities may result in marine mammals protected under the MMPA being exposed to sound levels above the Level B harassment threshold.

UniSea proposes to replace the existing G1 Dock with an 80 foot by 400 foot OPEN CELL SHEET PILE™ (OCSP™) dock. The OCSP dock will be constructed of PS31 flat sheet piles (web thickness of 0.5 inches and width between interlocks of 19.69 inches). In addition to replacing the existing pile-supported G1 Dock, the project would include installation of the following:

- Approximately fifty (50) 24-inch diameter fiber-reinforced polymer (FRP) composite fender piles;
- Approximately nine (9) 24-inch diameter steel support piles along the dock face and for crab brailer support;
- One (1) 24-inch diameter steel plug/closure pile to retain fill between the existing and new sheet pile cells at the north end of the project;

- Seawater intake sheet pile (PS31 flat sheet piles) structure approximately 90 foot by 85 foot, access ramp, and armor rock erosion protection (3,400 cubic yards of rock fill and 400 cubic yards of armor rock);
- Four (4) 50 foot steel catwalks with intermediate supports of two (2) 18-inch diameter steel piles each, four (4) piles total;
- Two (2) dolphins which include five (5) 24-inch diameter steel support piles each and two (2) 24-inch diameter steel fender pin piles each, fourteen (14) piles total.



*Figure 1. Project location.*

### 3 Methods

Land-based trained observers will be located on site before, during, and after in-water construction activity at sites appropriate for monitoring marine mammals within and approaching the shutdown and monitoring zones (Section 3.4).

During observation periods, observers will continuously scan the area for marine mammals using binoculars and the naked-eye during daylight hours. Observers will work a maximum of four consecutive hours followed by an observer rotation or a 30-minute break. 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 to the safety monitoring zones (Section 3.4). Observers will follow observer protocols, meet training requirements, fill out data forms, and report findings in accordance with protocols reviewed and approved by NMFS.

Observers will implement mitigation measures including monitoring of the proposed shutdown zone and zone of influence, clearing of the zones and shutdown procedures. They will be in continuous contact with the construction personnel via two-way radio. A cellular phone will be used as back-up communications and for safety purposes.

#### 3.1 Observer Qualifications

Monitoring will be conducted by qualified, trained marine mammal observers (hereafter, “observer”). In order for marine mammal 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. Experience and ability to conduct field observations and collect data according to assigned protocols;
3. Experience or training in the field identification of marine mammals, including the identification of behaviors, with ability to accurately identify marine mammals in Alaskan waters to species;
4. Sufficient training, orientation or experience with the construction operation to provide for personal safety during observations;
5. Writing skills sufficient to prepare a report of observations; and
6. Ability to communicate orally, by radio or in person, with project personnel to provide real-time information on marine mammals observed in the area as necessary.

#### 3.2 Data Collection

Observers will use a NMFS-approved Marine Mammal Sighting Form (Appendix A) which will be completed by each observer for each survey day. Marine Mammal Sighting Forms will be used by observers to record the following:

- Date and time that pile driving begins or ends;
- Construction activities occurring during each sighting;
- Weather parameters (*e.g.* percent cover, percent glare, visibility);
- Water conditions (*e.g.* Tidal state [incoming (flood), slack (neither direction), or outgoing (ebb)], and sea state). The Beaufort Sea State Scale (Appendix C) will be used to determine sea-state.
- Species, numbers, and if possible, sex and age class of marine mammals;

- Marine mammal behavior patterns observed, including bearing from observer and direction of travel. Note concurrent pile driving activity;
- Specific focus should be paid to behavioral reactions just prior to, or during, soft-start (impact pile driving) and shutdown procedures;
- Distance from pile driving activities to marine mammals and distance from the marine mammal to the observation point;
- Record of whether an observation required the implementation of shutdown procedures and the duration each shutdown.
- Locations of all marine mammal observations;
- 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 marine mammal monitoring:

- Hearing protection for observers within the airborne impact injury zone;
- Portable radios and headsets for the observers to communicate with the monitoring coordinator, construction contractor, and other observers;
- Access to phone (located in office), and the contact information for the other observers, monitoring coordinator, and NMFS point of contact;
- Green flags and red flags (one each, per observing location) as back-up for radio communication;
- Daily tide tables for the project area;
- Watch or Chronometer;
- Binoculars with built-in rangefinder or reticles – (quality 7 x 50 or better);
- Monitoring plan, IHA permit, and/or other relevant permit requirement specifications in sealed clear plastic cover;
- Notebook with pre-standardized monitoring Marine Mammal Observation Record forms on waterproof paper (e.g. Rite-in-the Rain);

### 3.4 Shutdown and Monitoring Zones

UniSea has established shutdown zones (zone of exclusion) to delineate areas in which marine mammals may be exposed to injurious underwater sound levels due to pile driving. Marine mammal monitoring will also occur in areas beyond the shutdown zone, called “zones of influence,” where sound pressure levels may cause harassment. The shutdown zone (zone of exclusion) and zone of influence are shown in Appendix B.

