Explosives Handling Wharf

2023-2024 Pile Replacement Projects

Marine Mammal Monitoring Plan

Marine Structure Maintenance and Pile Replacement Program

Navy Region Northwest

Silverdale, WA

April 2023

Naval Facilities Engineering Command Northwest

1101 Tautog Circle

Silverdale, WA 98315

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1 INTRODUCTION

The U.S. Department of the Navy (Navy) is conducting maintenance, pile replacement, and repair activities at marine waterfront structures over a 5-year period at six installations within Navy Region Northwest (Region). These installations, which are located in the Puget Sound region of Washington State, include: Naval Base (NAVBASE) Kitsap Bangor, NAVBASE Kitsap Bremerton, NAVBASE Kitsap Keyport, NAVBASE Kitsap Manchester, Zelatched Point, and Naval Station (NAVSTA) Everett. The specific installation location addressed in this plan is NAVBASE Kitsap Bangor. During the 2023-2024 in water work season, the Navy will be conducting a pile replacement project at NAVBASE Kitsap Bangor Explosives Handling Wharf 1 (EHW 1).

This project will consist of removing twenty-two (22) 18 – 24 inch concrete piles by cutting them at the mudline and four (4) 12 inch steel guide piles vibratory extraction. The piles will be replaced with eight (8) 30 inch diameter steel piles will be installed and four (4) new 12 inch diameter steel guide piles. The piles would be installed with a vibratory hammer until they are within five feet of final tip elevation and then would be impact driven to the final depth. A bubble curtain or other noise attenuation device shall be employed during impact installation of steel piles where water depths are greater than 0.67 meters (2 feet).

This monitoring plan has been developed to ensure compliance with the Letter of Authorization issued for this project by the National Marine Fisheries Service. The purpose of this plan is to provide a protocol for marine mammal monitoring that will occur during in-water construction scheduled to occur between July 16, 2023 and January 15, 2024. Visual marine mammal monitoring will be conducted before, during, and after pile driving activities where noise levels may behaviorally disturb marine mammals. Noise levels from pile driving were determined to exceed the behavioral and injury thresholds for marine mammals, and a zone surrounding piles being installed will be visually monitored and pile driving will be shut-down if marine mammals are in the injury zone. This measure will preclude physical harm to marine mammals.

The LOA also requires hydroacoustic monitoring when three or more steel piles are to be impact driven. Given the limited pile driving during the EHW1 project and the large amount of acoustic data from previous projects at the Bangor waterfront, the Navy has requested NMFS waive the requirement for acoustic monitoring during this project.

2 METHODS

2.1 Observer Qualifications

Monitoring will be conducted by qualified, trained marine mammal observers (hereafter, “observer”). An observer is a biologist with prior training and experience in conducting marine mammal monitoring or surveys, and who has the ability to identify marine mammal species and describe relevant behaviors that may occur in proximity to in-water construction activities. A trained observer will be placed at the best vantage point(s) practicable (e.g., from a small boat, the pile driving barge, on shore, or any other suitable location) to monitor for marine mammals and implement shutdown/delay procedures when applicable by calling for the shutdown to the hammer operator. The observers will have no other construction related tasks while conducting monitoring.

A dedicated monitoring coordinator will be on-site during all construction days. The monitoring coordinator will oversee marine mammal observers. The monitoring coordinator will serve as the liaison between the marine mammal monitoring staff and the construction contractor to assist in the distribution of information.

2.2 Data Collection

Observers will use a National Marine Fisheries Service (NMFS)-approved Marine Mammal Observation Record Form (Appendix A) which will be completed by each observer for each survey day.

- Name of Observer.
- 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 B) 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. If possible, include the correlation to sound pressure levels for context.
- Distance from pile driving activities to marine mammals and distance from the marine mammal to the observation point
- Locations of all marine mammal observations
- Other human activity in the area. Record the hull numbers of fishing vessels if possible.

The monitoring coordinator will complete a Marine Mammal Observation Record Form (Appendix A) for each day of monitoring. The summary form compiles information collected on the individual sighting forms and provides additional details about construction activities during marine mammal monitoring. The summary form will be provided to the Navy each day following monitoring.

2.3 Equipment

The following equipment will be required to conduct marine mammal monitoring:

- A survey boat will include the following minimum equipment: a means to keep electrical equipment dry, a fixed marine radio for the Captain to communicate on marine channels independent of observers communicating on a dedicated channel, depth finder, measuring tape, and GPS units that track the constant movement of the vessel. Vessels will comply with all Coast Guard regulations and be able to pass a Coast Guard safety inspection.
- Hearing protection for biologists and boat operators working near heavy construction equipment
- At a minimum, portable marine radios with extra batteries and headsets for the observers to communicate with the monitoring coordinator, construction contractor, and other observer(s). Red and green flags can be added as back-up or in addition to the radios.
- Cellular phones and the contact information for the other observer(s), monitoring coordinator, and Navy point of contact.
- Nautical charts

- Daily tide tables for the project area
- Watch or Chronometer
- Binoculars (quality 7 x 50 or better, can have built-in rangefinders or reticles) and/or rangefinders
- 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 non-bleeding paper (e.g., Rite-in-the-Rain)
- Marine mammal identification guides on waterproof paper
- Clipboard
- Pen/Pencil

2.4 Pile Driving Visual Monitoring and Shutdown Zones

During all pile driving, the Navy will visually monitor Injury and Behavioral Disturbance Zones as follows:

- An **Injury Monitoring Zone** shall be established and monitored to prevent injury to marine mammals from noise due to impact pile driving steel and physical interaction with construction equipment.
- During pile driving, a **Behavioral Disturbance Monitoring Zone** will be established that will encompass as much of the Behavioral Disturbance Zone (i.e., for impact driving, the zone where underwater sound pressure levels are estimated to be at or above 160 dB re 1 µPa and for vibratory driving, the zone where vibratory pile driving noise levels are estimated to be at or above 120 dB RMS) that can be practicably monitored from observer positions described in Section 2.5.

