Final

Marine Mammal Monitoring Plan

TRIDENT SUPPORT FACILITIES
EXPLOSIVES HANDLING WHARF (EHW-2)

NAVAL BASE KITSAP at BANGOR
SILVERDALE, WA

July 2012

DEPARTMENT OF THE NAVY

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1.0 INTRODUCTION

The purpose of this monitoring plan is to provide a protocol for marine mammal monitoring during the proposed construction of the second Explosives Handling Wharf (EHW-2) at the Naval Base Kitsap (NBK) at Bangor, WA waterfront. This plan was developed to support the respective Biological Assessment (BA) and Incidental Harassment Authorization (IHA) documents for ESA and MMPA permitting. Those documents provide a more in-depth discussion on the modeling assumptions and calculations for the project and are incorporated here by reference.

Marine mammal monitoring will be conducted before, during, and after pile driving activities, within the areas that are estimated to be encompassed by the airborne and underwater injury or behavioral disturbance thresholds. Acoustic monitoring (see Navy's Acoustic Monitoring Plan) will be used to determine the distances to the injury and behavioral disturbance zone isopleths and the visual marine mammal monitoring survey protocols will be adjusted accordingly (either larger or smaller survey areas) to encompass the actual zones of influence.

2.0 ACTION AREA

The action area includes "all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action" (50 CFR § 402.02). Specifically, the action area is defined as the geographic extent of physical, biological, and chemical effects of the action above baseline conditions. The action area boundary takes into account how the action's physical, chemical, and biotic effects (stressors) move across the landscape, through direct and indirect pathways, over time, to identify the spatial and temporal scale of the action area (WSDOT 2011).

Construction of the EHW-2 will generate both airborne and underwater sound from impact and vibratory pile driving. To determine which noise effect extended the farthest, sound propagation was modeled and compared to ambient levels.

The ambient noise levels at NBK at Bangor were previously measured over a one month period in the summer of 2007 (July 10 – Aug 14) (Slater 2009). The underwater sound measurements were conducted at several locations in the vicinity of the project area. The location closest to the project area, designated as Marginal Wharf in the report, recorded data from two hydrophones deployed 300-500 feet north of the Marginal Wharf. Recordings were made 5 minutes per hour throughout the entire study period (Slater 2009). Average underwater broadband ambient noise levels near the project site were 114 dB RMS re: 1 microPascal (dB re 1µPa) between 100 hertz (Hz) and 20 kilohertz (kHz). Airborne noise levels at the NBK at Bangor waterfront in the daytime ranged between 60 and 104 dBA (decibels in the A-weighted scale) and averaged 64 dBA; night levels ranged between 64 and 96 dBA, averaging 64 dBA, consistent with other urbanized environments where equipment is operating.

Baseline underwater and airborne noise measurements were also conducted during the Test Pile Program (TPP) at NBK at Bangor from August – October 2011. Underwater ambient levels recorded during the TPP were consistent with those previously reported in Slater (2009). Recordings made in the middle of the Hood Canal approximately 2,200-2,300 meters from the pile averaged 114 dB RMS re: 1 microPascal between 50 Hz and 20 kHz. Ambient airborne data was collected at locations farther from the wharves than during prior data collection efforts, in order to reduce the potential for acoustic contributions from waterfront activities being

incorporated into the ambient environment. Measurements were generally made between 125 – 550 meters from the pile, along the shoreline between EHW-1 and Marginal Wharf. Airborne ambient levels averaged 55 dBA Leq re: 20 microPa between 25 Hz and 20 KHz.

Using the practical spreading loss model for transmission ($15*\log_{10}[R_1/R_2]$, where R_1 is the distance of the modeled sound pressure level from the driven pile, and R_2 is the distance from the driven pile of the initial measurement), it was determined that underwater sound from vibratory pile driving was the stressor identified to have the furthest geographic distribution to be distinguishable above ambient conditions. Sound generated from vibratory pile driving would intersect land masses (e.g., Toandos Peninsula) prior to attenuating to measured background levels. As such, the geographic boundary of the Action Area was defined by the line-of-sight intersection of land and water and is shown on Figure 1.

To determine the potential areas in which marine mammal monitoring may be required for monitoring, the Navy modeled the sound propagation out to defined threshold criteria from sound pressure levels anticipated for impact and vibratory pile driving during EHW-2 construction. Figures 2 and 3 depict the anticipated extent of underwater and airborne zones of influence based on the various marine mammal threshold criteria.

3.0 METHODS

3.1. 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 at-sea 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, marine mammal observers, and marbled murrelet 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.