#### 3.4.1 Shutdown Zones and Zone of Influence

- During impact pile driving and vibratory pile driving/removal, the shutdown zone, or zone of exclusion, shall include all areas where the underwater SPLs are anticipated to equal the Level A (injury) harassment criteria for pinnipeds (190 dB isopleth). The shutdown zone encompasses a radius 10 meters around the pile being driven/removed.
- During impact pile driving, the zone of influence shall include all areas where the underwater SPLs are anticipated to equal or exceed the Level B harassment criteria for marine mammals during impact pile driving (160 dB isopleth).

- During vibratory pile driving and removal, the zone of influence shall include all areas where the underwater SPLs are anticipated to equal or exceed the Level B harassment criteria for marine mammals during vibratory pile driving (120 dB isopleth).
- The shutdown zone and zone of influence will be monitored throughout the time required to drive or remove a pile. If a marine mammal enters the zone of influence, an exposure will be recorded and animal behaviors documented. However, the pile segment would be completed without cessation, unless the animal approaches or enters the shutdown zone.
- If a marine mammal approaches or enters the shutdown zone, all pile driving/removal activities associated will immediately be halted.
- Under certain construction circumstances where initiating the shutdown and clearance procedures would result in an imminent concern for human safety, the shutdown provision may be waived at the discretion of the construction foreman. A pile may be deemed “dangerous” if the implementation of the shutdown procedures would: 1) constitute a significant hazard to the personnel installing/removing the pile, or 2) create a risk of the pile slipping from the cradle during shutdown procedures due to the angle of installation/removal. The construction foreman would be required to coordinate with the monitoring coordinator at the start of each construction day to identify in advance the piles which may meet these criteria. In the event that shutdown procedures were waived for any piles for reasons (1) or (2) above, UniSea would be notified on the same day of the event, and a written justification would be provided by the construction foreman documenting the necessity for waiving shutdown procedures.

#### 3.4.2 Shutdown Zone (In-water construction activities not involving a pile driving hammer)

- During in-water construction activities not involving a pile driver, but having the potential to affect marine mammals, in order to prevent injury to these species from their physical interaction with construction equipment, a shutdown zone of 10 meters (33 feet) will be monitored to ensure that marine mammals are not present in this zone.
- These activities could include, but are not limited to: (1) the positioning of the pile on the substrate via a crane (i.e., “stabbing” the pile), (2) the removal of the pile from the water column/substrate via a crane (i.e. “deadpull”), or (3) the placement of sound attenuation devices around the piles.

### 3.5 Observer Monitoring Locations

In order to effectively monitor the shutdown zone (zone of exclusion) and the zone of influence, marine mammal observers will be positioned at the best practicable vantage points, taking into consideration security, safety, and space limitations, in order to properly monitor these zones. Observers will be stationed at locations that provide adequate visual coverage for the marine mammal shutdown zone and zone of influence.

One observer will be placed at a suitable location near the G1 dock in order to observe the shutdown zone for vibratory and impact pile driving, as described in Section 3.4.1, Shutdown Zone and Zone of Influence. This observer’s monitoring will be primarily dedicated to observing the shutdown zone; however, this observer will also record all marine mammal sightings beyond the radius of the shutdown zone, provided it does not interfere with their effectiveness at carrying out the shutdown procedures. Additionally, one observer will be stationed on shore, and will be responsible for monitoring and recording data on any marine mammals that enter the zone of influence for vibratory and impact pile driving/removal activities, as described in detail in Section 3.4.1, Shutdown Zone and Zone of Influence.

Potential observation locations are depicted below in Figure 2.



*Figure 2. Observer monitoring locations.*

### 3.6 Proposed Monitoring Techniques

The proposed zones of exclusion (shutdown zone) and zones of influence (Table 1) were calculated using data from the Naval Base Kitsap at Bangor Trident Support Facility Explosive Handling Wharf (EHW-2)

Project (Illingworth and Rodkin, 2013) and the practical spreading loss equation. The observers will monitor the zone of exclusion (190 dB) and the zones of influence (160 dB and 120 dB) for the presence of pinnipeds (i.e., Steller sea lions or harbor seals). If pinnipeds are observed approaching or within the zone of exclusion, shutdown procedures (Section 3.4) will be implemented to prevent a Level A exposure. If pinnipeds are observed within the zones of influence, the sighting will be documented as a Level B exposure and reported to NMFS in the monthly reports for NMFS determination. If the number of Steller sea lion or harbor seal exposures approach the number of takes allowed by the IHA, UniSea will notify NMFS and seek further consultation. If any marine mammal species is encountered that is not authorized by the IHA and is likely to be exposed to sound pressure levels greater than or equal to the zones of influence (inside Iliuliuk Harbor), then UniSea will shut down in-water activity to avoid take of those species. Work will continue when the animal has voluntarily left the harbor.