During all pile driving, the Navy will establish Shutdown Zones as follows:

- A **Shutdown Zone for cetaceans (harbor porpoise, humpback whale, and transient killer whale)** will include the Injury Zone and the portion of the Behavioral Disturbance Zone that can be practicably monitored from observer positions described in Section 2.5. If a cetacean approaches or enters the Shutdown Zone, pile driving will cease.
    - During impact installation of **30 inch steel piles** at **EHW 1**, the shutdown zone for harbor porpoise and transient killer whale will extend to a radius of 631 meters and will extend to a radius of 740 meters for humpback whale (Table 1).
    - During impact installation of **12 inch steel piles** at the **EHW 1,** the shutdown zone for harbor porpoise, humpback and transient killer whale will extend to a radius of 400 m (Table 3).
    - During all vibratory pile driving, the Shutdown Zone for all cetaceans will include the injury zone. Additionally, pile driving will also cease for any cetaceans detected within the behavioral zone (Table 2 and 4).
- A **Shutdown Zone for pinnipeds (harbor seals and sea lions)** will include the Injury Zone. If a pinniped enters the Shutdown Zone, pile driving will cease, but if it enters only the Behavioral Disturbance Zone, a take would be recorded and behaviors documented. That pile would be completed without cessation, unless the animal approaches or enters the Shutdown Zone, at which point all pile driving activities will be halted.

  - During impact installation of **30-inch steel piles** at **EHW 1**, the Shutdown Zone radius for harbor seals is 160 meters and 10 meters for sea lions (Table 1). For vibratory pile driving, the radius of the Shutdown Zone is 20 meters for harbor seals and 10 meters for sea lions (Table 2).
  - During impact installation of **12 inch steel piles** at EHW 1, the Shutdown Zone radius for harbor seals is 25 meters and 10 meters for sea lions (Table 3). For vibratory pile driving, the radius of the Shutdown Zone is 10 meters for both harbor seals and sea lions (Table 4).
- If marine mammals are seen outside the Behavioral Disturbance Zone, these animals will also be recorded (not as a take) and their location identified.
- Distances for all monitoring zones are provided in Table 1, 2, 3, and 4 below.

Table 1. NAVBASE Kitsap Bangor EHW 1 Monitoring and Shutdown Zones Distances during Impact Driving of 30-inch Steel Piles

Marine Mammal Group	*Behavior Threshold*	*Monitoring Zone*	*Injury Threshold*	*Shutdown Zone*
HF Cetaceans: Harbor Porpoise	**631 meters**	**740 meters**	**541 meters**	**631 meters**
LF Cetaceans: Humpback			**736 meters**	**740 meters**
MF Cetaceans: Transient killer whale			**10 meters**	**631 meters**
Harbor Seal			**158 meters**	**160 meters**
Sea Lions			**9 meters**	**10 meters**

Table 2. NAVBASE Kitsap Bangor EHW 1 Monitoring and Shutdown Zones Distances during Vibratory Driving of 30-inch Steel Piles

Marine Mammal Group	*Behavior Threshold*	*Monitoring Zone*	*Injury Threshold*	*Shutdown Zone*[1]
HF Cetaceans: Harbor Porpoise	**11,700 meters**	[1]	**37 meters**	**minimum 40 meters**
LF Cetaceans: Humpback			**25 meters**	
MF Cetaceans: Transient killer whale			**2 meters**	
Harbor Seal			**15 meters**	**20 meters**
Sea Lions			**11 meters**	**10 meters**

[1] The shutdown encompasses the injury zone. Additionally, a Behavioral Disturbance Monitoring Zone will be established that will encompass as much of the Behavioral Disturbance Zone that can be practicably monitored from observer positions described in Section 2.5. All pile driving shall cease should any cetaceans be detected within the behavioral disturbance zone.

Table 3. NAVBASE Kitsap Bangor EHW 1 Monitoring and Shutdown Zones Distances during Impact Driving of 12-inch Steel Piles

Marine Mammal Group	*Behavior Threshold*	*Monitoring Zone*	*Injury Threshold*	*Shutdown Zone*
HF Cetaceans: Harbor Porpoise	**398 meters**	**400 meters**	**185 meters**	**400 meters**
LF Cetaceans: Humpback			**136 meters**	
MF Cetaceans: Transient killer whale			**3 meters**	
Harbor Seal			**25 meters**	**25 meters**
Sea Lions			**1.4 meters**	**10 meters**

Table 4. NAVBASE Kitsap Bangor EHW 1 Monitoring and Shutdown Zones Distances during Vibratory Driving of 12-inch Steel Piles

Marine Mammal Group	*Behavior Threshold*	*Monitoring Zone*	*Injury Threshold*	*Shutdown Zone*[1]
HF Cetaceans: Harbor Porpoise	**2,200 meters**	[1]	**3 meters**	**minimum 20 meters**
LF Cetaceans: Humpback			**2 meters**	
MF Cetaceans: Transient killer whale			**<1 meters**	
Harbor Seal			**1 meters**	**10 meters**
Sea Lions			**<1 meters**	

[1] The shutdown encompasses the injury zone. Additionally, a Behavioral Disturbance Monitoring Zone will be established that will encompass as much of the Behavioral Disturbance Zone that can be practicably monitored from observer positions described in Section 2.5. All pile driving shall cease should any cetaceans be detected within the behavioral disturbance zone.

