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SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

EXPLOSIVES HANDLING WHARF 1 PILE REPLACEMENT PROJECT

NAVAL BASE KITSAP AT BANGOR

SILVERDALE, WA

March 16, 2012

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Department of the Navy

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ACRONYMS AND ABBREVIATIONS

CV	Coefficient of Variation
dB	Decibel
DPS	Distinct Population Segment
EA	Environmental Assessment
EHW-1	Explosives Handling Wharf #1
EHW-2	Explosives Handling Wharf #2
ESA	Endangered Species Act
FONSI	Finding of No Significant Impact
FR	Federal Register
GPS	Global Positioning System
Hz	Hertz
IHA	Incidental Harassment Authorization
K/B	Keyport/Bangor
kHz	Kilohertz
kg	Kilogram
km	Kilometer
m	Meter
MHHW	Mean Higher High Water
MMPA	Marine Mammal Protection Act
Navy	United States Navy
NBK	Naval Base Kitsap
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOA	Notice of Availability
OPNAVINST	Office of the Chief of Naval Operations Instruction
RMS	Root Mean Square
SEA	Supplemental Environmental Assessment
SEL	Sound Exposure Level
SPL	Sound Pressure Level
SSL	Steller Sea Lion
Sq	Square
U.S.	United States
WAC	Washington Administrative Code
WRA	Waterfront Restricted Area
ZOI	Zone of Influence

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1 DESCRIPTION OF ACTIVITIES

1.1 Introduction

The Navy has prepared this Supplemental Environmental Assessment (SEA) to supplement the environmental analysis contained in the *Final Environmental Assessment, Explosives Handling Wharf 1 Pile Replacement Project, Naval Base Kitsap at Bangor,* herein referred to as the Final Environmental Assessment (EA)[1]. The Final EA and coordination with regulatory agencies and tribes concluded that the proposed action at Naval Base Kitsap (NBK) at Bangor would not significantly impact the quality of the human or natural environment or generate significant controversy. As a result, a Finding of No Significant Impact (FONSI) was signed on July 25, 2011[2].

Per the Office of the Chief of Naval Operations Instruction (OPNAVINST) 5090.1C (Change 1), Environmental Readiness Program Manual, of July 2011, a supplemental EA is to be prepared to amend an original environmental planning document when the action proponent determines that:

- Substantial changes have been made in the proposed action that is beyond the scope of the original environmental planning document (e.g., new or additional alternatives are being considered);
- Significant new circumstances occur or information becomes available that could affect the proposed action and its potential environmental impacts (e.g., baseline conditions have changed or new analytical methodologies are available to assess potential environmental impacts); or
- Navy determines that Navy interests or the purposes of the National Environmental Policy Act (NEPA) or executive order 12114 will be furthered by doing so.

The Navy determined that a supplemental analysis was required to address the following changes that occurred and new information made available since the FONSI:

- The Navy reinitiated consultation with National Marine Fisheries Service (NMFS), Northwest Region under the Endangered Species Act (ESA) for incidental takes of Steller sea lions. The Final EA concluded that Steller sea lions would not be expected to occur in the July to October construction window; however, Steller sea lions were observed during construction activities in October 2011.
- Consultation with NMFS includes the humpback whale. The humpback whale was not considered in the Final EA based on limited occurrences over the last several decades in Hood Canal. A single humpback whale was documented in the Hood Canal over a period of weeks in January and February 2012.
- The Navy is requesting an Incidental Take Authorization (IHA) for the remaining construction work (second year). An IHA was issued for the first year of construction.

[1] The Final EA prepared by the Navy addressing this action is on file and interested parties may obtain a copy from: Commanding Officer, Naval Facilities Engineering Command Northwest, 1101 Tautog Circle, Silverdale, WA 98315.

[2] A Notice of Availability (NOA) for the FONSI was published in the Kitsap Sun for three consecutive days (May 25 to May 27, 2011).

- The project includes installation and removal of eight 16-inch diameter steel false work piles. The installation and removal of these false work piles was not included in the proposed action in the Final EA.
- Vibratory removal of piles and pneumatic chipping will occur from July 16, 2012 through February 15, 2013, instead of ending October 31, 2012, per the Final EA.

The Final EA covered both years of construction; however, NMFS approved an IHA for the first year of construction only. The Navy is requesting an IHA for remaining construction activities that have the potential to affect marine mammals during the second year of construction beginning July 2012. The proposed remaining project activities that could result in behavioral harassment to marine mammals are vibratory removal of steel piles and pneumatic chipping for concrete pile removal.

1.2 Proposed Action

The proposed action remains as described in the Final EA. That document described and analyzed a two-year project for the restoration of the Explosives Handling Wharf (EHW-1)'s structural integrity; the Navy is in the second year of that project. Thus, the proposed action remains the same. The impacts and analysis affecting the remainder of the project have changed, however, which is why the Navy has undertaken this Supplemental EA. Table 1-1 provides a description of activities completed during the 2011/2012 in-water work window (year 1 of construction). Table 1-2 provides a description of remaining activities to be completed in the 2012/2013 in-water work window (year 2 of construction). The Final EA included installation of 28 piles and removal of 138 piles; however, 36 piles were installed and only 136 piles will be removed.

Table 1-1. Construction Activities Completed – First Year

Installation of twelve 30-inch diameter hollow steel pipe piles (approximately 74-122 feet [23-37 meters] long at the walkway)
Installation of sixteen 30-inch diameter hollow steel pipe piles (approximately 130 feet [40 meters] long at EHW-1 bents 8-10)
Installation of eight 16-inch diameter steel falsework piles
Removal of two 24-inch diameter steel fender piles at the main wharf and associated fender system components
Removal of eight 12-inch diameter steel fender piles
Construction of 6 cast-in-place concrete pile caps (scheduled for early 2012)

Table 1-2. Construction Activities Proposed – Second Year

Removal of one 24-inch diameter steel fender pile at the main wharf and associated fender system components (to be cut-off at mudline)
Removal of twenty-one 12-inch diameter steel fender piles
Removal of ninety-six 24-inch diameter hollow pre-cast concrete piles to the mud line
Removal of eight 16-inch diameter steel falsework piles
Removal of the EHW-1 fragmentation barrier and walkway
Construction of up to 6 cast-in-place concrete pile caps (if not completed as scheduled for early 2012)
Installation of a pre-stressed concrete superstructure for the walkway
Installation of four sled-mounted passive cathodic protection systems
Installation/re-installation of related appurtenances

Table 1-3 compares pile installation and removal activities completed in the 2011/2012 in-water work window to activities that remain to be completed in the 2012/2013 in-water work window. While impact pile driving was authorized for the project during the first in-water construction season, no impact pile driving is necessary to complete the repairs. Since all pile installation was completed within the first in-water construction season, the Navy does not anticipate requiring the use of an impact hammer for the remainder of the project. The proposed action described here only includes remaining project activities at EHW-1 that were not completed during the first year of construction.

