

Marine Mammal Monitoring Plan

TRIDENT SUPPORT FACILITIES
EXPLOSIVES HANDLING WHARF (EHW-1)



NAVAL BASE KITSAP at BANGOR
SILVERDALE, WA

June 2012

DEPARTMENT OF THE NAVY

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1.0 INTRODUCTION

The United States Navy (Navy) will complete necessary repairs and maintenance of the Explosive Handling Wharf #1 (EHW-1) facility at Naval Base Kitsap at Bangor. These activities are part of a two-year EHW-1 Pile Replacement Project that began in August 2011. The purpose of this plan is to provide a protocol for marine mammal monitoring that will occur during in-water construction scheduled to begin July 16, 2012. Visual marine mammal monitoring will be conducted before, during, and after pile extraction activities where noise levels may behaviorally disturb marine mammals. Noise levels from project construction were determined not to exceed the injury thresholds for marine mammals. However, a safety zone will be monitored to preclude physical harm to marine mammals. This monitoring plan was developed in coordination with the Nation Marine Fisheries Service to ensure compliance with the Biological Opinion's terms and conditions and the incidental harassment authorization issued for in-water construction from July 16, 2012 through February 15, 2013. In conjunction with this plan, acoustic monitoring of pneumatic chipping of at least five concrete piles will occur. A separate monitoring protocol has been prepared for the acoustic monitoring.

2.0 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 the environmental monitoring staff including all acousticians and marine mammal observers. The monitoring coordinator will serve as the liaison between the environmental monitoring staff and the construction contractor to assist in the distribution of information.

2.2. 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.

- Date and time that vibratory pile extraction or pneumatic chipping 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 extraction 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.

2.3. EQUIPMENT

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

- If boat based monitors are used, a survey boat (with flying bridge for elevated observations) will include: covered cabin areas to keep electrical equipment dry, a fixed marine radio for the Captain to communicate on Ch. 16 and other marine channels independent of observers communicating on a dedicated channel, depth finder, measuring tape, navigational plotting equipment, and both fixed and hand-held GPS Units. 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;
- Portable marine radios and headsets for the observers to communicate with the monitoring coordinator, construction contractor, and other observer(s);
- Cellular phones, without a camera (one per boat/observing location), and the contact information for the other observer(s), monitoring coordinator, and NMFS point of contact;
- Green flags (one per boat/observing location) as back-up for radio communication;
- Red flags (one per boat/observing location) as back-up for radio communication;
- Nautical charts;
- Daily tide tables for the project area within the Hood Canal;
- 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 non-bleeding paper (e.g Rite-in-the Rain);
- Marine mammal identification guides on waterproof paper
- Clipboard
- Pen / Pencil

2.4. SHUTDOWN AND BUFFER ZONES

The Navy will monitor a buffer zone within the floating security fence equivalent to where pneumatic chipping noise levels are estimated to be at or above 120 dB re 1 μ Pa (Figure 2-1).

This zone is considered a realistic area for visual monitoring for both vibratory extraction of steel