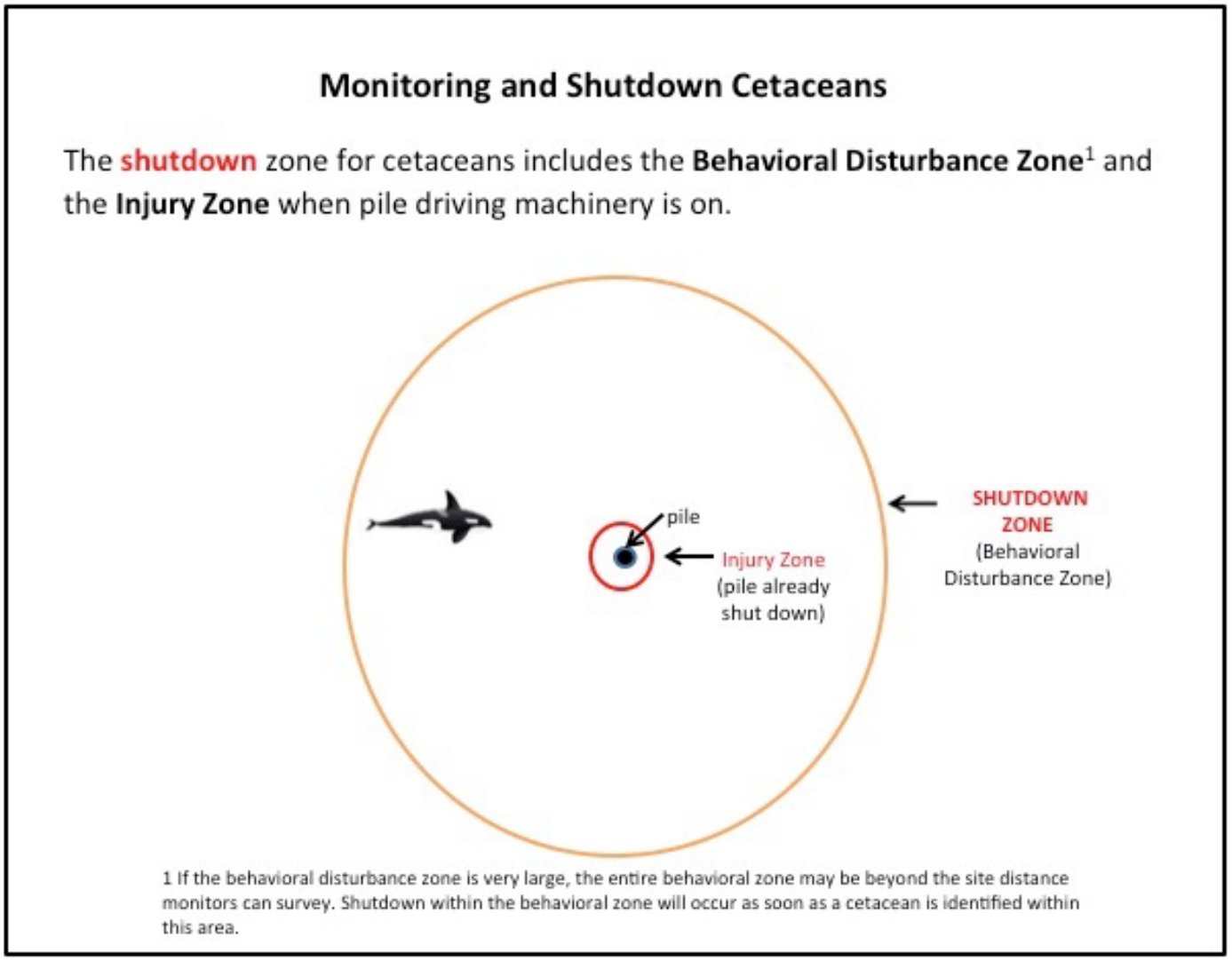

Figure 1. Monitoring and Shutdown for Cetaceans

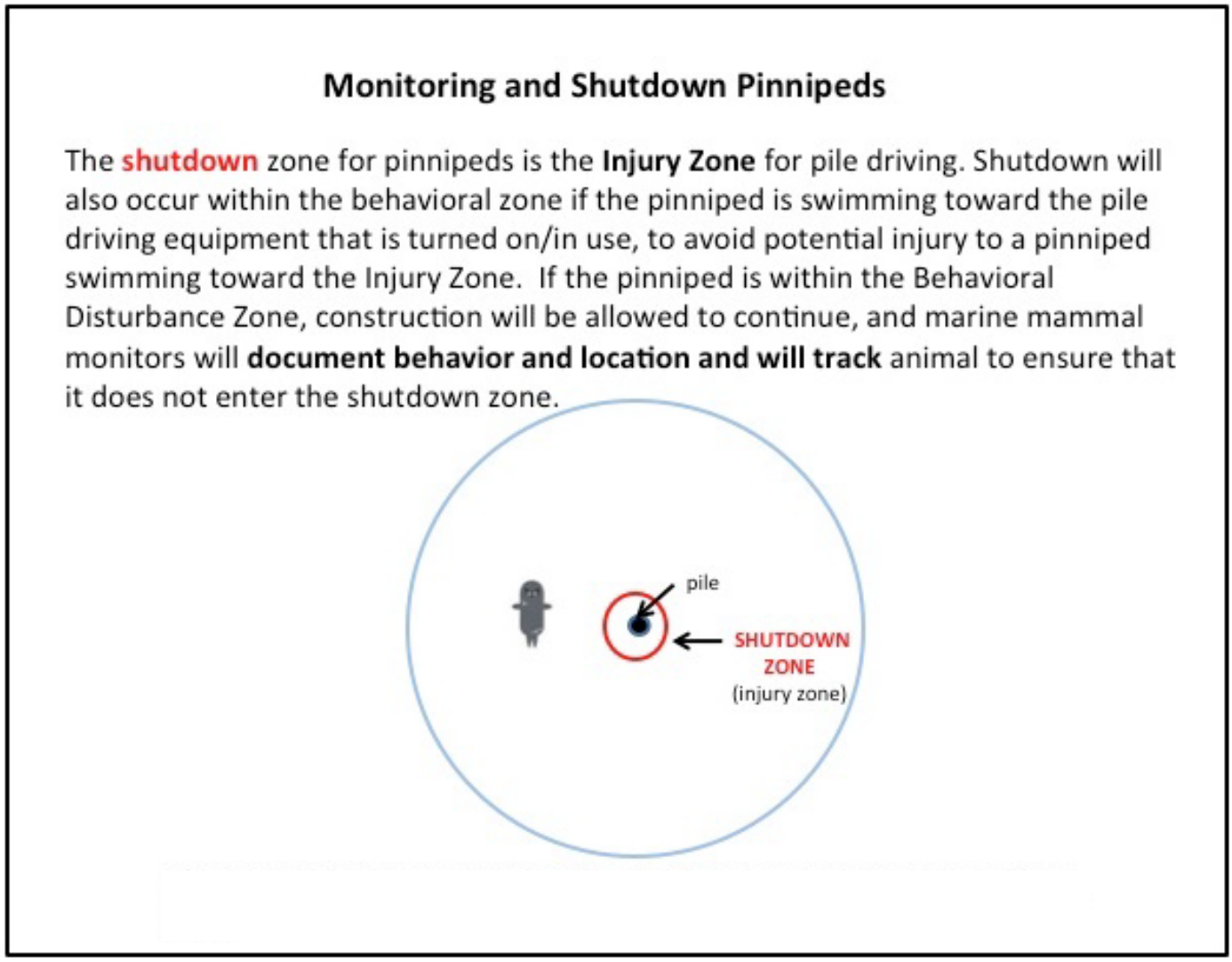

Figure 2. Monitoring and Shutdown for Pinnipeds

2.5 Observer Monitoring Locations

When driving piles, to effectively monitor the Injury and Behavioral Disturbance Zones marine mammal observers will be positioned at the best practicable vantage points, taking into consideration security, safety, and space limitations at the waterfront. The minimum number and locations of monitors will be as follows for each project. **Any changes to the number and locations of monitors must pre-approved by a Navy environmental point of contact listed in Section 3 Interagency Notification.**

- During impact installation of **30-inch steel piles** at **EHW 1**, two observers will be positioned on the pier to monitor the Shutdown Zone and Behavioral Threshold areas. In addition to the two observers on the pier, one boat with an observer will be positioned at 500 meters to monitor the shutdown zones for all cetaceans (see Table 1), and the behavioral (Level B) zone for harbor seals and sea lions. Figure 3 depicts the representative monitoring locations of observers during impact driving. During vibratory pile driving, two observers will be positioned on the pier or shore to monitor the Shutdown Zones and a portion of the area exceeding the Behavioral Threshold (see Table 2). Figure 4 depicts the representative monitoring locations of observers during vibratory driving. Each monitoring location will have a minimum of one dedicated marine mammal observer (not including boat operators).
- During impact installation of **12-inch steel piles** at **EHW 1**, two observers will be positioned on the pier to monitor the Shutdown Zone and Behavioral Threshold areas. In addition to the two observers on the pier, one boat with an observer will be positioned at 300 meters to monitor the shutdown zones for all cetaceans (see Table 3), and