Table 1-3. Pile Installation/Removal Activities by In-Water Work Window

Activity Status for Each Construction In-Water Work Window (July 16 through February 15)	Piles Installed via Vibratory Driver		Piles Removed via Vibratory Driver/Direct Pull			Piles Removed via Pneumatic Chipping	Total
	16" steel falsework	30" steel	12" steel fender	16" steel falsework	24" steel fender	24" concrete	
Complete 2011/2012	8	28	8	0	2	0	46
Remaining for 2012/2013	0	0	21	8	1	96	126
Project Total	8	28	29	8	3	96	172

It should be noted that eight falsework (temporary) piles were driven during the first year of construction which were not accounted for in the Final EA or IHA application. These temporary piles were used to support in-water construction activities and will be removed during the second year of construction.

Remaining construction activities include the removal of the fragmentation barrier, walkway, and 126 steel and concrete piles (Table 1-2). Of the piles requiring removal, 96 are 24-inch diameter hollow pre-cast concrete piles, which will be removed down to the mudline with a pneumatic chipping hammer or similar device. An additional twenty-one 12-inch steel fender piles and eight 16-inch false work steel piles will be extracted using a vibratory hammer, direct pull, or, if

necessary, cut off at the mudline. One 24-inch steel fender pile will be cut at the mudline because it is too close to the EHW-1 structure to be extracted. Other remaining project elements to be undertaken in the second phase (year) of the repair project are the installation of four sled-mounted cathodic protection systems, a new pre-stressed superstructure, and related appurtenances. Additionally, if any of the six cast-in-place pile caps scheduled to be constructed early in 2012 (see Table 1-1) are not completed by July 15, 2012; these will also be included in the second year of construction. The pile cap work does not involve in-water work.

In-water project activities will be conducted during the in-water work window that is protective of fish species (July 16 through February 15). Sound propagation data was collected in 2011 through hydroacoustic monitoring during pile installation and removal to support environmental analyses for the first year repair work and other future repair work that may be necessary to maintain the EHW-1 facility and other structures at the Bangor waterfront. In 2011, pneumatic chipping was not conducted; therefore, the Navy anticipates that hydroacoustic monitoring will be conducted for pneumatic chipping during the 2012/2013 in-water work period and included in the second IHA. The presence of marine mammals will also be monitored during vibratory pile extraction and pneumatic chipping.

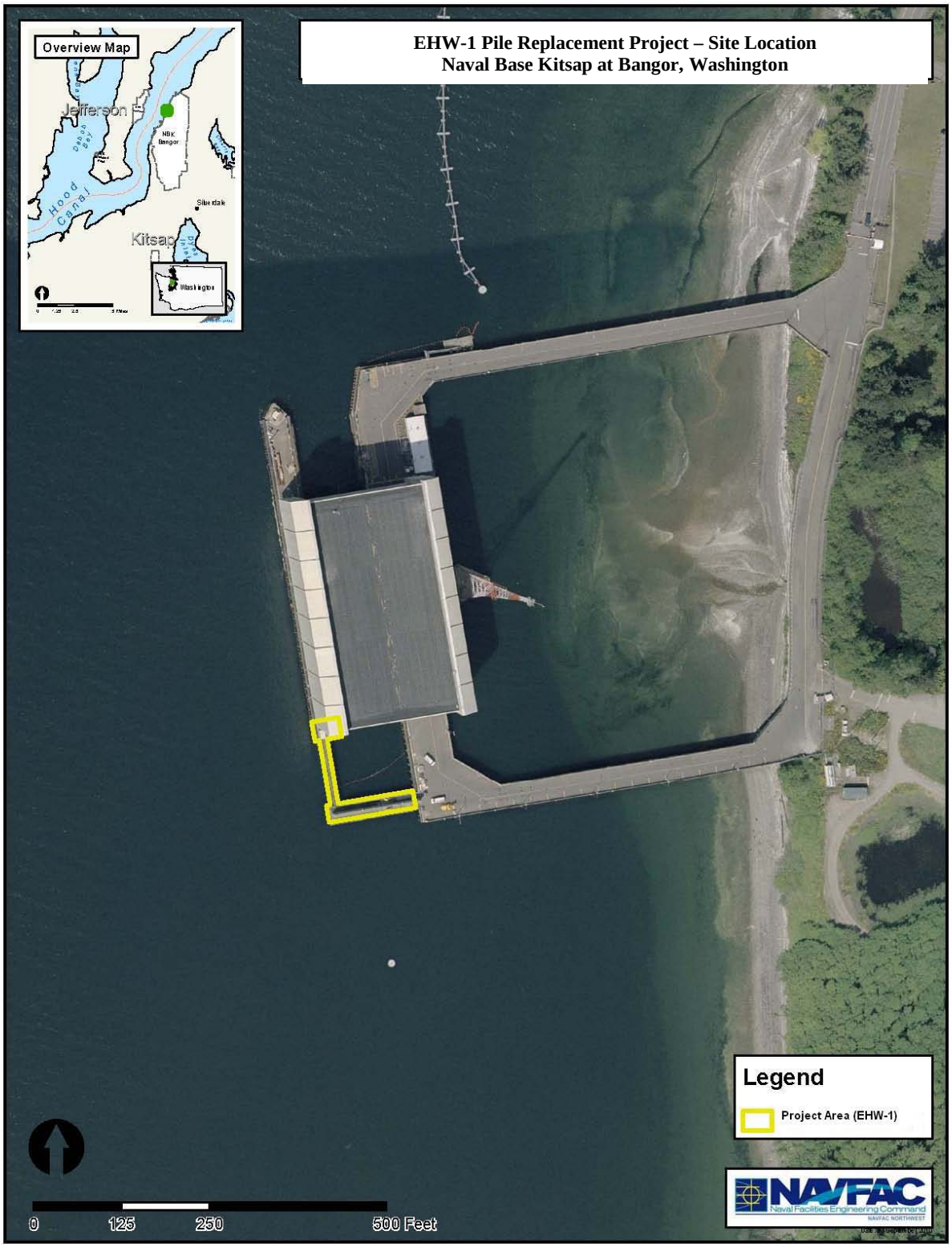

Figure 1-1. Proposed Project Area

1.3 Description of Pile Removal and Remaining Construction Activities

The remaining construction activities at EHW-1 are described in detail below.