*Table 1. Zones of Exclusion and Influence*

Source	Zone of Exclusion (m)	Zone of Influence (m) *
Underwater		
Vibratory Pile Installation	10	10,000
Vibratory Pile Removal	10	7,400
Impact Pile Installation	10	500
Drilling for Pile Installation	10	10
Airborne		
All Pile Removal/Installation	N/A	30

\* *Zones of Influence adjusted for land features (figures in Appendix B).*

### 3.6.1 Visual Survey Protocol – Pre-Activity Monitoring

- Prior to the start of pile driving/removal or other in-water construction activities, the shutdown zone will be monitored for 15 minutes to ensure that there are no marine mammals present. The following survey methodology will be implemented prior to commencing pile installation/removal or other in-water construction activities:
- Observers will survey the shutdown zone and zone of influence. They will ensure that no marine mammals are seen within the shutdown zone before pile-driving/removal or other in-water construction activities begin.
- If marine mammal(s) are present within or approaching the shutdown zone prior to pile driving/removal or other in-water construction activities, the survey will continue and the start of these activities will be delayed until the animal(s) leave the shutdown zone voluntarily and have been visually confirmed beyond the shutdown zone, or 15 minutes has elapsed without re-detection of the animal in the shutdown zone.
- If marine mammal(s) are not detected within the shutdown zone (i.e. the zone is deemed clear of marine mammals), the observers will raise a green flag and radio the monitoring coordinator/construction contractor that pile driving/removal or other in-water construction activities can commence.

- If marine mammal(s) are present within the zone of influence, pile driving/removal or other in-water construction activities would not need to be delayed, but observers would monitor and document, to the extent practical, the behavior of marine mammals that remain in the zone of influence.
- Marine Mammal Observation Record forms (Appendix A) will be used to document observations.
- Observers will use binoculars and the naked eye to search continuously for marine mammals.
- In case of fog or reduced visibility, observers must be able to see the entire shutdown zone, or pile driving/removal will not be initiated until visibility in these zones improves to acceptable levels.

### 3.6.2 Visual Survey Protocol – During Activity Monitoring

The shutdown zone and zone of influence will be monitored throughout the time required to install or remove a pile (including soft start procedures), or complete other in-water construction as described in Section 3.4.1. The following survey methodology will be implemented during pile driving/removal and other in-water construction activities:

- If a marine mammal is observed within or entering the zone of influence during pile driving/removal an exposure would be recorded and behaviors documented. However, that pile segment would be completed without cessation, unless the animal approaches or enters the shutdown zone
- If an animal approaches or enters the shutdown zone:
  1. All pile installation/removal activities and other in-water construction activities will be halted.
  2. The observers shall immediately radio to alert the monitoring coordinator/construction contractor and raise a red flag.
  3. This action will require an immediate “all-stop” on pile operations.
- Under certain construction circumstances where initiating the shutdown and clearance procedures would result in an imminent concern for human safety the shutdown provision may be waived (see Section 3.4.1 for additional details).
- In the event of a shutdown, construction activities may resume only when the animal that was within, or was approaching, the shutdown zone has voluntarily left the shutdown zone and has been visually confirmed beyond the shutdown zone, or 15 minutes have passed without re-detection of the animal, and the zone is deemed clear of marine mammals. Observers will then raise a green flag and radio the monitoring coordinator/construction contractor that activities can re-commence;
- During an in-water construction delay, surveys will continue to be conducted.
- If marine mammals are detected outside the shutdown zone, the observers will continue to monitor these individuals and record their behavior, but pile driving and other in-water construction may proceed. Any marine mammals detected outside the shutdown zone after pile driving or other in-water construction activities are initiated shall likewise continue to be monitored and their behaviors recorded.
- Marine Mammal Observation Record forms (Appendix A) will be used to document observations.
- Observers will use binoculars and the naked eye to search continuously for marine mammals.
- In case of fog or reduced visibility, observers must be able to see the entire shutdown zone or pile driving/removal and in-water construction activities will not be initiated until visibility in the zone improves to acceptable levels.

### 3.6.3 Visual Survey Protocol – Post-Activity Monitoring

Monitoring of the shutdown and buffer zones will continue for 30 minutes following completion of pile installation activities. A post-monitoring period is not required for other in-water construction. These surveys

will record marine mammal observations, and will focus on observing and reporting unusual or abnormal behavior of marine mammals. Marine Mammal Observation Record forms (Appendix A) will be used to document observations. In general, the same protocols described in section 3.6.2 (Visual Survey Protocol – During Activity Monitoring) would apply. During these surveys, if any injured, sick, or dead marine mammals are observed procedures outlined in Section 4 should be following regarding notifying the appropriate authorities.

## 4 Interagency Notification

In the event that UniSea needs to modify terms of this monitoring plan, the NMFS representative will be promptly contacted for discussion of the requested modification. In addition, if UniSea finds an injured, sick, or dead marine mammal, UniSea will notify NMFS immediately. All of these marine mammal sightings will be called into the NMFS Stranding Hotline (1-800-853-1964) unless the marine mammal's condition is a direct result of the project, in which case additional notification should be made to Jordan Carduner (NMFS HQ) (301) 427-8483. UniSea will provide NMFS with the species or description of the animal(s), the condition of the animal (including carcass condition if the animal is dead), location, the date and time of first discovery, observed behaviors (if alive), and photo or video (if available).

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 animal, the finder (i.e. marine mammal observer) has the responsibility to ensure that evidence associated with the specimen is not unnecessarily disturbed.