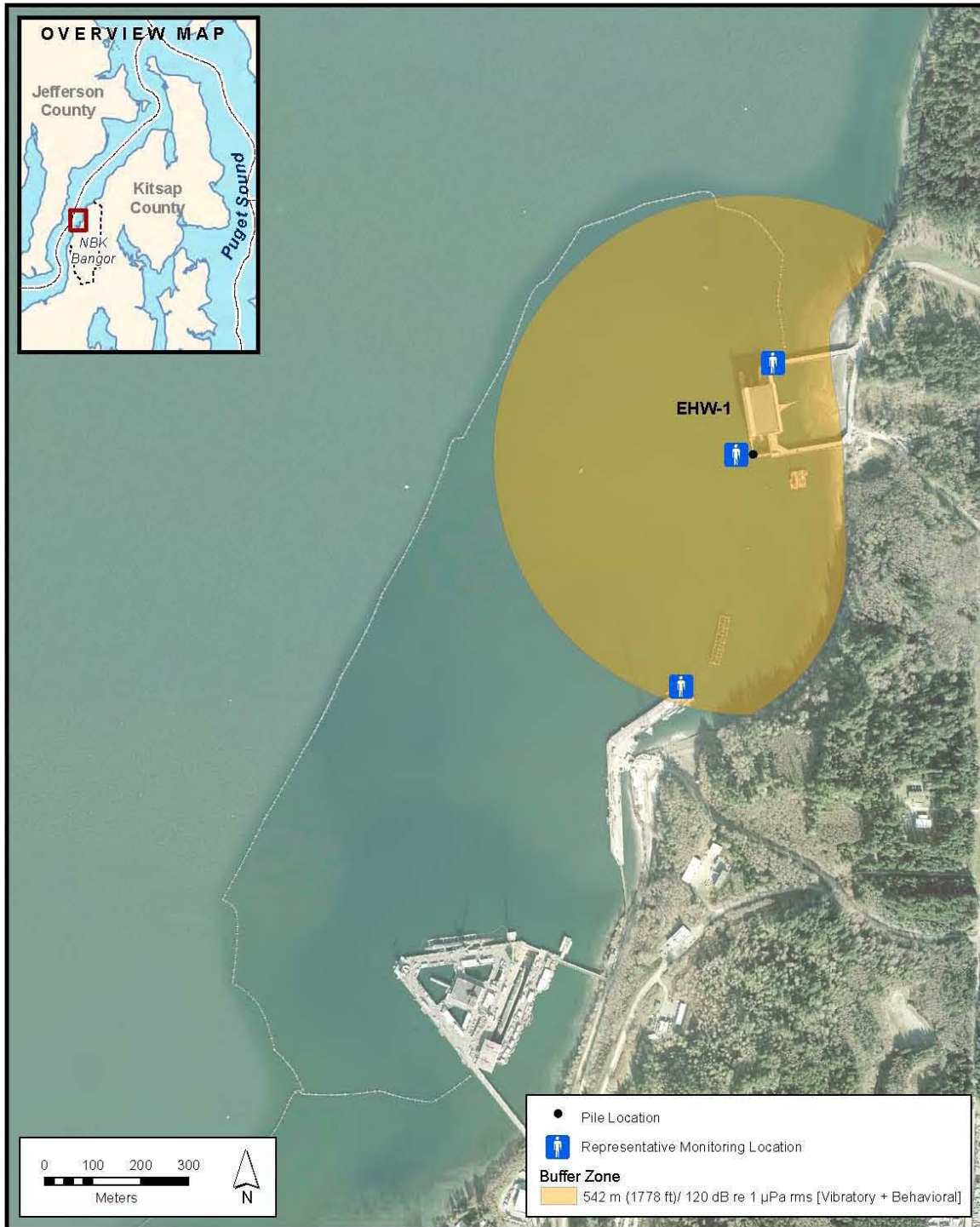


Figure 2-1. Buffer Zone for Visual Marine Mammal Monitoring with Representative Monitoring Locations Shown.

piles and pneumatic chipping of concrete piles. If hydroacoustic data indicates this zone is smaller than calculated, then the zone will be adjusted to reflect the site-specific data.

In addition, the Navy established a 10 meter radius shutdown zone from a pile to preclude physical injury of marine mammals while pile extraction activities are conducted. If the Navy determines another activity may physically harm marine mammals then a 10 meter radius shutdown zone from the activity will be monitored.

Shutdown and Buffer Zone (Pile removal via a vibratory driver or chipping hammer):

- During pile removal with a vibratory driver or chipping hammer, a 10 meter (33 feet) shutdown zone shall be established and monitored to prevent injury to marine mammal species from their physical interaction with construction equipment during in-water activities. Modeling does not predict sound levels at or above the criteria for injury.
- During pile removal with a vibratory driver or chipping hammer, the buffer zone shall include all areas where within the Port Security Barrier (PSB) fence equivalent to where pneumatic chipping noise levels are estimated to be at or above (120 dB re 1 μ Pa) (Figure 2-1).
- The shutdown and buffer zone(s) will be monitored throughout the time required to extract a pile with a vibratory driver or a pneumatic chipper. If a marine mammal enters the buffer zone, an exposure would be recorded and behaviors documented. However, that pile would be completed without cessation, unless the animal approaches or enters the shutdown zone, at which point all pile removal activities will be halted.
- Under certain construction circumstances where initiating the shutdown and clearance procedures (which could include a delay of 15 minutes or more) would result in an imminent concern for human safety, the shutdown provision may be waived.