- Removal of piles:
  - One 24-inch steel fender pile;
  - Twenty-one 12-inch diameter steel fender piles;
  - Eight 16-inch diameter steel falsework piles; and
  - Ninety-six 24-inch diameter hollow pre-cast concrete piles to the mudline (includes 72 at fragmentation barrier, 4 at walkway, 4 at Bent 8 outboard support, and 8 at Bents 9 and 10).

  The one 24-inch steel fender pile will be cut at the mudline because of its close proximity to the EHW-1 structure. A diver will use a torch to cut the pile at the mudline. All other steel piles will be removed by direct pull (rigging is attached to a pile and a crane pulls on the piling until it is removed) or extracted with a vibratory hammer. If these methods are not feasible, they will be cut off at the mudline.

  Concrete piles will be removed with a pneumatic chipping hammer or another tool capable of cutting through concrete. If possible, a diver using a small pneumatic hammer will first score piles. The pile will then be moved slightly back and forth to break the pile at the score. Remaining parts of the pile will be chipped away with a pneumatic hammer. If there is not room to move the pile, the entire base of the pile will be chipped away with a pneumatic hammer for removal. A pneumatic chipping hammer is similar to an electric power tool, and performs much like a smaller version of a jackhammer, but uses the energy of compressed air instead of electricity. The pneumatic chipping hammer basically consists of a steel piston that is reciprocated (moved backward and forward alternately) in a steel barrel by compressed air. On its forward stroke, the piston strikes the end of the chisel. The reciprocating motion of the piston occurs at such a rate that the chisel edge vibrates against the concrete with enough force to fragment or splinter the pile. Rebar strands in the piles will be torched to cut and remove. Concrete debris will be captured as practicable using debris curtains/sheeting and removed from the project area. Removed piles and/or pile pieces will be placed on a barge for upland disposal.

- Removal of the concrete fragmentation barrier and walkway. The walkway is used to get from the Wharf Apron to the Outboard Support. These structures will likely be removed by cutting the concrete into sections using a wire saw, or other equipment, and removed using a crane. The crane will lift the sections from the existing piles and place them on a barge. Concrete pieces will be hauled to a barge for upland disposal.

- Construction of cast-in-place concrete pile caps. The pile caps will be situated on the tops of the steel piles that are located directly beneath the structure and function as a load transfer mechanism between the superstructure and the piles. Concrete formwork may be located below water level at high tide (Mean Higher High Water [MHHW]).

- Installation of a pre-stressed concrete superstructure for the walkway. The superstructure is the pre-stressed concrete deck of the wharf found above, or supported by, the caps or

sills, including the deck, girders, and stringers. It will be installed using a barge-based crane to situate the concrete slab above the piles.

- Installation of four sled-mounted passive cathodic protection systems. A passive cathodic protection system is a metallic rod or anode that is attached to a metal object to protect it from corrosion. The anode is composed of more active metal that is more easily oxidized, thus it corrodes first and acts as a barrier against of the structural member to which the anode is attached. At the EHW-1 facility, the passive cathodic protection systems will be banded to the steel piles to prevent the metallic surfaces of the wharf from corroding due to the saline conditions in Hood Canal.

- Installation/re-installation of related appurtenances would follow. Appurtenances are the associated parts of the superstructure that connect the superstructure to the piles. These pieces include all of the components such as bolts, welded metal hangers and fittings, brackets, etc.

Vibratory removal of piles and pneumatic chipping will occur from July 16, 2012 to February 15, 2013. The installation of the concrete pile caps, the concrete superstructure, and sled mounted passive cathodic protection systems will occur out of the water and on the tops of the piles or attached to the wharf's superstructure. The removal of the fragmentation barrier and walkway will occur above the water with best management practices in place to prevent material from entering the water. While these activities will generate airborne noise that may enter the water, this is expected to be minimal. However, to be cautious, these activities will occur in the window of July 16 to February 15 to minimize impacts to listed species, particularly fish.

The Navy will monitor hydroacoustic sound levels associated with pneumatic chipping, as well as the presence and behavior of marine mammals during vibratory pile removal and pneumatic chipping activities.

1.4 Duration of Activities

No in-water work will begin until all required permits and approvals are in place. The remaining work will occur during the construction window scheduled to begin in July 2012. All in-water construction, including vibratory pile extraction and pneumatic chipping, will be limited to July 16, 2012 through February 15, 2013 (215 days).

The contractor estimates that steel pile extraction will occur at an average rate of two piles per day. Steel piles will be extracted using a vibratory hammer, direct pull, or they will be cut at the mudline. Extraction is anticipated to take approximately 30 minutes per pile. Concrete piles will be removed using a pneumatic chipping hammer or other similar concrete demolition tool. It is estimated that concrete pile removal could occur at a rate of five piles per day maximum, but removal will more likely occur at a rate of three piles per day. Concrete piles are expected to take a maximum of two hours of chipping per pile, or potentially six hours per day. Therefore, while 215 days of in-water work time is proposed for vibratory extraction or pneumatic chipping, only a fraction of the total work time per day will actually be spent conducting these activities. An average workday is approximately 8 to 9 hours, depending on the month. While its anticipated that only one hour of vibratory pile extraction will be needed per day for steel piles, or 6 hours of

pneumatic chipping will be needed for concrete piles, to account for deviations from the estimated times for pile removal, the Navy modeled the potential impact as if the entire day could be spent conducting vibratory pile removal or pneumatic chipping.

Based on the proposed action, the total duration for vibratory steel pile removal is estimated to be 15 days (29 steel piles at an average of two per day). The total time for concrete pile removal using a pneumatic chipping hammer would be 32 days (96 piles at an average of three per day).

2 ENVIRONMENTAL IMPACTS

Existing environmental conditions and the impacts resulting from the second year of the proposed action are consistent with what was evaluated in the Final EA with the exception of the occurrences and estimated densities of marine mammals. Therefore, only marine mammals will be discussed in detail in this SEA. Impacts to the following resource areas are unchanged and will not be discussed:

- Bathymetry
- Geology and Sediments
- Water Resources
- Air Quality
- Airborne Noise
- Marine Vegetation
- Benthic Invertebrates
- Fish
- Birds
- Cultural Resources
- Environmental Health and Safety
- Socioeconomics
- Coastal Zone Management

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3 MARINE MAMMAL SPECIES AND NUMBERS

Based on marine mammal monitoring conducted during the first year of construction, the data provided in the Final EA for the Steller sea lion and harbor porpoise has been revised in this Supplement. In addition, based on recent observations in Hood Canal, data has been provided for the humpback whale, which was not included in the Final EA. Tables 3-1, 3-2, and 3-3 provide updated data (italicized) on these species and their estimated densities within the Project Area.