Figure 1. EHW-2 Action Area

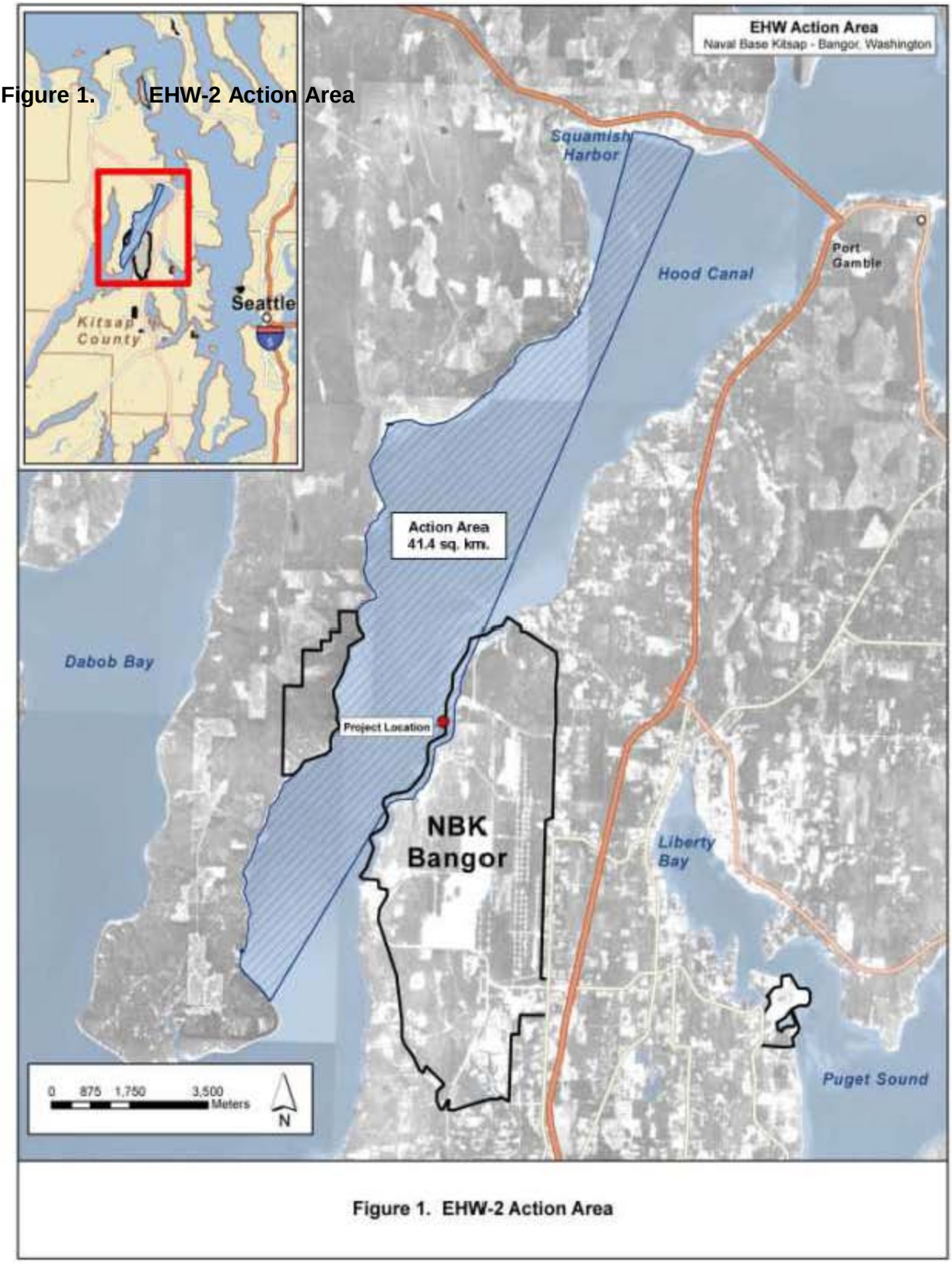

Figure 1. EHW-2 Action Area

The distances to and the area encompassed by the underwater noise thresholds for cetacean and pinnipeds for concurrent impact and vibratory pile driving are shown in Figure 2.