Shutdown Zone (In-water construction activities not involving a vibratory driver or chipping hammer):

- During in-water construction activities not involving a vibratory driver or chipping hammer, but having the potential to affect marine mammals, in order to prevent injury from physical interaction with construction equipment, a shutdown zone of 10 meters (33 feet) will be monitored to ensure marine mammals are not present within this zone.
- These activities could include, but are not limited to: (1) the movement of a barge to the pile location, or (2) the removal of a pile from the water column/substrate via a crane (i.e., “dead pull”).

2.5. OBSERVER MONITORING LOCATIONS

In order to effectively monitor the shutdown zone, marine mammal observers will be positioned at the best practicable vantage point(s), taking into consideration security, safety, and space limitations at the waterfront. An observer will be stationed in a small vessel, on the wharf, or on the pile driving barge (a location that will provide adequate visual coverage for the marine mammal shutdown zone). At least one additional observer will be stationed to monitor the buffer zone.

Monitoring platforms will be located to clearly observe the 10 meter Shutdown Zone, as described in detail in Section 2.4. Additional monitoring platforms will be located to maximize monitoring of the buffer zone for vibratory pile extraction and pneumatic chipping, as described in detail in Section 2.4. The exact positioning of the monitoring location will vary as the location of the piles being removed changes.

Each monitoring location will have a minimum of one dedicated marine mammal observer (not including boat operators). A minimum of two monitors will be present if a boat is used as a monitoring platform (one monitor dedicated to monitor the Shutdown Zone and one on the boat to monitor the Buffer Zone). A minimum of three monitors will be present if only land-based or wharf-based monitoring locations are used (one monitor dedicated to monitor the Shutdown Zone and two monitors to monitor the Buffer Zone) (see Figure 2-1).

Security restrictions and operations inside the Waterfront Restricted Area (WRA) as defined by the area inside the PSB fence line, may preclude the placement of boats/personnel at certain times and locations. If security restrictions result in movement of a monitoring location, an alternate location will be identified for monitoring by the monitoring coordinator in conjunction with the Navy. Additionally, security requires that all vessels maintain a minimum standoff distance of 25 feet from the PSB fence at all times.

2.5.1. Coordination with other concurrent monitoring

Adjacent to EHW-1, construction of a new wharf, Explosives Handling Wharf #2 (EHW-2), is scheduled to overlap with construction at EHW-1. Because the visual marine mammal buffer zones for the two projects overlap, monitors may be coordinated to concurrently monitor the buffer zone within the WRA for both projects. Representative visual monitoring locations for EHW-2 are presented in Appendix D. Monitoring of the EHW-1 shutdown zone will always occur with a monitor dedicated solely to that task.

2.6. MONITORING TECHNIQUES

The Navy will collect sighting data and behaviors of marine mammal species observed in the 10-meter shutdown zone and the buffer zone pre-, during, and post-extraction 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 shutdown and buffer zone. Monitoring of the shutdown zones will take place from 15 minutes prior to initiation through 30 minutes post-completion of all vibratory pile extraction or pneumatic chipping activities to ensure there are no marine mammals present.
- 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.

2.6.1. Visual Survey Protocol – Pre-Activity Monitoring

The following survey methodology will be implemented prior to commencing vibratory pile extraction or pneumatic chipping:

- If marine mammal(s) are present within or approaching the shutdown zone prior to vibratory pile extraction or pneumatic chipping, 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 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 vibratory pile extraction or pneumatic chipping can commence.
- If marine mammal(s) are present within the buffer zone, vibratory pile extraction or pneumatic chipping 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 buffer zone.
- In case of fog or reduced visibility, the observers must be able to see the shutdown zones or vibratory pile extraction or pneumatic chipping will not be initiated until visibility in these zones improves to acceptable levels.

2.6.2. Visual Survey Protocol – During Activity Monitoring

The shutdown and buffer zones will be monitored throughout vibratory pile extraction or pneumatic chipping. The following survey methodology will be implemented during vibratory pile extraction or pneumatic chipping:

- If a marine mammal is observed within or entering the buffer zone during pile removal an exposure 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, at which point all pile removal activities will be halted. The observers shall immediately radio to alert the monitoring coordinator/construction contractor and raise a red flag. This action will require an immediate “all-stop” on pile operations.
- However, under certain construction circumstances where initiating the shutdown and clearance procedures (which could include a delay of 15 min or more) would result in an imminent concern for human safety the shutdown provision may be waived.
- Once a shutdown has been initiated, pile removal activities 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.