## 5 Reporting

### 5.1 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, tidal 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 (impact only) 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)

- Detailed description of the sound attenuation system, including design specifications. Details of any issues associated with bubble curtain deployment or any functional checks conducted on the system should be recorded on a daily or per pile basis.
- Pre-activity observational survey-specific data:
  - Dates 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 animal 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 animal 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 animal 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 Forms

# MARINE MAMMAL OBSERVATION RECORD FORM

Project Name: \_\_\_\_\_

Monitoring Location: \_\_\_\_\_

Page \_\_\_\_\_ of \_\_\_\_\_

Date: \_\_\_\_\_

(Dock Location, Land Location, other)

Time Effort Initiated: \_\_\_\_\_

Time Effort Completed: \_\_\_\_\_

## SIGHTING DATA

Event Code	Sighting Number (1 or 1.1 if resight)	Time/Duration watching sighting (Start/End time if continuous)	WP # (every time a sighting is made)	Observer	Sighting Cue	Species	Dist/Dir to Animal (from Observer)	Dist to Pile between animal & pile)	# of Animals Group Size (min/max/best)	Relative Motion/and Behavior Code (see code sheet)	Const Type During Sighting	Mitigation used during sighting? (Y/N)	Mitigation Type?	Visibility	% Glare	Weather Condition	Sea State and Wave Ht	Swell Direction	Behavior Change/ Response to Activity/Comments
		: :					m or km	m or km		opening closing parallel none Behavior code:	PRE POST SSV SSI V I PC DP ST NONE		DE  SD	B P M G E			Light Mod Heavy	N or S W or E	
		: :					m or km	m or km		opening closing parallel none Behavior code:	PRE POST SSV SSI V I PC DP ST NONE		DE  SD	B P M G E			Light Mod Heavy	N or S W or E	
		: :					m or km	m or km		opening closing parallel none Behavior code:	PRE POST SSV SSI V I PC DP ST NONE		DE  SD	B P M G E			Light Mod Heavy	N or S W or E	
		: :					m or km	m or km		opening closing parallel none Behavior code:	PRE POST SSV SSI V I PC DP ST NONE		DE  SD	B P M G E			Light Mod Heavy	N or S W or E	
		: :					m or km	m or km		opening closing parallel none Behavior code:	PRE POST SSV SSI V I PC DP ST NONE		DE  SD	B P M G E			Light Mod Heavy	N or S W or E	
		: :					m or km	m or km		opening closing parallel none Behavior code:	PRE POST SSV SSI V I PC DP ST NONE		DE  SD	B P M G E			Light Mod Heavy	N or S W or E	
		: :					m or km	m or km		opening closing parallel none Behavior code:	PRE POST SSV SSI V I PC DP ST NONE		DE  SD	B P M G E			Light Mod Heavy	N or S W or E	
		: :					m or km	m or km		opening closing parallel none Behavior code:	PRE POST SSV SSI V I PC DP ST NONE		DE  SD	B P M G E			Light Mod Heavy	N or S W or E	

Sighting #=chronological number of sightings, If resight of same animal, then 1.1, 1.2, etc. WP (Waypoint)=GPS recording of lat/long, time/date stamp. Critical for vessel observers.

## Marine Mammal Observation Record – Sighting Codes

### 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 progress in a direction. Note general direction of travel when last seen [Example: "SW (N)" for swimming north]
TR	Traveling	Traveling in an obvious direction. Note direction of travel when last seen [Example: "TR (N)" for traveling north]
UN	Unknown	Behavior of animal undetermined, does not fit into another behavior
<b>Pinniped only</b>		
EW	Enter Water (from haul out )	Enters water from a haul-out for no obvious reason
FL	Flush (from haul out )	Enters water in response to disturbance
HO	Haul out (from water)	Hauls out on land
RE	Resting	Resting onshore or on surface of water
LO	Look	Is upright in water "looking" in several directions 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.
<b>Cetacean only</b>		
LG	Logging	Resting on surface of water with no obvious signs of movement

### Marine Mammal Species

Code	Marine Mammal Species
HSEA	Harbor Seal
STSL	Steller Sea Lion
OTHR	Other

**Event**

<b>Code</b>	<b>Activity Type</b>
E ON	Effort On
E OFF	Effort Off
PRE	Pre Watch
POST	Post Watch
SSI	Soft start-impact
WC	Weather Condition/Change
S	Sighting
M-DE	Mitigation Delay
M-SD	Mitigation Shutdown

**Construction Type**

<b>Code</b>	<b>Activity Type</b>
SSI	Soft Start (Impact)
V	Vibratory Pile Driving (installation and extraction)
I	Impact Pile Driving
DP	Dead pull
ST	Stabbing
DR	Drilling
NONE	No Pile Driving
OTH	Other

**Mitigation Codes**

<b>Code</b>	<b>Activity Type</b>
DE	Delay onset of Pile Driving
SD	Shut down Pile Driving

### Visibility

Code	Distance Visible
B	Bad (<0.5km)
P	Poor (0.5 – 1.5km)
M	Moderate (1.5 – 10km)
G	Good (10 - 15km)
E	Excellent (>15km)

### Weather Conditions

Code	Weather Condition
S	Sunny
PC	Partly Cloudy
L	Light Rain
R	Steady Rain
F	Fog
OC	Overcast