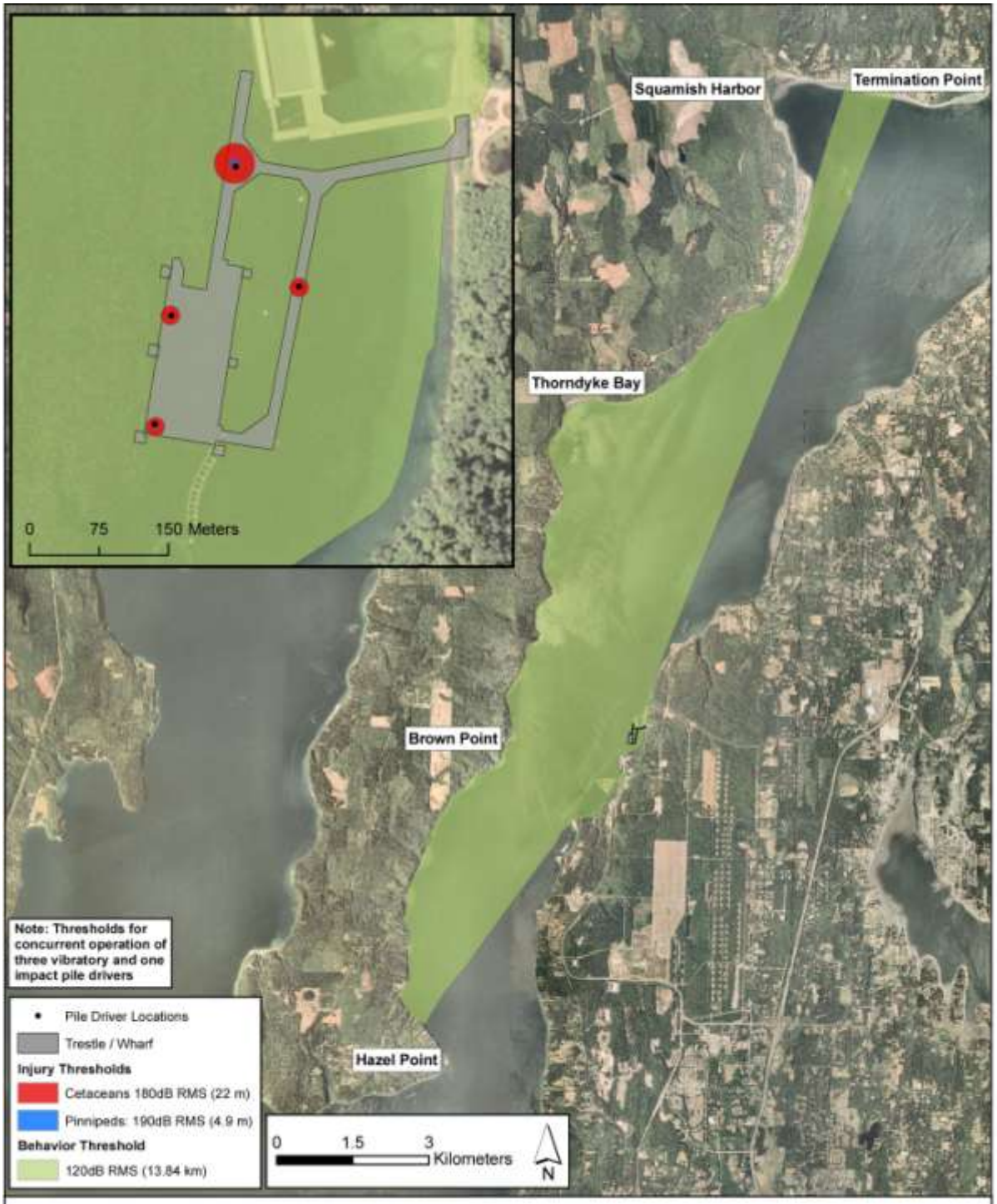

Figure 2. Distance to NMFS Underwater Noise Thresholds for Marine Mammals

Figure 3 indicates the airborne noise thresholds for harbor seals and other pinnipeds, for concurrent impact and vibratory pile driving.

Figure 3. Distance to NMFS Airborne Noise Thresholds for Marine Mammals

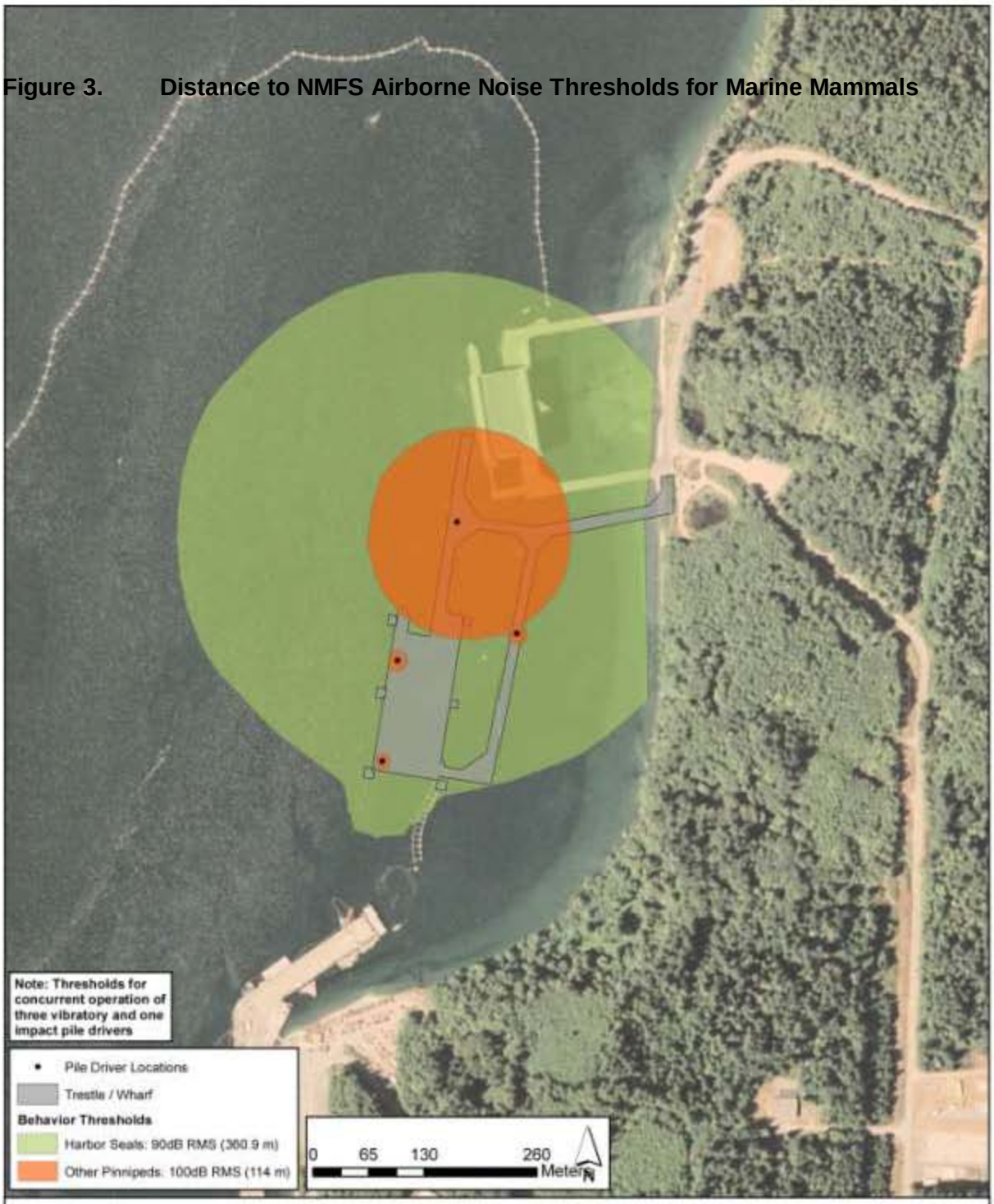

Figure 3. Distance to NMFS Airborne Noise Thresholds for Marine Mammals

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.