the behavioral (Level B) zone for harbor seals and sea lions. Figure 5 depicts the representative monitoring locations of observers during impact driving. During vibratory pile driving, two observers will be positioned on the pier or shore to monitor the Shutdown Zones and a portion of the area exceeding the Behavioral Threshold (see Table 4). Figure 6 depicts the representative monitoring locations of observers during vibratory driving. Each monitoring location will have a minimum of one dedicated marine mammal observer (not including boat operators).

2.6 Monitoring Techniques

The Navy will collect sighting data and behaviors of marine mammal species observed pre-, during, and post-driving period. The efficacy of visual detection depends on several factors including the observer's ability to detect the animal, the environmental conditions (visibility and sea state), and monitoring platforms. The following survey methodology will be implemented for all monitoring activities:

- Observers will survey the Injury and Behavioral Disturbance Zones. Monitoring will take place 15 minutes prior to initiation through 30 minutes post-completion of pile driving to ensure there are no marine mammals present.
- In case of reduced visibility due to weather or sea state, the observers must be able to see the Shutdown Zones or pile driving will not be initiated until visibility in these zones improves to acceptable levels.
- The Injury and Behavioral Disturbance Monitoring Zones will be monitored throughout the time required to install a pile.
- Marine Mammal Observation Record forms (Appendix A) will be used to document observations.

- Any survey boats engaged in marine mammal monitoring will maintain speeds equal to or less than 10 knots.
- Observers will be trained and experienced marine mammal observers in order to accurately verify species sighted.
- Observers will use binoculars and the naked eye to search continuously for marine mammals.