Table 3-1. Steller Sea Lions Historically Sighted in Hood Canal in the Vicinity of NBK at Bangor

	Stock(s) Abundance	Season(s) of Occurrence	Relative Occurrence	Density (Individuals/ sq km) Within In-water Work Season
2011 EA	45,095-55,832	Fall to late spring (Nov – mid-April)	Rare to occasional use	0.00
2012 Supplement	*58,334–72,223*	*October – mid-April*	*Common*	*0.028*

The Final EA indicated that Steller sea lions enter the project area in November. During the first year of construction, Steller sea lions were observed as early as October. Therefore, the data has been updated to illustrate a common relative occurrence and that the Steller sea lion use of Hood Canal extends from October to April. As a result, the density of Steller sea lion has increased from 0 to 0.028 individuals per square kilometer.

Table 3-2. Harbor Porpoise Historically Sighted in Hood Canal in the Vicinity of NBK at Bangor

	Stock(s) Abundance	Season(s) of Occurrence	Relative Occurrence	Density (Individuals/ sq km) Within In-water Work Season
2011 EA	10,682	Year-round	Rare to occasional use	0.011
2012 Supplement	10,682	Year-round	*Occasionally present*	*0.250*

Based on monitoring reports, the density of harbor porpoises has increased from 0.011 to 0.25 individuals per square kilometer. The relative occurrence of the harbor porpoise has been updated from “rare to occasional use” to “occasionally present.”

Table 3-3. Humpback Whale Historically Sighted in Hood Canal in the Vicinity of NBK at Bangor

	Stock(s) Abundance	Season(s) of Occurrence	Relative Occurrence	Density (Individuals/ sq km) Within In-water Work Season
2011 EA	n/a	n/a	n/a	n/a
2012 Supplement	2,043[3] (Coefficient of Variation [CV]=0.10)	Year-round in Puget Sound	Extremely rare	0.003

While occurrences are extremely rare, one humpback whale was recently documented in Hood Canal over a period of several weeks; therefore, its density has been calculated to be 0.003 individuals per square kilometers.

3.1 ESA-listed Marine Mammals

3.1.1 Steller Sea Lion (*Eumetopias jubatus*)

Population Abundance

The eastern distinct population segment (DPS) of Steller sea lions includes the species distribution east of 144°W longitude (Loughlin 1997), including southeast Alaska, Canada, Washington, Oregon, and California (62 Federal Register [FR] 30772). The eastern stock was estimated by NMFS in the *Recovery Plan for the Steller Sea Lion* to number between 45,000 to 51,000 animals (NMFS 2008a). This stock has been increasing approximately 3% per year over the entire range since the late 1970s (NMFS 2008a; Pitcher et al. 2007). The most recent population estimate for the Eastern stock ranges from 58,334 to 72,223 (Allen and Angliss 2011).

he Eastern stock is stable or increasing throughout the northern portion of its range (Southeast Alaska and British Columbia) and stable or increasing slowly in the central portion of its range (Oregon through northern California) (Angliss and Outlaw 2008; Olesiuk 2008). Steller sea lion numbers in southern and central California have declined from historic numbers, but they have been relatively stable since 1980. Although the population size has increased overall, the status of this stock relative to its optimum sustainable population is unknown (Angliss and Outlaw 2008).

Steller sea lions occupy major winter haul-out sites on the coast of Vancouver Island in the Strait of Juan de Fuca and the Georgia Basin (Bigg 1985; Olesiuk 2008); the closest breeding rookery to the project area is at Carmanah Point near the western entrance to the Strait of Juan de Fuca. In Washington inland waters, up to 10 animals have been observed at Toliva Shoals in south Puget Sound (Jeffries et al. 2000), and up to six individuals have been observed on NBK Kitsap at Bangor (Bhuthimethee 2008, personal communication; Navy 2010).

Steller sea lions were first documented in Hood Canal in 2008 while hauled out along the Bangor waterfront (Bhuthimethee 2008, personal communication; Navy 2010); they are seasonally present. Beginning in April 2008, Navy personnel have recorded sightings of marine mammals at

known haul-outs along the Bangor waterfront. Steller sea lions have been sighted on the submarines docked at Delta Pier North and Delta Pier South, and on the nearshore pontoons of the floating security fence (Navy 2010). These surveys have taken place frequently (average 14 per month) although without a formal protocol and only include known haul-outs. Steller sea lions were first observed on NBK at Bangor hauled out on a submarine at Delta Pier in November 2008. An independent observation reported four Steller sea lions at the same location on a different day in November 2008 (Bhuthimethee 2008, personal communication). On both occasions, California sea lions were also present, allowing the informants to confirm their identifications based on discrepancies in size and other physical characteristics. Boat-based opportunistic sightings along portions of the Bangor waterfront during the course of fish surveys during spring/summer of 2007 did not detect any Steller sea lions (Figure 7–24 in Agness and Tannenbaum 2009), nor did boat-based protocol marine wildlife surveys conducted during summer/fall 2008 and winter/spring 2009/2010 (Tannenbaum et al. 2009, 2011).

Data provided by Navy personnel since April 2008 have continued to document sightings of Steller sea lions at Delta Pier from November through April. Steller sea lions have only been observed hauled out on submarines docked at Delta Pier. Delta Pier and other piers on NBK at Bangor are not accessible to pinnipeds, with the exception of smaller California sea lions which are able to haul out on pontoons that support the floating security barrier. One to two animals are typically seen hauled-out with California sea lions; the maximum Steller sea lion group size seen at any given time was six individuals in November 2009. The time period from November through April coincides with the time when Steller sea lions are frequently observed in Puget Sound. Only adult and sub-adult males are likely to be present in the project area during this time; female Steller sea lions have not been observed in the project area. Since there are no known breeding rookeries in the vicinity of the project site, Steller sea lion pups are not expected to be present. By May, most Steller sea lions have left inland waters and returned to their rookeries to mate. Occasionally, sub-adult individuals (immature or pre-breeding animals) will remain in Puget Sound over the summer. However, on NBK at Bangor, Steller sea lions have historically only been observed from November through April and not during the summer months. Recent observational data from daily surveys available from the Test Pile Program noted the presence of Steller sea lions along NBK at Bangor in October for the first time. Steller sea lions arrived on October 8, 2011 and were seen during surveys every day of the remaining 12 days of the project. Up to four individuals were sighted either hauled-out at the submarines docked at Delta Pier or swimming in the waters just adjacent to the base. These sightings were incorporated into the data in Table 3-4 used to estimate the density of Steller sea lions for the month of October.