- 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;
    - Specific focus should be paid to recording behavioral reactions just prior to or during soft-start 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:

- Survey boats (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 within the airborne impact injury zone;
- Portable marine radios and headsets for the observers to communicate with the monitoring coordinator, construction contractor, and other observers;
- Cellular phones, without a camera (one per boat/observing location), and the contact information for the other observers, 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

3.4. SHUTDOWN AND BUFFER ZONES

The acoustic modeling results presented within the Draft Environmental Impact Statement and the request for an Incidental Harassment Authorization were used to develop the shutdown zones for pile installation activities associated with the EHW-2. While the acoustic zones of influence vary between the different diameter piles and installation methods, the Navy established shutdown zones based on the maximum zone of influence for pile installation activities (see analysis in compliance documents for details). The shutdown zones were created 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 for additional areas beyond the shutdown zone where sound pressure levels may cause harassment. Monitoring of these zones and the implementation of other minimization measures, such as the use of sound attenuation devices, will reduce the impacts of underwater sound from pile driving to these species.

Shutdown and Buffer Zone (*Impact and Vibratory pile driving/removal*):

- During impact pile driving/removal the shutdown zone shall include all areas where the underwater SPLs are anticipated to equal the Level A (injury) harassment criteria for marine mammals (180 dB isopleths for cetaceans; 190 dB isopleths for pinnipeds). For pinnipeds the shutdown distance will be 20 meters[1] from the pile and for cetaceans the shutdown distance will be 85 meters[2] from the pile.
- During vibratory pile driving/removal involving multiple pile driving rigs, the shutdown zone shall include all areas where the underwater SPLs are anticipated to equal the Level A (injury) harassment criteria for marine mammals (180 dB isopleths for cetaceans; 190 dB isopleths for pinnipeds). For pinnipeds the shutdown distance will be 10 meters[3] from the pile and for cetaceans the shutdown distance will also be 10 meters[4] from the pile.
- All shutdown zones will initially be based on the distances from the source which were predicted for each threshold level. However, in-situ acoustic monitoring will be utilized to determine the actual distances to these threshold zones, and the size of the shutdown zones will be adjusted accordingly (increased or decreased) based on received sound pressure levels. The Navy will use near-field and far-field attended hydrophones and SLMs to record the vibratory and impact pile driving signals. At the end of the acoustic

[1] The modeled injury threshold distance for pinnipeds for one impact pile driver is approximately 5 meters, but the Navy has increased this distance up to 20 meters based on in-situ recorded sound pressure levels during the TPP which indicated the pinniped injury zone more consistently extended up to 20 meters from the pile.
[2] The modeled injury threshold distance for cetaceans for one impact pile driver is approximately 22 meters, but the Navy has increased this distance up to 85 meters based on in-situ recorded sound pressure levels during the TPP which indicated the cetacean injury zone more consistently extended up to 85 meters from the pile.
[3] The actual modeled injury threshold distance for pinnipeds for three vibratory pile drivers is approximately 2.3 meters, but the Navy has rounded this distance up to 10 meters to be consistent with the shutdown zone for in-water non-pile driving activities.
[4] The modeled injury threshold distance for cetaceans for three vibratory pile drivers is 10 meters.

monitoring period, the data will be processed and the injury and behavioral disturbance zones will be calculated and compared to previous modeling. The Navy anticipates that acoustic data collection will be completed prior to the end of the first in-water work window and will attempt to determine as quickly as possible whether revisions in the size of the shutdown or buffer zones are warranted based on the in-situ data. Realistically, based on the experience of processing the TPP and EHW-1 acoustic data sets and the expected need for follow-up discussions with NMFS, the Navy expects that revisions in the size of the shutdown and buffer zones would be implemented as part of subsequent IHA applications for the second and third years of construction at EHW-2.

- During impact pile driving/removal the buffer zone shall include all areas where the underwater or airborne SPLs are anticipated to equal or exceed the Level B (disturbance) harassment criteria for marine mammals during impact pile driving (160 dB isopleth). For pinnipeds and cetaceans the buffer zone would be approximately 464 meters and would be encompassed by the area inside the WRA fence line in the immediate vicinity of the EHW-2 footprint.
- During vibratory pile driving, the Level B (disturbance) harassment criterion (120 dB isopleth) predicts an affected area of 41.4 sq km (16 sq mi). The size of this area would make effective monitoring impractical. As a result, a buffer zone of 464 meters, equivalent to the size of the predicted 160 dB isopleth, will be monitored for pinnipeds and cetaceans during all vibratory pile driving/removal activities. This distance would serve as a guideline for the placement of marine mammal observing platforms and would be considered the minimum area covered; however, marine mammal observers would record all marine mammal sightings which are visually feasible, including those beyond the 464 meter "buffer zone". All sightings would be recorded and potential takes would be noted. The definitive determination of any "take", however, would be determined after post-processing of the acoustic data to compare the sighting distance to the actual extent of any harassment zones.
- The shutdown and buffer zones will be monitored throughout the time required to drive or remove a pile. If a marine mammal enters the buffer zone, an exposure would be recorded and behaviors documented. However, the pile segment would be completed without cessation, unless the animal approaches or enters the shutdown zone around any of the pile driving rigs. If a marine mammal approaches or enters the shutdown zone around any rig, all pile driving/removal activities associated with that rig will immediately be halted. Pile driving may proceed at other rigs as long as marine mammals have not been sighted within the shutdown zones associated with those rigs.
- 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 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, 2) result in a great risk of causing damage to an existing structure (either EHW-1 or newly constructed portions of EHW-2), or 3) create a risk of the pile slipping from the cradle during shutdown procedures due to the angle of installation/removal (i.e. during batter pile 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 piles which may meet these criteria. The Navy would be notified daily of any piles for which shutdown procedures were waived and a written justification would be provided by the construction foreman documenting the necessity for waiving shutdown procedures. .