- Once marine mammals are no longer detected within the shutdown zone (i.e., the zone is deemed clear of marine mammals), the observer will raise a green flag and radio the monitoring coordinator/construction contractor that activities can re-commence;
- 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 is initiated shall likewise continue to be monitored and their behaviors recorded.

2.6.3. Visual Survey Protocol – Post-Activity Monitoring

Monitoring of the shutdown zones will continue for 30 minutes following completion of vibratory pile removal or pneumatic chipping. 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 in Section 3.0 should be following regarding notifying the appropriate authorities.

3.0 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 addition, if the Navy finds an injured, sick, or dead marine mammal, the Navy 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 Brent Norberg (NMFS NW) at (206) 526-6550 and Ben Laws (NMFS HQ) (301) 427-8425. The Navy 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.

4.0 MONITORING REPORTS

A draft report will be submitted to NMFS within 90 work days of the completion of acoustic measurements and marine mammal monitoring. The results will be summarized in graphical form and include summary statistics and time histories of sound values for each monitored pile. A final report will be prepared and submitted to the NMFS within 30 days following receipt of comments on the draft report from the 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 removal data for acoustically monitored piles:
 - Description of the pile removal activities being conducted.
 - Size and type of piles.
 - The machinery used for removal.
 - The vibratory driver force or chipping hammer setting used to extract the piles.
- Specific acoustic monitoring information:
 - A description of the monitoring equipment.
 - The distance between hydrophone(s) and pile.
 - The depth of the hydrophone(s).
 - The physical characteristics of the bottom substrate from which the piles were extracted (if possible).
 - The RMS range and mean for each acoustically monitored pile.
 - The results of the underwater measurements, including the frequency spectrum and RMS SPL's for acoustically monitored piles.
- 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 and if they occurred before or after implementation of the soft start.
 - Distance to the animal from the source during soft start.
 - If possible, the correlation to underwater or airborne sound levels occurring at the time of this observable behavior.

- Actions performed to minimize impacts to marine mammals.
- Times when pile extraction 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 safety zones.
 - A refined take estimate based on the number of marine mammals observed during the course of construction.

APPENDIX A
MARINE MAMMAL OBSERVATION RECORD FORM

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MARINE MAMMAL OBSERVATION RECORD FORM

Project Name: _____ of _____
 Monitoring Location: _____
 (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 (min/max/best) / # of Calves	Relative Motion/and Behavior Code (see code sheet)	Const Type During Sighting	Mitigation used during sighting?	Mitigation Type?	Viability	% Glare	Weath Cond	Sea State and Wave Ht	Swell Dir	Behavior Change/Response to Activity/Comments
		: : : : : :					m or km km	m or km km	/ / — calves	opening closing parallel none	PRE POST SSV SSI V I PC DP ST NONE	Y	DE	B P M G E			Light Mod Heavy	N or S W or E	
		: : : : : :					m or km km	m or km km	/ / — calves	opening closing parallel none	PRE POST SSV SSI V I PC DP ST NONE	Y	DE	B P M G E			Light Mod Heavy	N or S W or E	
		: : : : : :					m or km km	m or km km	/ / — calves	opening closing parallel none	PRE POST SSV SSI V I PC DP ST NONE	Y	DE	B P M G E			Light Mod Heavy	N or S W or E	
		: : : : : :					m or km km	m or km km	/ / — calves	opening closing parallel none	PRE POST SSV SSI V I PC DP ST NONE	Y	DE	B P M G E			Light Mod Heavy	N or S W or E	
		: : : : : :					m or km km	m or km km	/ / — calves	opening closing parallel none	PRE POST SSV SSI V I PC DP ST NONE	Y	DE	B P M G E			Light Mod Heavy	N or S W or E	
		: : : : : :					m or km km	m or km km	/ / — calves	opening closing parallel none	PRE POST SSV SSI V I PC DP ST NONE	Y	DE	B P M G E			Light Mod Heavy	N or S W or E	
		: : : : : :					m or km km	m or km km	/ / — calves	opening closing parallel none	PRE POST SSV SSI V I PC DP ST NONE	Y	DE	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.

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

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

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 (\$ 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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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 SS	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.	 Force 0
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.	 Force 1

Beaufort SS	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.	