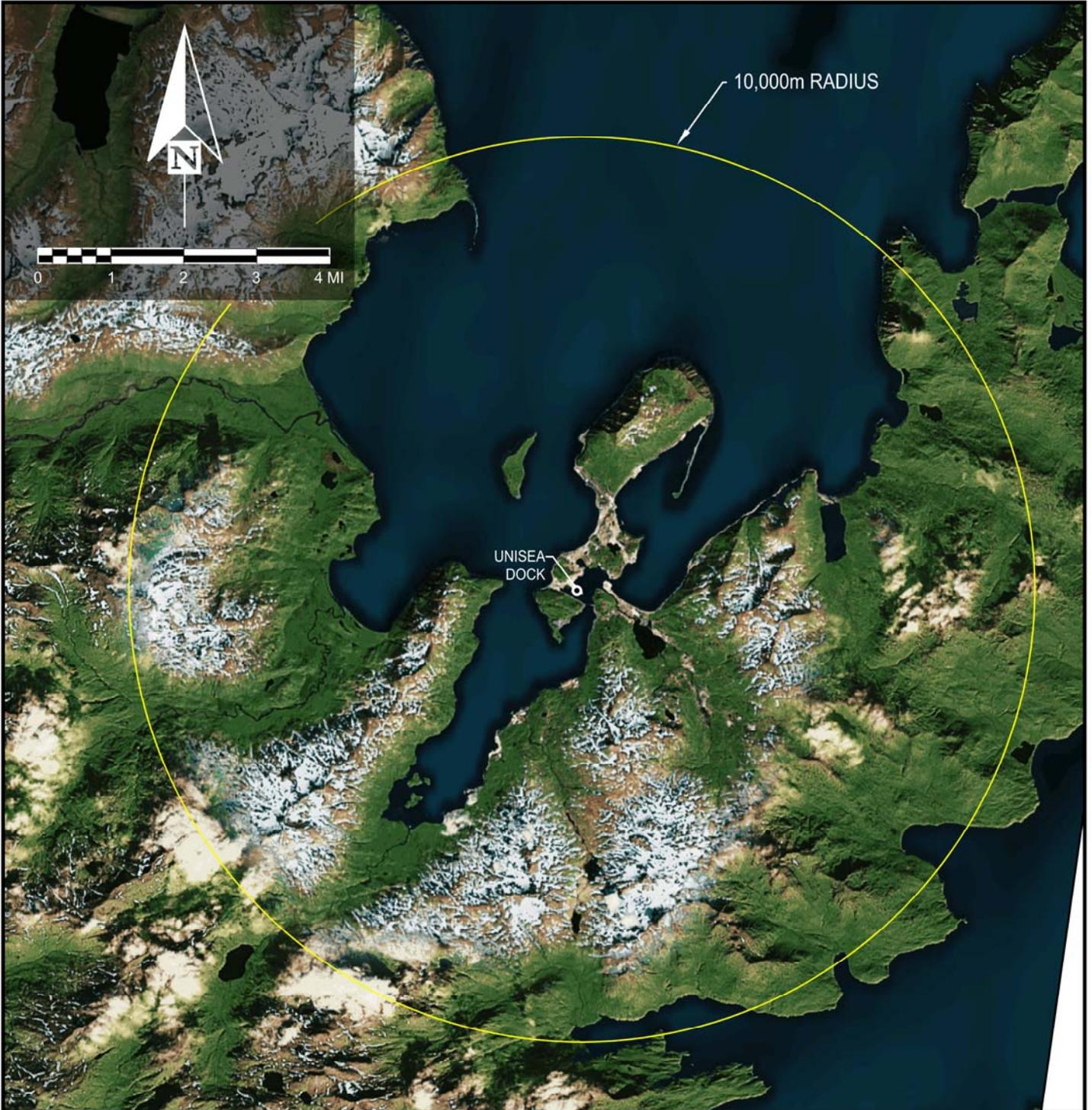
**Glare:** Percent glare should be the total glare of observers' area of responsibility. Determine if observer coverage is covering 90 degrees or 180 degrees and document daily. Then assess total glare for that area. This will provide needed information on what percentage of the field of view was poor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

**Sea State and Wave Height:** 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.

Code	Wave Height
Light	0 – 3 ft
Moderate	4 – 6 ft
Heavy	>6 ft

**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.

## **Appendix B.** Zone of Exclusion and Zone of Influence Figures



PURPOSE:  
REPLACE EXISTING DOCK

DATUM: 0' MLLW

PROJECT LOCATION:  
LAT: 53.8776° LONG: 166.5491°  
SEC. 3 & 10, T73S, R118W, S.M.