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 movement of the barge to the pile location, (2) the positioning of the pile on the substrate via a crane (i.e., "stabbing" the pile), (3) the removal of the pile from the water column/substrate via a crane (i.e. "deadpull"), or (4) the placement of sound attenuation devices around the piles.
- Marine mammal monitoring will only occur for the period 15 minutes prior to the activity through the duration required to complete the in-water work.

3.5. OBSERVER MONITORING LOCATIONS

In order to effectively monitor the shutdown zones, marine mammal observers will be positioned at the best practicable vantage point(s), taking into consideration security, safety, and space limitations at the NBK waterfront, in order to properly monitor these zones. Observers may be stationed in small vessels or on the pile driving barge(s) at locations that will provide adequate visual coverage for the marine mammal shutdown and buffer zones. During pile driving of the abutment or some of the shallow trestle piles, due to the proximity to the shoreline and the difficulties in maneuvering a vessel in shallow water, an observer may alternatively be positioned on shore, but from an elevated platform to monitor the shutdown zone(s).

Security restrictions and operations inside the Waterfront Restricted Area (WRA) as defined by the area inside the Port Security Barrier (PSB) fence line, may also preclude the placement of boats/personnel at certain times and locations. For instance, security concerns regarding the number of vessels within the WRA have resulted in the Navy limiting the number of monitoring vessels for the acoustic, marine mammal, and marbled murrelet monitoring plans, in addition to the construction related vessels (i.e. barges, tugs, etc.). Additionally, security requires that all vessels maintain a minimum standoff distance of 25 feet from the PSB fence at all times. During operations that occur at the EHW-1 facility and Marginal Wharf, monitoring personnel may also be precluded from being stationed on/near these structures.

One observer will be placed at a suitable location around each active pile driving rig in order to observe the respective shutdown zones for vibratory and impact pile driving. as described in detail in Section 3.4, Shutdown and Buffer Zones. These observers' monitoring would be primarily dedicated to observing the shutdown zones, however, they would record all marine mammal sightings beyond these distances provided it did not interfere with their effectiveness at carrying out the shutdown procedures. Additionally, a vessel-based monitoring platform will be located approximately 100-400 meters from the pile to monitor the buffer zone(s) for vibratory and impact pile driving/removal activities, as described in detail in Section 3.4, Shutdown and

Buffer Zones. The observer associated with this platform would also record all visible marine mammal sightings beyond the buffer zone both within and outside of the WRA.

During the period of acoustic monitoring associated with EHW-2, a marine mammal observer will also be stationed on the acoustic vessel outside the WRA, towards the middle of the Hood Canal. The primary purpose of the vessel would be to record acoustic data in the far-field study area and to service two of the floating rafts for acoustic data recording. However, the marine mammal observer will be capable of any recording marine mammal sightings with this far-field area to further support marine mammal data collection. In addition, consistent with the monitoring protocols used during the TPP, any far-field observers would communicate with near-field observers to alert them to the potential for incoming marine mammal species approaching the WRA.

Potential observation locations are depicted in Figures 4 and 5. The exact positioning of the observer platforms/monitoring boats will vary as different pile driver types and pile locations become active within the footprint of the proposed EHW-2 facility. Each monitoring location/platform will have a minimum of 1 dedicated marine mammal observer (not including boat operators). At the start of the EHW-2 project when the maximum number of pile driving rigs (four) are expected to be on-site, there will be a minimum number of five marine mammals observers (one monitoring the shutdown zone at each of the four active rigs, and one monitoring the buffer zone within the WRA). As construction progresses and pile driving rigs are removed from operation, monitoring personnel associated with those locations will no longer be required and will be eliminated from the monitoring effort.

3.6. MONITORING TECHNIQUES

The Navy will collect sighting data and behaviors of marine mammal species observed in the shutdown zone and the immediate vicinity within the WRA during the period of construction. All observers will be experienced biologists trained in marine mammal identification and behaviors, as described in Section 3.1, Observer Qualifications. NMFS requires that the observers have no other construction-related tasks while conducting monitoring.

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. Monitoring of the shutdown zones will take place from 15 minutes prior to initiation through 30 minutes post-completion of all pile driving and removal activities. Monitoring of the shutdown zones for other in-water construction activities as defined in Section 3.4 will take place from 15 minutes prior to initiation until the activity has been completed.