Table 3-4. Steller Sea Lions (SSL) Observed on NBK at Bangor, April 2008 - October 2011

	Number of Surveys with SSL present	Number of Surveys	Frequency of SSL presence at survey sites[1]	Monthly Average of Maximum Number Observed	Density (animals/sq km)[2]
January	4	25	0.16	1.0	0.024
February	1	28	0.04	0.5	0.012
March	4	28	0.14	1.0	0.024
April	5	38	0.13	1.3	0.031
May	0	44	0.00	0.0	0
June	0	44	0.00	0.0	0
July	0	31	0.00	0.0	0
August	0	29	0.00	0.0	0
September	0	26	0.00	0.0	0
October	12	38	0.32	1.3	0.031
November	3	22	0.14	5.0	0.12
December	5	24	0.21	1.5	0.036
Totals	**34**	**377**	**Average: 0.095**	**Average Within In-Water Work Season: 1.16**	**Within In-Water Work Season: 0.028**

1. Frequency is the number of surveys with Steller sea lions present/number of surveys conducted.
2. For consistency, density estimates were derived from the Explosives Handling Wharf #2 (EHW-2) IHA application. The EHW-2 project is located adjacent to Explosives Handling Wharf #1 (EHW-1). The EHW-2 application was submitted to NMFS December 2011. Density was calculated as the monthly average of the maximum number of individuals present during Navy surveys at known haul-outs divided by the area defined by the 120 dB behavioral harassment isopleth for vibratory pile installation (41.4 sq km). The 41.4 sq km area used in the calculation is slightly larger than the 120 dB behavioral harassment isopleths (35.9 sq km) used in this application for vibratory extraction. However, because both projects would occur in the same location within Hood Canal, the Navy believes the densities should be consistent for both projects. Furthermore, differences in the size of the area used in the density calculation were minor (Steller sea lion densities estimated with the 35.9 sq km area are 0.032).

Based on observations in recent years on NBK at Bangor, Steller sea lions may be seasonally present in the project area (October through April) and overlap with the in-water construction period (mid-July through mid-February). Steller sea lions hauled-out on submarines at Delta Pier would be beyond the areas encompassed by the airborne noise behavioral harassment threshold. The Final EA calculated a distance of seven meters (23 feet) for steel pile removal and four meters (13 feet) for concrete pile removal (chipping hammer). Steller sea lions are unlikely to be affected by construction activities except potentially when vibratory pile extraction or pneumatic chipping is under way. Exposure to noise from vibratory extraction or pneumatic chipping would likely involve sea lions that are moving through the area en route to Delta Pier or during the return trip to Puget Sound. Steller sea lions that are exposed to elevated noise levels could exhibit behavioral changes such as increased swimming speed, increased surfacing time, or decreased foraging. Pile removal would occur only during daylight hours, and therefore would not affect nocturnal movements of Steller sea lions in the water. Most likely, Steller sea lions affected by elevated underwater or airborne noise would move away from the sound source and be temporarily displaced from the affected areas. Given the absence of any rookeries, only one haul-out area near the project site (i.e., submarines docked at Delta Pier), and infrequent attendance by a small

number of individuals at the EHW-1 site, potential disturbance exposures will have a negligible effect on individual Steller sea lions and would not result in population-level impacts.

The Navy determined a reasonable area that Steller sea lions could be expected to utilize in the project area while swimming and foraging, based on available literature, in order to calculate in-water density for sound exposure modeling. Foraging trips of satellite-tracked adult western stock Steller sea lions in Alaska averaged 17 ± 5 km during summer, and 133 ± 60_km in winter (Merrick and Loughlin 1997). Eastern stock Steller sea lions were concentrated within 1 to 13 km (mean 7.0 km) of rookeries off the coast of California during summer and were observed 7 to 59 km offshore (mean 28.2 km) in autumn (Bonnell et al. 1983). Foraging ranges of young-of-the-year animals in Alaska averaged 30 km (Merrick and Laughlin 1997). Winter foraging ranges for adult male eastern stock Steller sea lions in Washington inland waters have not been reported, but can reasonably be expected to be as great as distances reported for females and juveniles. Given these distances, the Navy concluded that it was reasonable to expect that Steller sea lions could travel 30 to 130 km when foraging in inland waters.

The area calculated to be encompassed by the underwater behavioral harassment thresholds (120 dB rms) for EHW-1 pile removal is approximately 36 sq km. Because this project will overlap with the EHW-2 project, for purposes of the analysis, the Navy is utilizing the larger of the two behavioral disturbance areas as defined by both projects. The affected area for EHW-2 was determined to be 41.4 sq km. The 35.9 sq km area for EHW-1 is entirely contained within the larger EHW-2 area used in the analysis. The Navy believes that it is reasonable to expect that Steller sea lions would forage within this area, given their reported foraging distances. Moreover, it is assumed that any sea lions swimming within this area would potentially be subject to exposure to elevated pile extraction noise from the EHW-1 construction site. The density calculation for Steller sea lions uses the average of the monthly maximum number of individuals present during surveys (Table 3-4). The average of the monthly maximum number present during the in-water work window is 1.16 animal. The calculated density of Steller sea lions is 0.028 animal per sq km.

With regard to the range of this species in Hood Canal and the project area, Navy marine biologists assume that the opportunity to haul-out on submarines docked at Delta Pier is a primary attractant for Steller sea lions in Hood Canal. Their haul-out site, submarines docked at Delta Pier (approximately one km from the EHW-1), is within the underwater distance threshold for behavioral harassment due to vibratory pile extraction (10 km) based on calculations in the Final EA. The haul-out site is outside of the underwater disturbance threshold for pneumatic chipping (0.54 km) and airborne disturbance thresholds for both vibratory extraction and pneumatic chipping (7 meters and 4 meters, respectively, for sea lions). It is assumed that animals swimming to and from the submarines may be exposed to disturbing noise levels primarily resulting from vibratory pile extraction because the submarines are within the zone above the 120 dB threshold.