Beaufort SS	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.	 <p>Force 4</p>
5	17-20	Fresh breeze	6 – 8 (max 8)	Moderate waves, taking longer form; many whitecaps; some spray		 <p>Force 5</p>

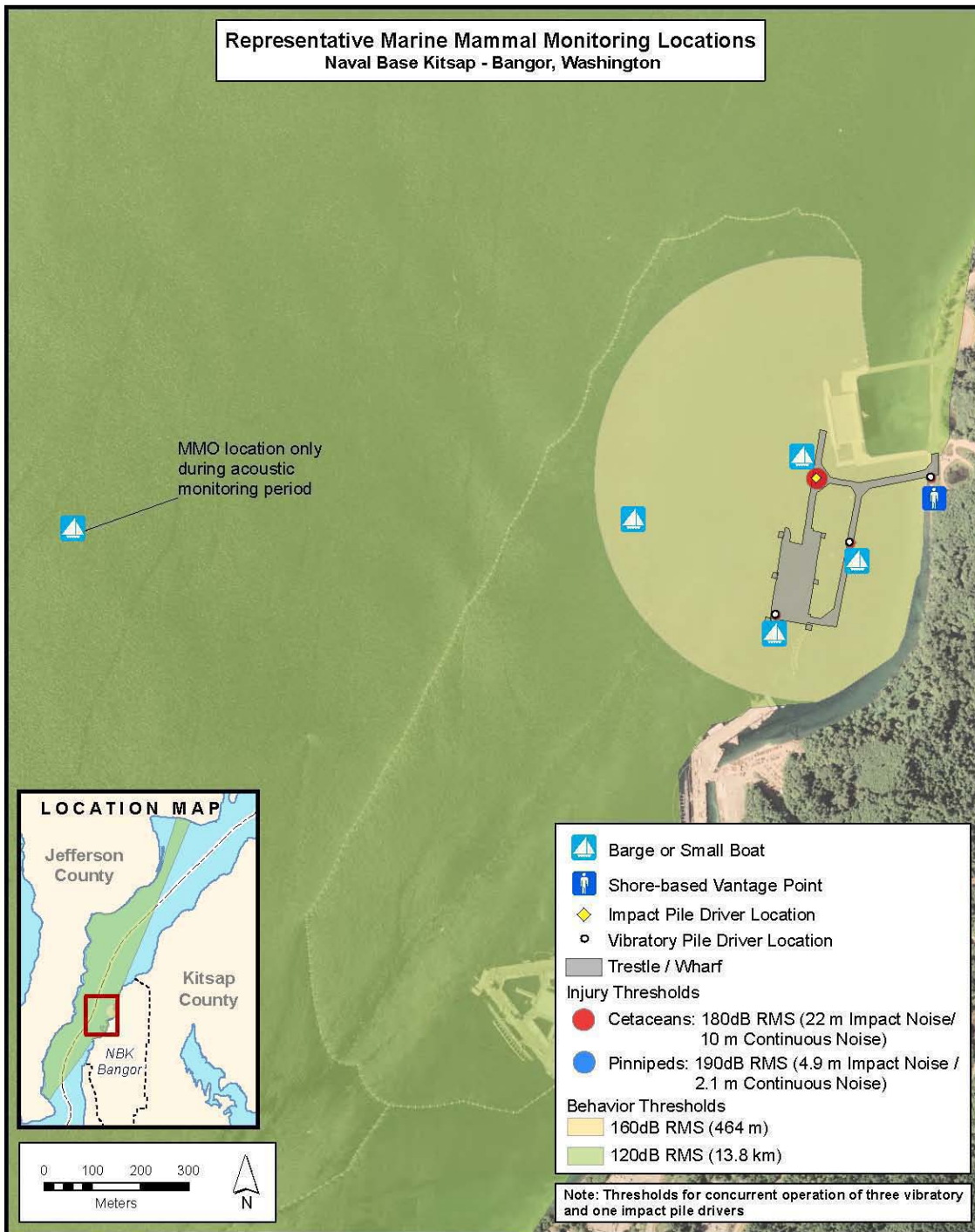
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APPENDIX C
CHAIN OF CUSTODY RECORD FORM

Chain of Custody Record				
Date and Time of Collection:	Duty Station:	Collection By:		
Source of Specimen (Person and/or Location) Found At:		Project Name:		
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:	

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:	
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:	

APPENDIX D
REPRESENTATIVE MARINE MAMMAL MONITORING LOCATIONS FOR EHW-2



Representative Marine Mammal Monitoring Locations for EHW-2