Figure 4. Representative Marine Mammal Monitoring Locations within the Underwater Noise Thresholds for Impact and Vibratory Pile Driving

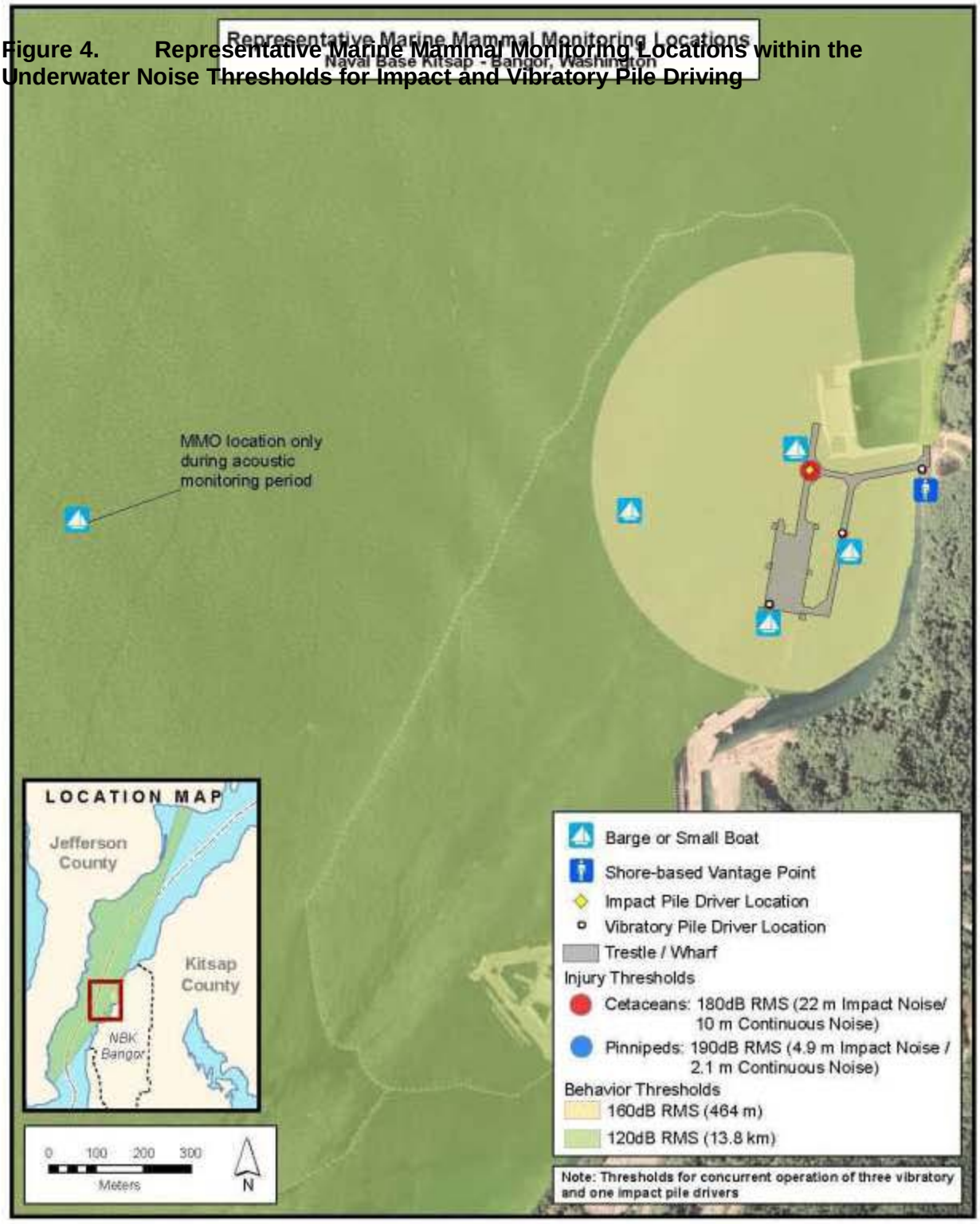

Figure 4. Representative Marine Mammal Monitoring Locations within the Underwater Noise Thresholds for Impact and Vibratory Pile Driving

Figure 5. Representative Shutdown Zones for Marine Mammal Monitoring Locations within the Waterfront Restricted Area