Based on the exposure calculation[3] using the updated data, an average of one individual Steller sea lion per day may experience elevated noise levels that would qualify as harassment while present during the in-water work period for steel vibratory pile extraction. No animals are expected to experience elevated noise levels that would qualify as harassment while present during pneumatic chipping during

[3] The exposure calculation is described in detail in the Final EA (Section 3.9.2.2.1.1). The exposure estimate equals the species density estimate * noise threshold zone of influence (ZOI) impact area * total days of activity.

concrete pile removal. The density analysis assumes an even distribution of animals; however, in reality, Steller sea lion distribution within the project area is patchy with their occurrence concentrated near Delta Pier in groups of 1-4 individuals. As a result, it is more likely that more than one exposure would occur in a day. Accordingly, the Navy has increased the number of requested takes to two exposures per day of pile extraction and one exposure per day of pneumatic chipping, for a total of 62 exposures. Therefore, the total number of Steller sea lion exposures is estimated to be 62 due to behavioral harassment. Table 3-5 depicts the number of acoustic harassments that are estimated from pile extraction both underwater and in-air.

Table 3-5. Number of Potential Exposures of Steller Sea Lions within Various Acoustic Threshold Zones

Season	Density of Steller Sea Lions (sq km)	Activity	Underwater	Airborne
			Behavioral Harassment Threshold (120 dB_{RMS}[3])	Behavioral Harassment Threshold (100 dB_{RMS}[3])
Mid-July – Mid-February	0.028	Vibratory Steel Pile Extraction	30[1]	0
		Pneumatic Chipping	32[2]	0
Total			62	0

1. Density (0.028 sea lion/sq km) multiplied by the zone of influence (ZOI) for behavioral harassment (35.9 sq km) results in a daily abundance of one Steller sea lion in the ZOI (0.028 sea lion/sq km * 35.9 sq km = 1.0052 or 1 sea lion). One multiplied by 15 potential days of pile extraction equals 15 estimated exposures to behavioral harassment. The density calculation assumes an even distribution of Steller sea lions. However, in reality their distribution is patchy with their occurrence concentrated near Delta Pier in groups of one to four individuals. As a result, it is more likely that more than one exposure would occur in a day. To ensure the Navy has adequate coverage, the Navy increased the number of takes requested to two exposures per day for pile extraction, for a total of 30 exposures.
2. Density (0.028 sea lion/sq km) multiplied by the ZOI for behavioral harassment (0.6 sq km) results in a daily abundance of no (zero) Steller sea lions in the ZOI (0.028 sea lion/sq km = 0.0168 or 0). Zero multiplied by 32 potential days of pneumatic chipping equals no (zero) estimated exposures to behavioral harassment. The density calculation assumes an even distribution of Steller sea lions; however, in reality, their distribution is patchy with their occurrence concentrated near Delta Pier in groups of one to four individuals. As a result, it is more likely that more than zero exposures would occur in a day. To ensure the Navy has adequate coverage, the Navy increased the number of takes requested to one exposure per day for pneumatic chipping, for a total of 32 exposures.
3. dB RMS = decibels root mean square

Steller sea lions that are exposed to acoustic harassment could exhibit behavioral reactions. Disturbance from underwater noise impacts is not expected to be significant at the population level because it is estimated that only a small number of Steller sea lions may be affected by acoustic harassment.

3.1.2 Humpback Whale (*Megaptera novaeangliae*)

Status and Management

Humpback whales were listed as endangered under the Endangered Species Preservation Act of 1966 (35 FR 1222) due to commercial whaling. This protection was transferred to the ESA in 1973. For the Marine Mammal Protection Act (MMPA) stock assessment reports, the CA/OR/WA Stock is defined to include humpback whales that feed off the west coast of the continental United States (U.S.). Because the species is listed as endangered under the ESA, the CA/OR/WA stock is automatically listed as "depleted" and "strategic" under the MMPA. The recovery plan for humpback whales was finalized in November 1991 (NMFS 1991). Critical habitat has not been designated for this species in the Puget Sound region.

Distribution

Humpback whales were one of the most common large cetaceans in the inland waters of Washington in the early 1900s (Scheffer and Slipp 1948). Humpback whale sightings were infrequent in Puget Sound and the Georgia Basin through the late 1990s, and prior to 2003, the presence of only three individual humpback whales was confirmed (Falcone et al. 2005). However, in 2003 and 2004, thirteen individuals were sighted in the inland waters of Washington, mostly during the fall (Falcone et al. 2005). Records available for April 2001 to February 2012 include observations in the Strait of Juan de Fuca, the Gulf Islands and the vicinity of Victoria, British Columbia, Admiralty Inlet, the San Juan Islands, Hood Canal, and Puget Sound (Orca Network 2012).

In Hood Canal, humpback whale sightings occurred several times beginning on January 27, 2012 (Orca Network 2012). Review of the sighting information indicates the sightings are of one individual (Calambokidis personal communication 2012). The most recent sighting reported was on February 23, 2012. At the time of this analysis, it is unknown whether the individual has left the Hood Canal. Prior to these sightings, there have been no confirmed reports of humpback whales entering Hood Canal (Calambokidis personal communication 2012). No other reports of humpback whales in the Hood Canal were found in the Orca Network database, the scientific literature, or agency reports. The Hood Canal Bridge was completed in 1961 and may have contributed to the lack of historical sightings (Calambokidis personal communication 2010). Only a few records of humpback whales near Hood Canal (but north of the Hood Canal Bridge) are in the Orca Network database. Two were from the northern tip of Kitsap Peninsula (Foulwater Bluff/Point No Point) and a few others from Port Madison Bay in Puget Sound.

Behavior and Ecology

In the summer, most humpback whales are found in high latitude feeding grounds eating crustaceans, plankton, and small fish. During the summer months, they spend the majority of their time building up blubber to live off in the winter. Humpback whales can consume up to 1,360 kg of food per day (NMFS 2012). In the winter, they congregate in subtropical or tropical waters for mating. The CA/OR/WA stock winters in coastal Central America and Mexico, and the stock migrates to areas ranging from the coast of California to southern British Columbia in summer and fall (NMFS 2012).

Acoustics

Humpback whales, like all baleen whales, are considered low-frequency cetaceans (Southall et al. 2007). Functional hearing for low-frequency cetaceans is estimated to range from 7 Hz to 22 kHz (Southall et al. 2007).

Impacts

With the absence of any regular occurrence adjacent to the project site, with15 days estimated for vibratory extraction expected with short durations per day and with the marine mammal monitoring proposed, the likelihood of exposure is minimal.