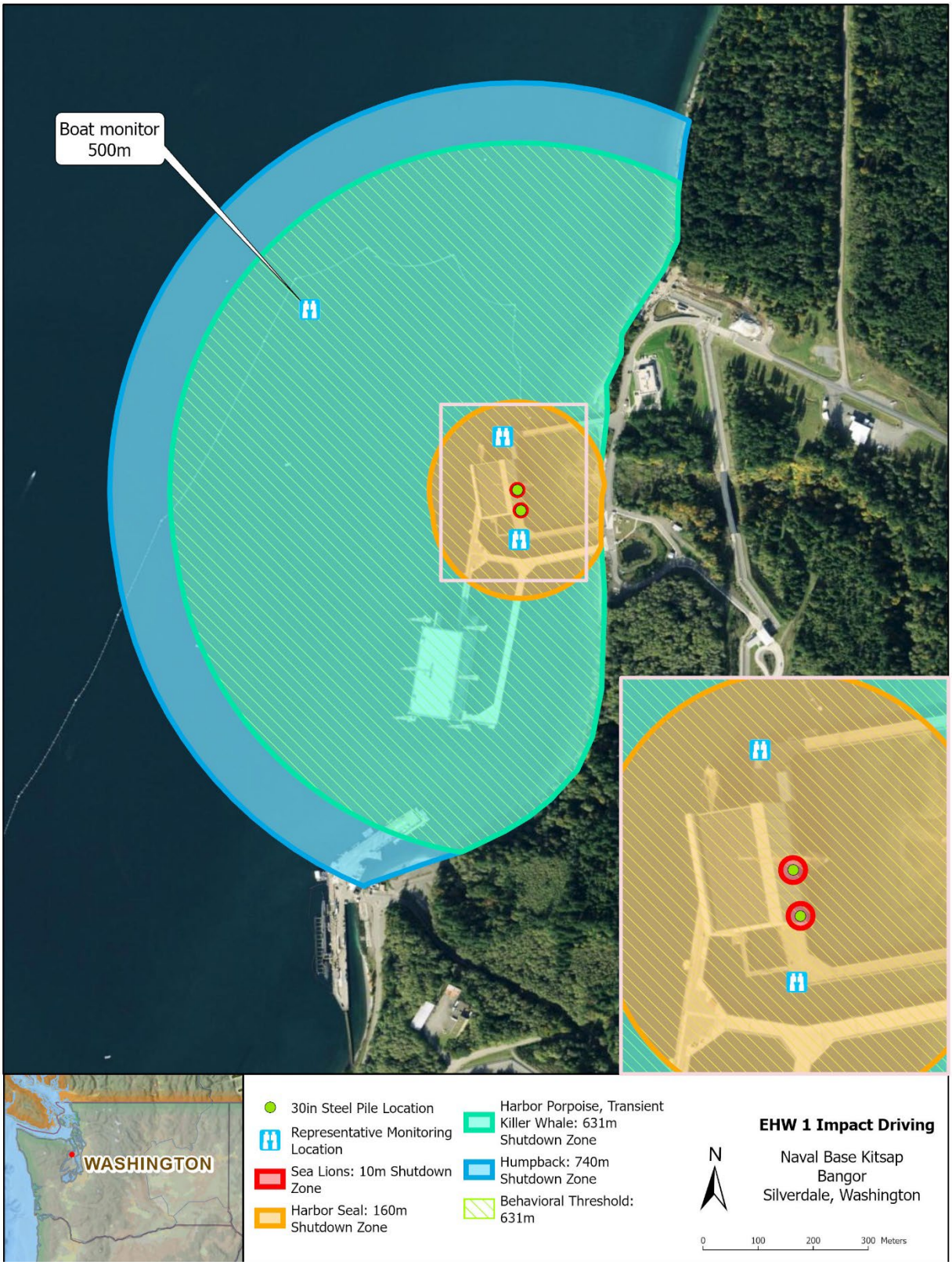

Figure 3. Example of Marine Mammal Visual Monitoring Zone at EHW 1 with Representative Monitoring Locations Indicated for Impact Driven 30" Steel Piles

Figure 4. Example of Marine Mammal Visual Monitoring Zone at EHW 1 with Representative Monitoring Locations Indicated for Vibratory 30" Driven Piles

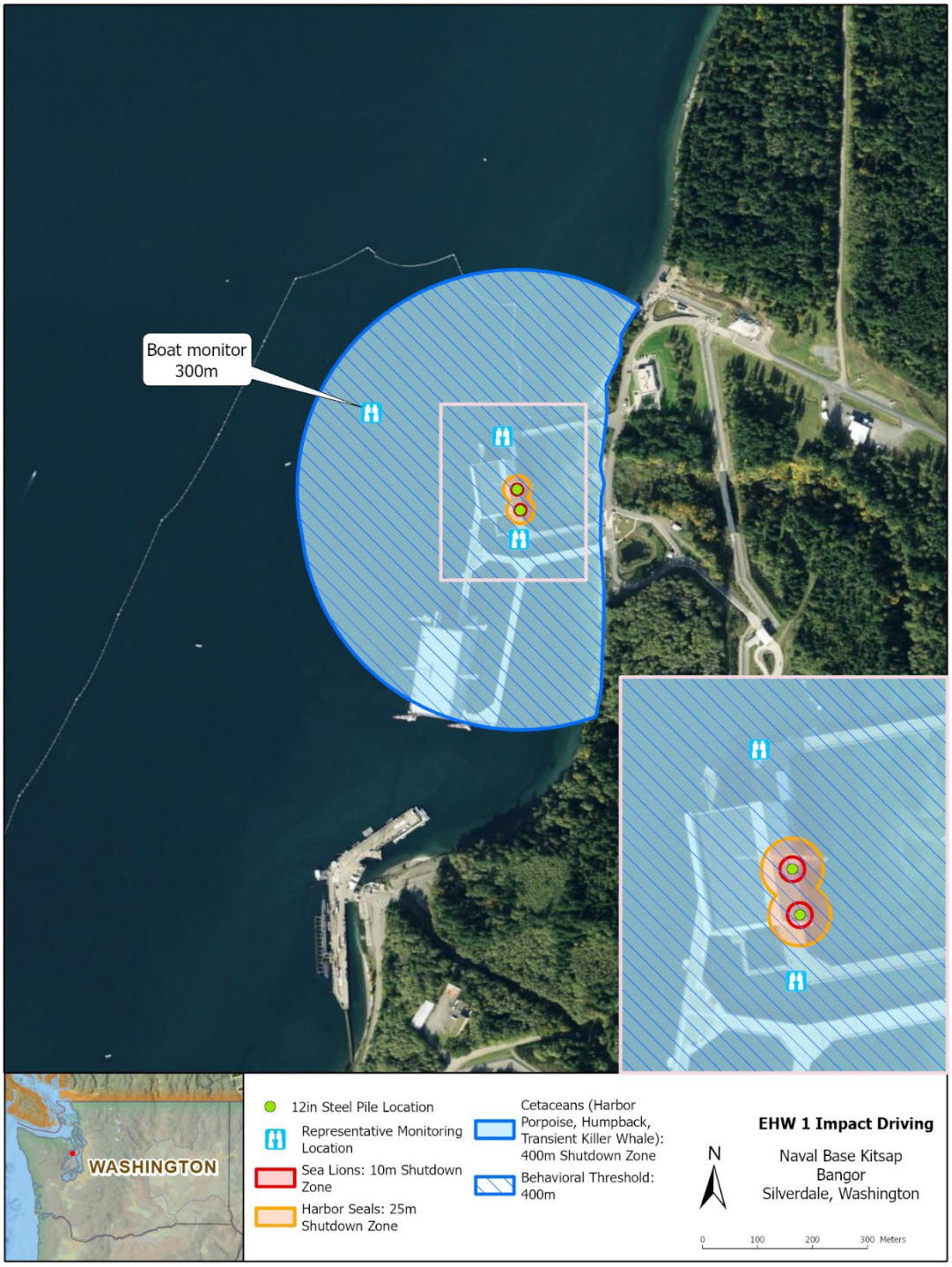

Figure 5. Example of Marine Mammal Visual Monitoring Zone at EHW 1 with Representative Monitoring Locations Indicated for Impact Driven 12" Steel Piles