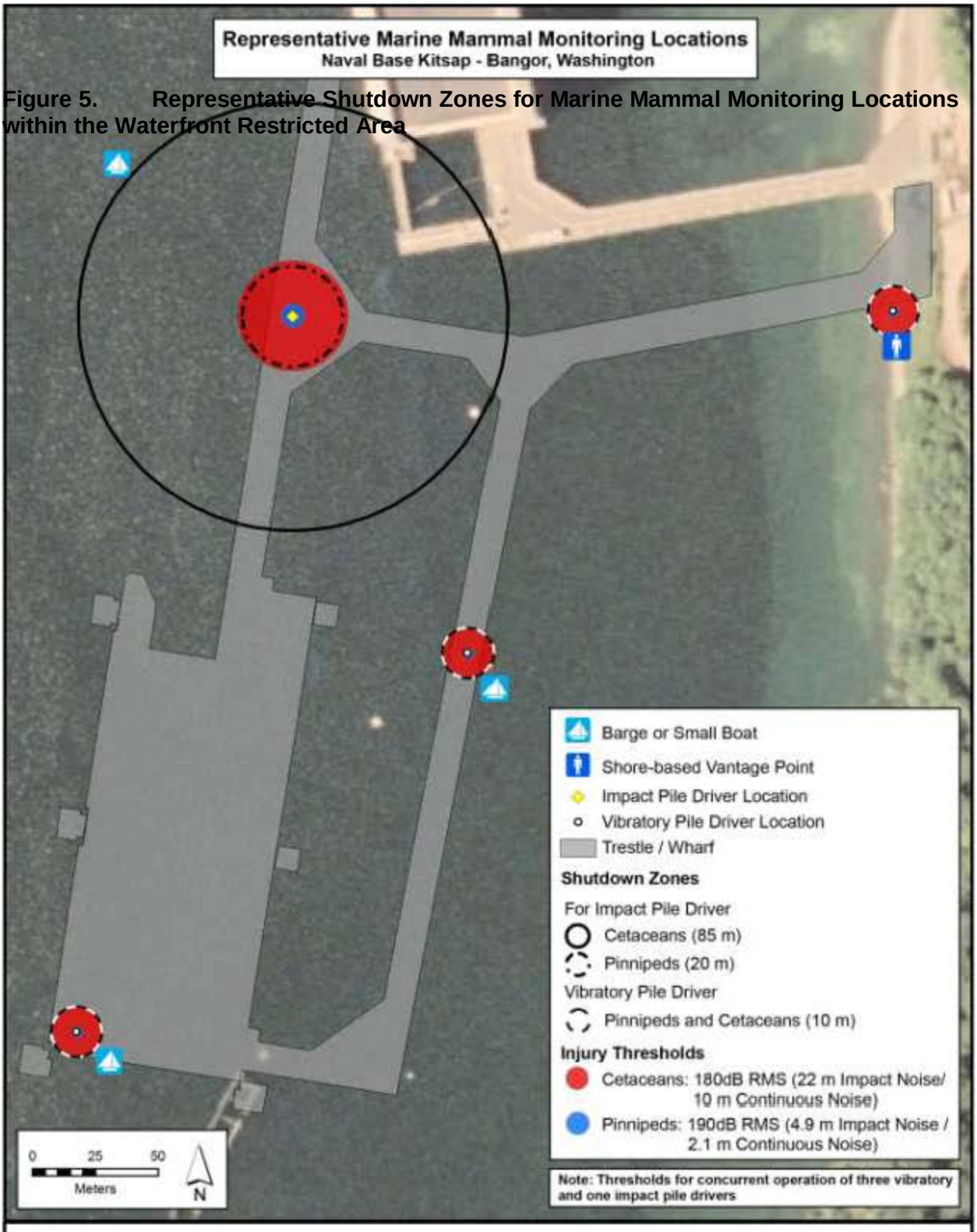

Figure 5. Representative Shutdown Zones for Marine Mammal Monitoring Locations within the Waterfront Restricted Area

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(s) will be monitored for 15 minutes to ensure that there are no marine mammals present. If concurrent marbled murrelet monitoring reveals that marbled murrelets are present within the shutdown zone for that species, pile driving will not start and surveys will continue until the marbled murrelets leave the shutdown zone voluntarily per the Marbled Murrelet Monitoring Plan. The following survey methodology will be implemented prior to commencing pile installation/removal or other in-water construction activities:

- Observers will survey the shutdown and buffer zone. 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.
- 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 buffer zone, 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 buffer zone.
- 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.
- In case of fog or reduced visibility, the observers must be able to see the shutdown zones or pile driving/removal will not be initiated until visibility in these zones improves to acceptable levels.
- During impact pile driving, the marbled murrelet monitoring protocols will be run concurrently with the above described monitoring efforts.

3.6.2. Visual Survey Protocol – During Activity Monitoring

The shutdown and buffer zones will be monitored throughout the time required to install or remove a pile (including the soft start procedures[5]), or complete other in-water construction as

[5] The sequence of the soft-start procedures includes a minor deviation from those typically requested by the NMFS which utilize a longer waiting period (one minute vs. 30 seconds). The Navy requested to change the waiting period

defined in Section 3.4. If concurrent marbled murrelet monitoring reveals that marbled murrelets are present or have entered the shutdown zone for that species, impact pile driving will not start and surveys will continue until the marbled murrelets leave the shutdown zone voluntarily per the Marbled Murrelet Monitoring Plan. 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 buffer zone 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 (injury) zone, at which point all pile installation/removal activities associated with that rig and other in-water construction 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. Shutdown at one pile driving location may not necessarily trigger shutdowns at other locations where pile driving is occurring concurrently.
- 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 (see Section 3.4 for additional details).
- Once a shutdown has been initiated, pile installation/removal activities at that rig 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.
- During the in-water construction delay, surveys will continue to be conducted and pile driving and other in-water construction activities will not resume until the shutdown zone has been deemed clear of all marine mammals.
- Once marine mammals are no longer 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 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 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.
- 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.

because observational data during the Test Pile Program and EHW-1 repairs indicated a one minute wait period may be too long. Longer breaks between the sounds may be interpreted by the animals as a transient sound, and may not serve the intended purpose to provide an indication that louder sounds are about to begin. The Navy consulted with NMFS regarding using a shorter waiting period (i.e. 30 seconds) and the Service found the Navy's reasoning to be valid and accepted the requested modification.

- Observers will use binoculars and the naked eye to search continuously for marine mammals.
- In case of fog or reduced visibility, the observers must be able to see the shutdown zones or pile driving/removal and in-water construction activities will not be initiated until visibility in these zones improves to acceptable levels.
- During impact pile driving the marbled murrelet monitoring protocols will be run concurrently with the above described monitoring efforts.

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/ removal 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 would apply. During these surveys, if any injured, sick, or dead marine mammals are observed procedures outlined in Section 4.0 should be following regarding notifying the appropriate authorities.