The extent of noise from pneumatic chipping is not expected to extend beyond the floating security fence. Humpback whales would not be expected within the floating security barrier; therefore, no exposures would be expected due to pneumatic chipping.

Humpback whales are extremely rare in Hood Canal with only one confirmed record. Based on this data, the density for humpback whales in the Hood Canal is 0.003/km^2 (one individual divided by the area of the Hood Canal [291 km^2]). A seasonal use trend in Hood Canal was not possible to discern from one occurrence. However, humpback whales occur intermittently in all months in other Washington inland waters; therefore, it is assumed the humpback whales could occur year-round. Table 3-6 depicts the number of acoustic harassments and is estimated at zero from vibratory pile extraction and pneumatic chipping. With the absence of any regular occurrence adjacent to the project site and 15 days estimated for vibratory extraction expected with short durations per day and with the marine mammal monitoring proposed, the likelihood of exposure is negligible.

Table 3-6. Number Potential Exposures of Humpback Whales within Various Acoustic Threshold Zones

Season	Density of Humpback Whales [1] (sq km)	Activity	Underwater
			Behavioral Harassment Threshold (120 dB$_{RMS}$)
Mid-July – Mid-February	0.003	Vibratory Steel Pile Extraction	0[2]
		Pneumatic Chipping	0[3]
Total			0

1. Density was calculated as one (the maximum number of individuals present at a given time) (Calambokidis 2012) divided by the area of Hood Canal.
2. Density (0.003 humpback whales/sq km) multiplied by the ZOI for behavioral harassment (35.9 sq km) results in a daily abundance of no (zero) humpback whales in the ZOI (0.003 * 35.9 = 0.1077 or 0). Zero multiplied by 15 potential days of pile extraction equals no (zero) estimated exposures to behavioral harassment.
3. Density (0.003 humpback whales/sq km) multiplied by the ZOI for behavioral harassment (0.6 sq km) results in a daily abundance of no (zero) humpback whales in the ZOI (0.003 * 0.6 = 0.00018 or 0). Zero multiplied by 32 potential days of pneumatic chipping equals no (zero) estimated exposures to behavioral harassment. In addition, the ZOI for pneumatic chipping occurs within the floating security fence. Cetacean species are not documented or expected to occur within the floating security fence.

3.2 Non-ESA Listed Marine Mammals

Harbor porpoise (*Phocoena phocoena*) sightings have increased in Puget Sound and northern Hood Canal in recent years and are now considered to regularly occur year-round in these waters (Calambokidis 2010, personal communication). This may represent a return to historical conditions when harbor porpoises were considered one of the most common cetaceans in Puget Sound (Scheffer and Slipp 1948).Aerial surveys of the inland waters of Washington and southern British Columbia were conducted during August of 2002 and 2003 (J. Laake, unpublished data in Carretta et al. 2011). These aerial surveys included the Strait of Juan de Fuca, San Juan Islands, Gulf Islands, and Strait of Georgia, which includes waters inhabited by the Washington Inland Waters stock of harbor porpoise as well as harbor porpoises from British Columbia. An average of the 2002 and 2003 estimates of abundance in U.S. waters resulted in an uncorrected abundance of 3,123 (CV=0.10) harbor porpoises in Washington inland waters (J. Laake, unpublished data in Carretta et al. 2011). When corrected for availability and perception bias, using a correction factor of 3.42 (1/g(0); g(0)=0.292, CV=0.366) (Laake et al. 1997), the estimated abundance for the Washington Inland Waters stock of harbor porpoise is 10,682 (CV=0.38) animals (Carretta et al. 2011).

Harbor porpoises may be present anywhere in Hood Canal year-round. The Navy conducted nearshore marine mammal boat surveys of the Bangor waterfront area from July to September 2008 (Tannenbaum et al. 2009) and from November to May 2010 (Tannenbaum et al. 2011). During one of these surveys a harbor porpoise was sighted in May in the deeper waters within the waterfront restricted area (WRA) in the vicinity of the existing EHW. Overall, these nearshore surveys indicated a low occurrence of harbor porpoise within the waters adjacent to the base. However, recent marine mammal surveys conducted during the Test Pile Program indicate that the abundance of harbor porpoises within Hood Canal in the vicinity of NBK at Bangor is much more robust than anticipated from existing surveys and anecdotal evidence. During these surveys, while harbor porpoise presence in the immediate vicinity of the base (i.e., within 1 km) remained low, harbor porpoises were frequently sighted within several kilometers of the base, mostly to the north or south of the project area, but occasionally directly across from the proposed EHW-1 project site on the far side of Toandos Peninsula. Based on observations during trackline transect surveys conducted from September through October 2011, harbor porpoises have been seen commonly during surveys with the number of individuals sighted in the deeper water of Hood Canal ranging from no (zero) to eleven individuals, with an average of approximately six animals sighted per day (Navy, in prep.).

Potential exposures could occur if harbor porpoises move through the area on foraging trips when vibratory pile extraction would occur. Harbor porpoises that are taken could exhibit behavioral changes such as increased swimming speeds, increased surfacing time, or decreased foraging. Most likely, harbor porpoises may move away from the sound source and be temporarily displaced from the areas of pile driving. Since their occurrence immediately adjacent to the project site remains low, exposures would likely be at very low sound pressure levels. With approximately 15 days of vibratory extraction expected with short durations per day, the likelihood of exposure is small and, if exposure occurs, it would be brief as animals are traversing the area. Therefore, potential takes by disturbance will have a negligible short-term effect on individual harbor porpoises.
Additionally, because of the abundance of these animals in Hood Canal and other inland waters and the proportion of harbor porpoises that may experience effects relative to the entire stock, the

proposed action would not result in population-level impacts. The extent of noise from pneumatic chipping is not expected to extend beyond the floating security fence. Harbor porpoises would not be expected within the floating security fence; therefore, no takes are expected due to pneumatic chipping.