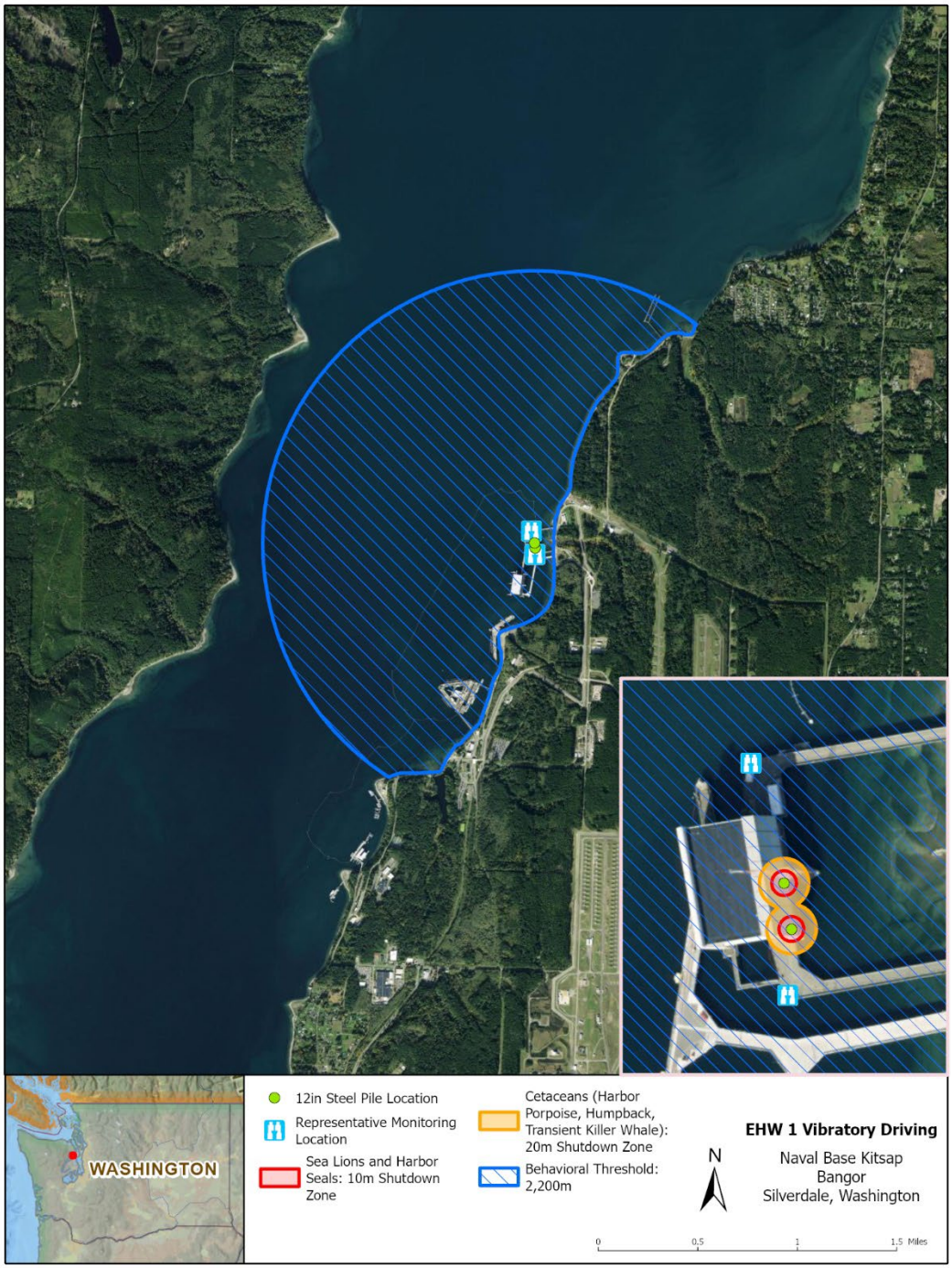

Figure 6. Example of Marine Mammal Visual Monitoring Zone at the EHW 1 with Representative Monitoring Locations Indicated for Vibratory 12" Driven Piles

2.6.1 Visual Survey Protocol – Pre-Activity Monitoring

The following survey methodology will be implemented prior to commencing pile driving:

- Visual surveys of the Injury and Behavioral Zone will occur for at least 15 minutes prior to the start of construction.
- If marine mammal(s) are present within or approaching a Shutdown Zone prior to pile driving, 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.
- If marine mammal(s) are not detected within a Shutdown Zone (i.e., the zone is deemed clear of marine mammals), the observers will inform the monitoring coordinator/construction contractor that pile driving can commence.
- If a marine mammal approaches or enters the Shutdown Zone, pile driving will be delayed until the animal(s) leave the zone. If pinnipeds (s) are present within the Behavioral Disturbance Monitoring Zone, pile driving 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.

2.6.2 Visual Survey Protocol – During Activity Monitoring

The Injury and Behavioral Disturbance Monitoring Zones will be monitored throughout pile driving. The following survey methodology will be implemented during pile driving:

- If a cetacean approaches or enters the Shutdown Zone for cetaceans, pile driving will cease until the animal(s) leave the zone. If a pinniped enters the Shutdown Zone for pinnipeds, pile driving will cease until the animal(s) leave the zone. If a pinniped is observed within or entering the Behavioral Disturbance Zone during pile driving, a take would be recorded, behaviors documented, and the Shutdown Zone monitor alerted to the position of the animal. However, that pile segment would be completed without cessation, unless the animal approaches or enters the Shutdown Zone for pinnipeds, at which point all pile driving activities will be halted. The observers shall immediately radio to alert the monitoring coordinator/construction contractor. This action will require an immediate “all-stop” on pile operations.
- Once a shutdown has been initiated, pile driving and other in-water construction activities will be delayed until the animal 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 (i.e., the zone is deemed clear of marine mammals). The monitoring coordinator will inform the construction contractor that activities can re-commence.
- If shutdown and clearance procedures would result in an imminent concern for human safety, as determined by the construction contractor, the Navy Point of Contact will be notified immediately. The Navy POC will notify NMFS within 24 hours.