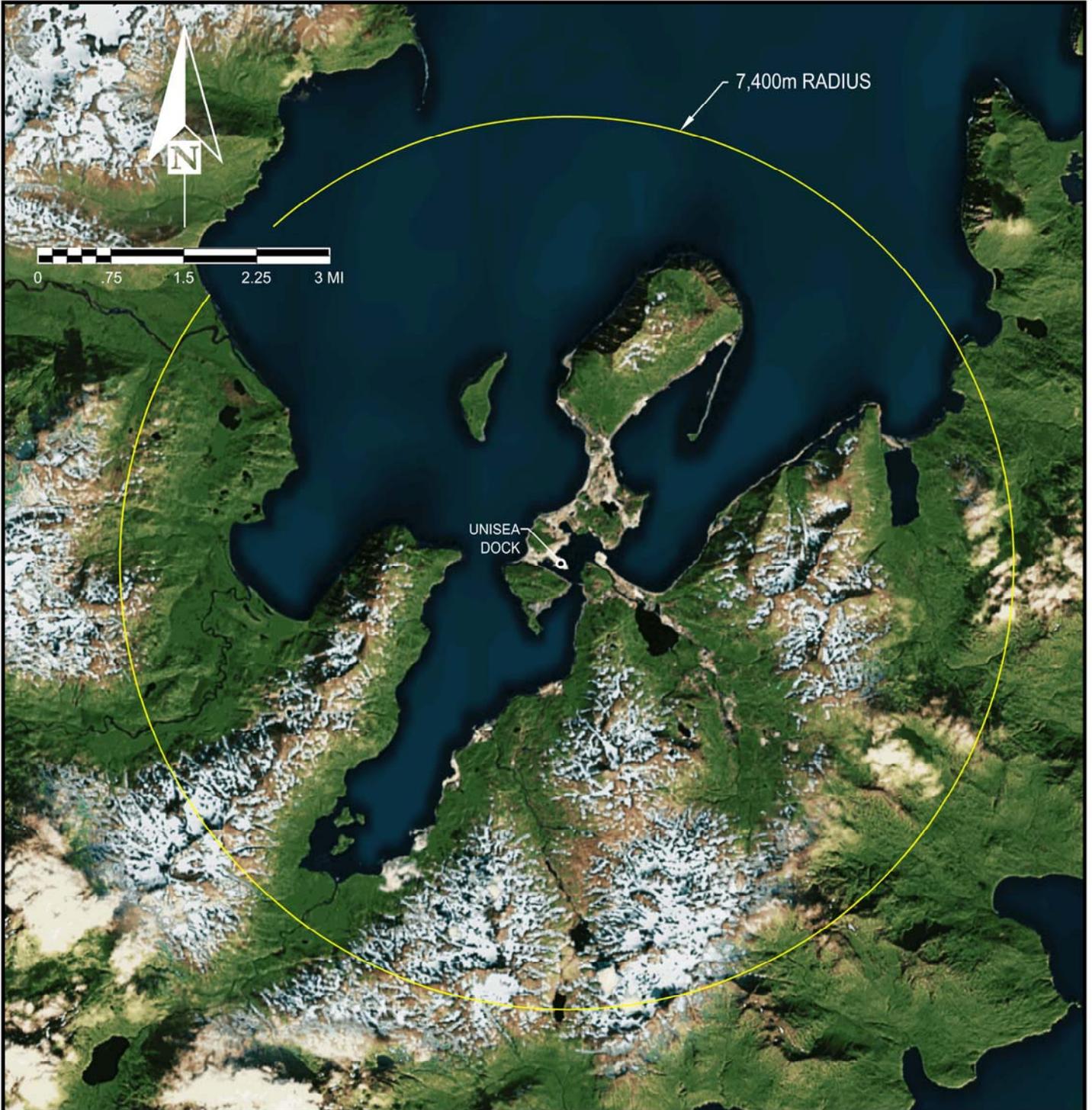
**ZONE OF INFLUENCE  
VIBRATORY DRIVING**

UNISEA, INC.  
88 SALMON WAY  
DUTCH HARBOR, AK  
99692

**UNISEA DOCK  
ILIULIUK HARBOR**  
POA-1988-735-M

AT: UNALASKA  
IN: ILIULIUK HARBOR

MAY 2015 SHEET **1** of **1**



PURPOSE:  
REPLACE EXISTING DOCK

DATUM: 0' MLLW

PROJECT LOCATION:  
LAT: 53.8776° LONG: 166.5491°  
SEC. 3 & 10, T73S, R118W, S.M.

**ZONE OF INFLUENCE  
VIBRATORY REMOVAL**

UNISEA, INC.  
88 SALMON WAY  
DUTCH HARBOR, AK  
99692

**UNISEA DOCK  
ILIULIUK HARBOR**  
POA-1988-735-M

AT: UNALASKA  
IN: ILIULIUK HARBOR

MAY 2015 SHEET **1** of **1**



PURPOSE:  
REPLACE EXISTING DOCK

DATUM: 0' MLLW

PROJECT LOCATION:  
LAT: 53.8776° LONG: 166.5491°  
SEC. 3 & 10, T73S, R118W, S.M.

**ZONE OF INFLUENCE  
VIBRATORY DRIVING  
AND REMOVAL**

UNISEA, INC.  
88 SALMON WAY  
DUTCH HARBOR, AK  
99692

**UNISEA DOCK  
ILIULIUK HARBOR**  
POA-1988-735-M

AT: UNALASKA  
IN: ILIULIUK HARBOR

MAY 2015 SHEET **1** of **1**



PURPOSE:  
REPLACE EXISTING DOCK

DATUM: 0' MLLW

PROJECT LOCATION:  
LAT: 53.8776° LONG: 166.5491°  
SEC. 3 & 10, T73S, R118W, S.M.