3.6.4. Acoustic Measurements

The Navy will conduct acoustic monitoring for impact and vibratory installation/removal activities associated with the EHW-2 project in order to determine the actual distances to the underwater and airborne thresholds for marine mammals. These include the 190 dB re 1µPa rms,180 dB re 1µPa rms,160 dB re 1µPa rms and 120 dB re 1µPa rms underwater isopleths, and the 100 dB re 20 µPa and 90 dB re 20 µPa unweighted airborne isopleths. The Navy may place additional hydrophones/microphones at other distances and depths as appropriate to accurately capture sound propagation characteristics at the project area. Ambient underwater and airborne conditions in the absence of pile driving activities may also be recorded for comparison. The Navy's Acoustic Monitoring Plan provides the specific details of the acoustic monitoring requirements and protocol for collecting both underwater and airborne sounds.

4.0 INTERAGENCY NOTIFICATION

The Navy anticipates that monitoring/shutdown zones may need to be modified as a result of acoustic data obtained during the monitoring period, and to reflect other conditions relating to construction activities and marine mammal species occurrence. 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.

5.0 MONITORING REPORTS

Two reports documenting marine mammal observations will be submitted to NMFS during the first in-water work season: (1) The acoustics monitoring report will summarize marine mammal observations that occurred during the acoustic monitoring period [30 days from start of monitoring, or until the Navy is able to capture a representative acoustic sample of the major pile driving scenarios described under the modeled conditions (impact hammer and vibratory driving, smaller [24-in to 36-inch] and larger [48-inch] piles, plumb and batter piles)]; and (2) a comprehensive annual marine mammal monitoring report documenting marine mammal observations during the entire first in-water work window. For each subsequent year of construction only an annual marine mammal monitoring report will be submitted after the end of each in-water work period.

The acoustic monitoring report will summarize the acoustic results obtained during the acoustic monitoring period for each representative pile driving scenario, and if possible, will correlate marine mammal sightings and behavioral observations to potential acoustic received levels. The report will include an estimation of the number of potential takes which have occurred thus far for the project, any adverse responses to construction activities by marine mammals, and actions taken to solve these problems. The draft acoustic monitoring report will be submitted to NMFS within 90 calendar days following the end of the acoustic monitoring period. The final acoustic monitoring report will be prepared and submitted to NMFS within 30 calendar days following resolution of comments received from the resource agencies on the draft interim report.

The draft comprehensive marine mammal monitoring report will be submitted to NMFS within 90 calendar days of the end of each 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)
    - General information regarding the bottom substrate into which the piles are driven
- Specific pile driving data:
    - Description of the pile driving activity being conducted (pile locations, pile driving naming system, 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 (either vibratory or impact) 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.
    - Impact or vibratory hammer force used to drive/extract the piles
    - Summary of representative underwater and airborne acoustic measurements for the different size of piles (i.e. 24, 26, or 48 inch), installation/removal methods (impact or vibratory;), and pile positioning (i.e. batter versus plumb)

- 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 is 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.

6.0 REFERENCES

Slater, M.C. 2009. Naval Base Kitsap, Bangor baseline underwater noise survey report. Prepared by Science Applications International Corporation, Bremerton, WA. Prepared for BAE Systems Applied Technologies, Inc., Rockville, MD.

Washington Department of Transportation (WSDOT). 2011. Biological assessment preparation for transportation projects Advanced training manual, version 02-2011. Washington State Department of Transportation, Olympia, WA.

APPENDIX A

MARINE MAMMAL OBSERVATION RECORD FORM

APPENDIX A

MARINE MAMMAL OBSERVATION RECORD FORM

Project Name: ______________________________

Monitoring Location____________________________
(Pier Location, Vessel based, Land Location, other)

Page __________ of _________

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 Behavior Code: ____	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	
		: : : :					m or km °	m or km	/ / ___ calves	opening closing parallel none Behavior Code: ____	PRE POST SSV SSI V I PC DP ST NONE	Y N	DE SD	B P M G E			Ligh tMod Heavy	N or S W or E	
		: : : :					m or km °	m or km	/ / ___ calves	opening closing parallel none Behavior Code: ____	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	
		: : : :					m or km °	m or km	/ / ___ calves	opening closing parallel none Behavior Code: ____	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	
		: : : :					m or km °	m or km	/ / ___ calves	opening closing parallel none Behavior Code: ____	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	
		: : : :					m or km °	m or km	/ / ___ calves	opening closing parallel none Behavior Code: ____	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	
		: : : :					m or km °	m or km	/ / ___ calves	opening closing parallel none Behavior Code: ____	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	

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
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
OTH	Other

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 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.

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 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

BEAUFORT SEA STATE SCALE

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 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.	
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.	

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.	
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 FORM

<table>
<tr><th colspan="5">Chain of Custody Record</th></tr>
<tr><td>Date and Time of Collection:</td><td colspan="2">Duty Station:</td><td colspan="2">Collection By:</td></tr>
<tr><td colspan="2">Source of Specimen (Person and/or Location)
Found At:</td><td colspan="3">Project Name:</td></tr>
<tr><td>Item No:</td><td colspan="4">Description of Specimen (include Species and Tag Number):</td></tr>
<tr><td rowspan="2">Item No:</td><td>From: (Print Name, Agency)</td><td>Release Signature:</td><td>Release Date:</td><td rowspan="2">Delivered via:
FEDEX
U.S. Mail
In Person
Other:</td></tr>
<tr><td>To: (Print Name, Agency)</td><td>Receipt Signature:</td><td>Receipt Date:</td></tr>
</table>

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:	