2.6.3 Visual Survey Protocol – Post-Activity Monitoring

Monitoring of the Shutdown Zones will continue for 30 minutes following completion of pile driving. These surveys will record marine mammal observations, and will focus on observing and reporting unusual or abnormal behavior of marine mammals. During these surveys, if any injured, sick, or dead marine mammals are observed, procedures outlined below in Section 3.0 should be followed.

3 INTERAGENCY NOTIFICATION

In the event that the Navy needs to modify terms of this monitoring plan, the NMFS representative will be promptly contacted for discussion of the requested modification. In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by this IHA, such as an injury (Level A harassment), serious injury, or mortality, Navy shall immediately cease the specified activities and report the incident to the Chief of the Permits and Conservation Division (301-427-8425), Office of Protected Resources, NMFS, and the Northwest Regional Stranding Coordinator (206-526-6550), NMFS. The report must include the following information:

- Time and date of the incident
- Description of the incident
- Environmental conditions (e.g., wind speed and direction, Beaufort sea state, cloud cover, and visibility)
- Description of all marine mammal observations in the 24 hours preceding the incident
- Species identification or description of the animal(s) involved
- Fate of the animal(s) and
- Photographs or video footage of the animal(s)

Activities shall not resume until NMFS is able to review the circumstances of the prohibited take. NMFS will work with Navy to determine what measures are necessary to minimize the likelihood of further prohibited take and ensure Marine Mammal Protection Act compliance. Navy may not resume their activities until notified by NMFS.

In the event that Navy discovers an injured or dead marine mammal, and the lead observer determines that the cause of the injury or death is unknown and the death is relatively recent (e.g., in less than a moderate state of decomposition), Navy shall immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, and the Northwest Regional Stranding Coordinator, NMFS. The report will include the same information as listed above. Activities may continue while NMFS reviews the circumstances of the incident. The Navy will work with NMFS to determine whether additional mitigation measures or modifications to the activities are appropriate.

In the event that Navy discovers an injured or dead marine mammal, and 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 animal, carcass with moderate to advanced decomposition, or scavenger damage), the Navy shall report the incident to the Chief of Permits and Conservation Division, Office of Protected Resources, NMFS, and the Northwest Regional Stranding Coordinator, NMFS, within 24 hours of the discovery. Navy shall provide photographs or video footage or other documentation of the stranded animal sighting to NMFS.

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. The Navy will prepare a Chain of Custody Record (Appendix C) to document handling of specimens.

Primary points of contact for the Navy are:

1. Tyler Yasenak – (360) 315-2452; tyler.yasenak@navy.mil
2. Frank Nichols - (360) 315-5411; thomas.f.nichols2.civ@us.navy.mil
3. Tiffany Selbig – (360) 315-2531; tiffany.selbig@navy.mil
4. Philip Thorson – Office: (360) 315-2812, cell phone: (831) 234-5793; philip.h.thorson.civ@us.navy.mil

The Navy primary point of contact will contact NMFS. The primary points of contact at NMFS are:

1. Modification to protocol – (360) 753-5835
2. Chief of the Permits and Conservation Division – (301-427-8425)
3. Northwest Regional Stranding Coordinator – (206-526-6550)

4 MONITORING REPORTS

A marine mammal monitoring report will be prepared for the EHW 1 Pile Replacement. A draft of each report is due to NMFS within 90 work days of the completion of marine mammal monitoring. The report shall interpret the data collected during monitoring and provide a narrative analysis of the data. The contractor will provide the Navy a draft report 45 days after completion of pile driving activities. This will give the Navy time to review the document and allow the contractor to make revisions prior to Navy submitting the report to NMFS. A final report will be prepared for each project and submitted to the NMFS within 30 days following receipt of comments on the draft report from NMFS. At a minimum, the report shall include:

- General data:
  - Date and time of activities
  - Water conditions (e.g., sea-state, tidal state)
  - Weather conditions (e.g., percent cover, visibility)
- Specific pile data:
  - Description of the pile driving activities including the size and type of pile
  - The installation methods used for each pile and the duration each method was used per pile
  - Impact or vibratory hammer force used to drive/extract piles
  - Detailed description of the sound attenuation system, including the design specifications
  - Depth of water in which the pile was driven
  - Depth into the substrate that the pile was driven
- Specific pile removal data:
  - Description of the pile removal activities being conducted
    - Size and type of piles
    - The machinery used for removal
    - Duration each pile removal method was used

  - The vibratory driver force
- Pre-activity observational survey-specific data:
  - Dates and time survey is initiated and terminated
  - Description of any observable marine mammal behavior in the immediate area during monitoring
  - If possible, the correlation to underwater sound levels occurring at the time of the observable behavior
  - Actions performed to minimize impacts to marine mammals.
- During-activity observational survey-specific data:
  - Description of any observable marine mammal behavior within monitoring zones or in the immediate area surrounding monitoring zones including the following:
    - Distance from animal to 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 is implemented, the distance from animal to source at the time of the shutdown
    - Behavioral reactions noted during soft starts[1] and if they occurred before or after implementation of the soft start
    - Distance to the animal from the source during soft start
  - Actions performed to minimize impacts to marine mammals
  - Times when pile driving is stopped due to presence of marine mammals within the Shutdown Zones and time when pile driving resumes
- Post-activity observational survey-specific data:
  - Results, which include the detections of marine mammals, species and numbers observed, sighting rates and distances, behavioral reactions within and outside of monitoring zones
  - A refined take estimate based on the number of marine mammals observed during the course of construction

[1] The objective of a soft-start is to provide a warning and/or give animals in close proximity to pile driving a chance to leave the area prior to a vibratory or impact driver operating at full capacity thereby, exposing fewer animals to loud underwater and airborne sounds.