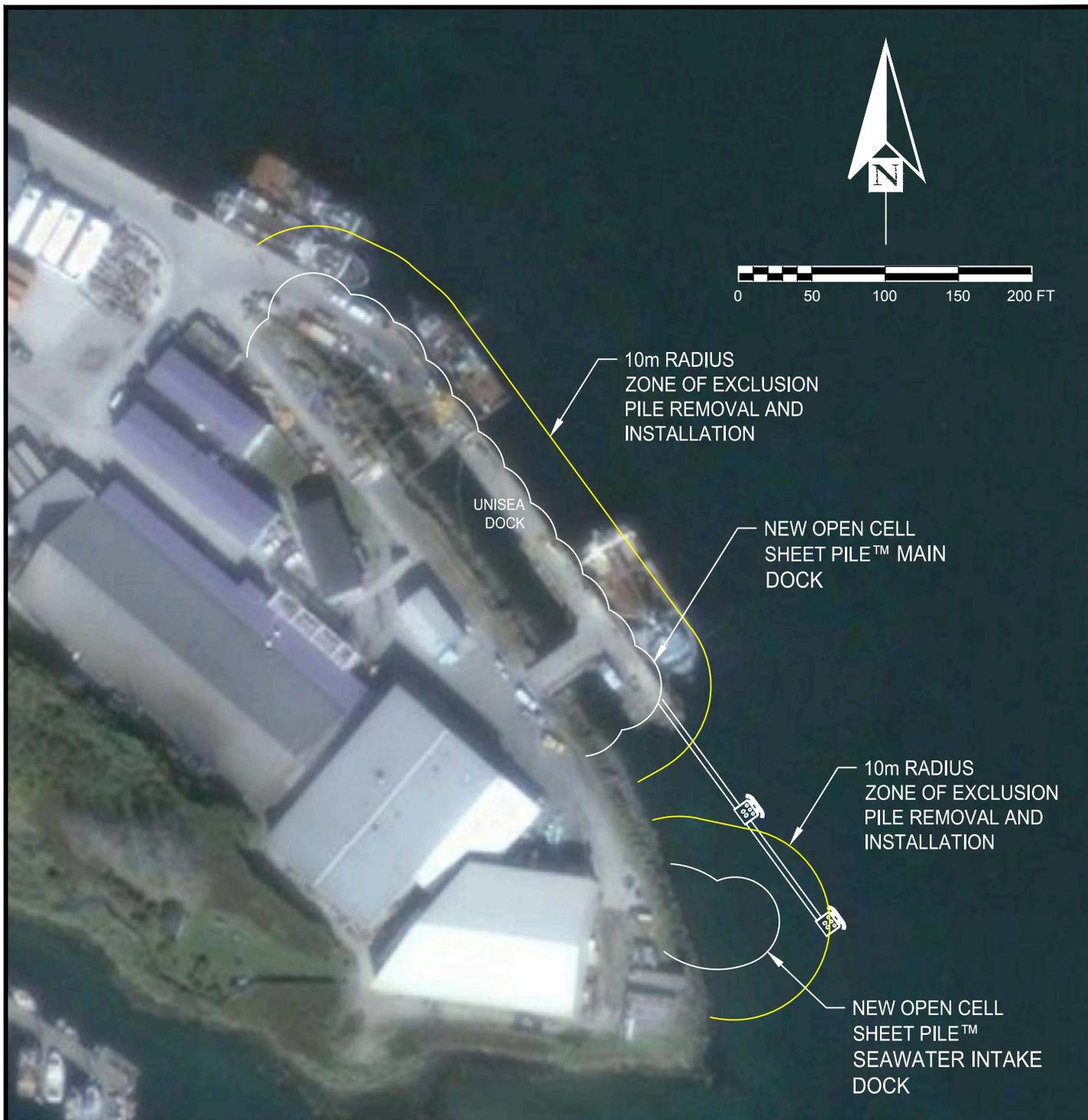
**ZONE OF INFLUENCE  
IMPACT DRIVING**

UNISEA, INC.  
88 SALMON WAY  
DUTCH HARBOR, AK  
99692

**UNISEA DOCK  
ILIULIUK HARBOR**  
POA-1988-735-M

AT: UNALASKA  
IN: ILIULIUK HARBOR

SEPT 2015 SHEET **1** of **1**



PURPOSE:  
REPLACE EXISTING DOCK

DATUM: 0' MLLW

PROJECT LOCATION:  
LAT: 53.8776° LONG: 166.5491°  
SEC. 3 & 10, T73S, R118W, S.M.