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Appendix A

Marine Mammal Observation Record Form

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APPENDIX A
MARINE MAMMAL OBSERVATION RECORD FORM

Project Name: ______________________________ Monitoring Location______________________________ Page ___________ of _____________
(Pier Location, Vessel based, Land Location, other)

Date: ______________________________ Vessel Name: ______________________________ 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 (btwn animal & pile)	# of Animals Group Size (min/max/best)# of Calves	Relative Motion/and Behavior Code (see code sheet)	Const Type During Sighting	Miti gation used during sighting?	Miti gation Type?	Visibility	% Glare	Weath Cond	Sea State and Wave Ht	Swell Dir	Behavior Change/ Response to Activity/Comments
		: : : :					m or km °	m or km	/ / ___ calves	opening closing parallel none	PRE POST SSV SSI V I PC DP ST NONE	Y N	DE SD	B P M G E			Light Mod Heavy	N or S W or E	
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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.

Sighting Codes
(Sighting Cue & Behavior 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
Pinniped only		
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.
Cetacean only		
LG	Logging	Resting on surface of water with no obvious signs of movement

Sighting Codes (continued)

Marine Mammal Species

Code	Marine Mammal Species
CASL	California Sea Lion
HSEA	Harbor Seal
STSL	Steller Sea Lion
HPOR	Harbor Porpoise
DPOR	Dall's Porpoise
ORCA	Killer Whale
HUMP	Humpback Whale
UNLW	Unknown Large Whale
RIVO	River Otter (not a marmam)
OTHR	Other
UNKW	Unknown

Event

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

Construction Type

Code	Activity Type
SSV	Soft Start (Vibratory)
SSI	Soft Start (Impact)
V	Vibratory Pile Driving (installation and extraction)
I	Impact Pile Driving
PC	Pneumatic Chipping
DP	Dead pull
ST	Stabbing
NONE	No Pile Driving

Mitigation Codes

Code	Activity Type
DE	Delay onset of Pile Driving
SD	Shut down Pile Driving

Sighting Codes (continued)

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)

Glare

Percent glare should be total glare of observers' area of responsibility. Are they covering 90 degrees or 180 degrees? Total glare for that area and write that area down on the datasheet so we know later what percentage of the field of view was poor due to glare.

Weather Conditions

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

Sea State and Wave Height

Use Beaufort Sea State Scale for Sea State Code. 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, but in inland waters the wave heights (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

Beaufort Sea State Scale

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APPENDIX B
BEAUFORT SEA STATE SCALE

US Navy and Beaufort Sea State Codes (http://ioc.unesco.org and http://www.wrh.noaa.gov/pqr/info/beaufort.php)

Beaufort Sea State	Wind Speed (knots)	Wind Description	Wave Height (ft) Beaufort	Sea State – Beaufort	Notes Specific to On-water Seabird Observations	Photos Indicating Beaufort Sea State
0	<1	Calm	0	Calm; like a mirror	Excellent conditions, no wind, small or very smooth swell. You have the impression you could see anything.	
1	1-3	Light air	¼ < ½	Ripples with appearance of scales; no foam crests	Very good conditions, surface could be glassy (Beaufort 0), but with some lumpy swell or reflection from forests, glare, etc.	

APPENDIX B
BEAUFORT SEA STATE SCALE (continued)

Beaufort Sea State	Wind Speed (knots)	Wind Description	Wave Height (ft) Beaufort	Sea State – Beaufort	Notes Specific to On-water Seabird Observations	Photos Indicating Beaufort Sea State
2	4-6	Light breeze	½ – 1 (max 1)	Small wavelets; crests with glassy appearance, not breaking	Good conditions, no whitecaps; texture/lighting contrast of water make murrelets hard to see. Surface could also be glassy or have small ripples, but with a short, lumpy swell, thick fog, etc.	
3	7-10	Gentle breeze	2 – 3 (max 3)	Large wavelets; crests begin to break; scattered whitecaps	Fair conditions, scattered whitecaps, detection of murrelets definitely compromised; a hit-or-miss chance of seeing them owing to water choppiness and high contrast. This could also occur at lesser wind with a very short wavelength, choppy swell.	

APPENDIX B
BEAUFORT SEA STATE SCALE (continued)

Beaufort Sea State	Wind Speed (knots)	Wind Description	Wave Height (ft) Beaufort	Sea State – Beaufort	Notes Specific to On-water Seabird Observations	Photos Indicating Beaufort Sea State
4	11-16	Moderate breeze	3 ½ – 5 (max 5)	Small waves becoming longer, numerous whitecaps	Whitecaps abundant, sea chop bouncing the boat around, etc.	
5	17-20	Fresh breeze	6 – 8 (max 8)	Moderate waves, taking longer form; many whitecaps; some spray		

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Appendix C

Chain of Custody Record

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Chain of Custody Record

Date and Time of Collection:	Duty Station:	Collection By:

Source of Specimen (Person and/or Location):	Project Name:
Found At:	

Item No:	Description of Specimen (Include Species and Tag Number):

Item No:	From: (Print Name, Agency)	Release Signature:	Release Date:	Delivered via: FEDEX U.S. Mail In Person Other:
	To: (Print Name, Agency)	Receipt Signature:	Receipt Date:	

Chain of Custody Record

Item No:	From: (Print Name, Agency)	Release Signature:	Release Date:	Delivered via: FEDEX U.S. Mail In Person Other:
	To: (Print Name, Agency)	Receipt Signature:	Receipt Date:	
Item No:	From: (Print Name, Agency)	Release Signature:	Release Date:	Delivered via: FEDEX U.S. Mail In Person Other:
	To: (Print Name, Agency)	Receipt Signature:	Receipt Date:	
Item No:	From: (Print Name, Agency)	Release Signature:	Release Date:	Delivered via: FEDEX U.S. Mail In Person Other:
	To: (Print Name, Agency)	Receipt Signature:	Receipt Date:	
Item No:	From: (Print Name, Agency)	Release Signature:	Release Date:	Delivered via: FEDEX U.S. Mail In Person Other:
	To: (Print Name, Agency)	Receipt Signature:	Receipt Date:	