**ZONE OF EXCLUSION  
PILE REMOVAL AND  
INSTALLATION**

UNISEA, INC.  
88 SALMON WAY  
DUTCH HARBOR, AK  
99692

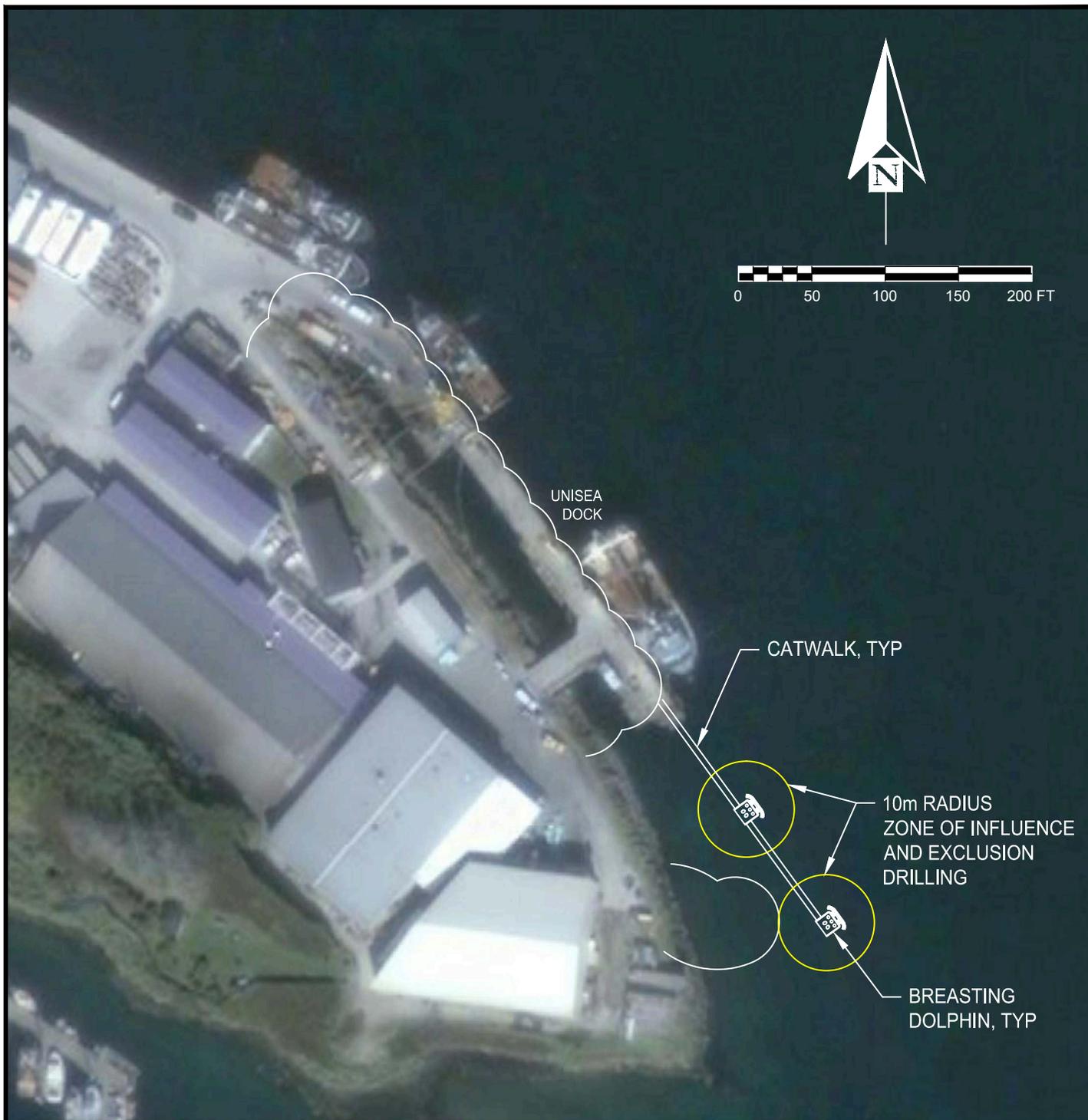
**UNISEA DOCK  
ILIULIUK HARBOR**

POA-1988-735-M

AT: UNALASKA  
IN: ILIULIUK HARBOR

MAY 2015

SHEET **1** of **1**



PURPOSE:  
REPLACE EXISTING DOCK

DATUM: 0' MLLW

PROJECT LOCATION:  
LAT: 53.8776° LONG: 166.5491°  
SEC. 3 & 10, T73S, R118W, S.M.

**ZONE OF INFLUENCE  
AND EXCLUSION  
DRILLING**

UNISEA, INC.  
88 SALMON WAY  
DUTCH HARBOR, AK  
99692

**UNISEA DOCK  
ILIULIUK HARBOR**

POA-1988-735-M

AT: UNALASKA  
IN: ILIULIUK HARBOR

MAY 2015

SHEET **1** of **1**

## **Appendix C.** Beaufort Sea Scale

## BEAUFORT SEA STATE SCALE

Beaufort Number (Force)	Wind Velocity (Knots)	Wind Description	Sea Conditions	Height of Waves (Feet)	Photos indicating Beaufort Sea State
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, crests glassy, no breaking	1-2	

Beaufort Number (Force)	Wind Velocity (Knots)	Wind Description	Sea Conditions	Height of Waves (Feet)	Photos indicating Beaufort Sea State
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	

Beaufort Number (Force)	Wind Velocity (Knots)	Wind Description	Sea Conditions	Height of Waves (Feet)	Photos indicating Beaufort Sea State
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 in streaks	18-25	

Beaufort Number (Force)	Wind Velocity (Knots)	Wind Description	Sea Conditions	Height of Waves (Feet)	Photos indicating Beaufort Sea State
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	

Beaufort Number (Force)	Wind Velocity (Knots)	Wind Description	Sea Conditions	Height of Waves (Feet)	Photos indicating Beaufort Sea State
12	64+	Hurricane	Air filled with foam, sea completely white with driving spray, visibility greatly reduced	45+	