Harbor porpoises may be present in Hood Canal year-round and are assumed to use the entire area. The Navy conducted vessel-based line transect surveys in the Hood Canal during the Test Pile Program (Navy, in prep.). Over the course of the surveys, the total trackline length was 259.01 kilometers. Sightings of harbor porpoises during these surveys were used to generate a density for Hood Canal. Based on guidance from other line transect surveys conducted for harbor porpoises using similar monitoring parameters (i.e., boat speed, number of observers, etc.) (Barlow 1988; Calambokidis et al. 1993; Carretta et al. 2001), the Navy determined the effective strip width for the surveys to be one kilometer, or a perpendicular distance of 500 meters from the transect to the left or right of the vessel. The effective strip width was set at the distance at which the detection probability for harbor porpoises was equivalent to one, which assumes that all individuals on a transect are detected. Only sightings occurring within the effective strip width were used in the density calculation. By multiplying the trackline length of the surveys by the effective strip width, the total area surveyed during the surveys was 259.01 sq. km. Thirty-five individual harbor porpoises were sighted within this area, resulting in a density of 0.135 animals per sq.km. To account for availability bias [g(0)] or the animals which are unavailable to be detected because they are submerged, the Navy utilized a g(0) value of 0.54, derived from other similar line transect surveys (Barlow 1988; Calambokidis et al. 1993; Carretta et al. 2001). This resulted in a density of 0.250 harbor porpoises per sq. km. Table 3-7 depicts the number of acoustic harassments that are estimated from underwater pile removal.

Table 3-7. Number of Potential Exposures of Harbor Porpoise within Various Acoustic Threshold Zones

Season	Density of Harbor Porpoise [1] (sq km)	Activity	Underwater
			Behavioral Harassment Threshold (120 dBrms)
Mid-July – Mid-February	0.250	Vibratory Steel Pile Extraction	135[2]
		Pneumatic Chipping	0[3]
Total			135

1. Density was calculated as the number of individuals observed in 2011 Test Pile Program surveys covering 259.01 sq km, corrected for detectability g(0) (Navy, in prep.).
2. Density (0.250 harbor porpoise/sq km) multiplied by the ZOI for behavioral harassment (35.9 sq km) results in a daily abundance of nine harbor porpoise in the ZOI (0.250 harbor porpoise/sq km * 35,9 sq km = 8.975 or 9). Nine multiplied by 15 potential days of pile extraction equals 135 estimated exposures from behavioral harassment.
3. Density (0.250 harbor porpoise/sq km)multiplied by the ZOI for behavioral harassment (0.6 sq km) results in a daily abundance of no (zero) harbor porpoise in the ZOI (0.250 harbor porpoise/sq km * 0.6 sq km = 0.015 or 0). Zero multiplied by 32 potential days of pneumatic chipping equals no (zero) estimated exposures from behavioral harassment. Also, the ZOI for pneumatic chipping occurs within the floating security fence. Cetacean species are not documented or expected to occur within the floating security fence.

Based on the density analysis above, up to nine individual harbor porpoises may experience sound pressure levels on a given day that would qualify as harassment. The total number of exposures is calculated to be 135 due to behavioral harassment. Harbor porpoises that are exposed to acoustic harassment could exhibit behavioral changes. Disturbance from underwater noise impacts is not expected to be significant at the population level because it is estimated that only a small number of harbor porpoises may be affected by acoustic harassment relative to the size of the entire stock.

3.3 Summary

Table 3-8 presents the total numbers of exposures anticipated for Steller sea lions and harbor porpoises within the Project Area. All exposure will be Level B disturbance takes from noise levels exceeding the 120 dB RMS underwater threshold for continuous noise from vibratory pile extraction or pneumatic chipping. No exposures are requested for the humpback whale.

Table 3-8. Summary of Potential Exposures during the EHW-1 Pile Replacement Project's Timeframe (July 16 through February 15)

Species	Underwater	Airborne	
	Vibratory Disturbance Threshold (120dB)	Vibratory Disturbance Threshold (100dB)	Vibratory Disturbance Threshold (90dB)
Humpback Whale	0	N/A	N/A
Steller Sea Lion	62	0	N/A
Harbor Porpoise	135	N/A	N/A
Total	**197**	**0**	**0**

Individual marine mammals would possibly be exposed to sound pressure levels during pile removal operations at NBK at Bangor that could result in behavioral disturbance. Any marine mammals that are behaviorally disturbed may change their normal behavior patterns (i.e., swimming speed, foraging habits, etc.) or be temporarily displaced from the area of construction. Any exposures would likely have only a minor effect and temporary impact on individuals and would not result in population level impacts. The sound generated from vibratory pile driving is non-pulsed (e.g., continuous), which is not known to cause injury to marine mammals. Impacts to marine mammals from changes in water quality as a result of pile removal operations would not be expected to occur. Other construction activities associated with installation of the pile caps, appurtenances, passive cathodic system, and new superstructure would occur over the water's surface, but are unlikely to generate airborne or underwater sounds that will affect marine mammal populations.

In accordance with the ESA, the Navy requested informal consultation with NMFS regarding the potential effect of the proposed action on Steller sea lions on August 11, 2010. The Navy received concurrence that the proposed action was "not likely to adversely affect" Steller sea lions on September 2, 2010. NBK is anticipated to reinitiate consultation with the NMFS Regional office on March 30, 2012 for the Steller sea lion. The Navy determined that the proposed action is "likely to adversely affect" the Steller sea lion based on potential exposure to noise levels above 120 dB from vibratory pile extraction and pneumatic chipping and requested incidental take be authorized. A Biological Opinion is anticipated to be received on June 15, 2012 (Appendix A).

In accordance with the ESA, the Navy requested informal consultations with NMFS regarding the potential affect of the proposed action on humpback whales on February 10, 2010. The Navy received correspondence from NMFS on February 17, 2010 stating that the project was thought to have "no effect" to humpback whales based on lack of occurrence in Hood Canal. NBK is anticipated to reinitiate consultation with the NMFS Regional office on March 30, 2012 for the humpback whale. The Navy requested concurrence with its determination that the proposed action is "not likely to adversely affect" the humpback whale based on discountable exposure to

noise levels above 120 dB threshold from vibratory pile extraction and pneumatic chipping. Concurrence is anticipated to be received on June 15, 2012 (Appendix A).

Marine Mammal Protection Act

Acoustic exposure estimates from pile driving operations indicate the potential for Level B harassment as defined by MMPA. No marine mammals would be exposed at levels that would result in injury or mortality. Other construction activities not associated with pile removal would not result in effects that would qualify as Level A or B harassment under the MMPA. Indirect impacts to marine mammals from changes in water quality and prey availability as a result of the EHW-1 Pile Replacement Project are expected to be minimal and would be temporary in nature. Although there may be impacts to individual marine mammals, the impacts at the population, stock, or species level would be negligible. In accordance with the MMPA, the Navy has submitted a request for an Incidental Harassment Authorization (IHA) to NMFS Headquarters for the incidental taking of marine mammals by the proposed action. The Navy submitted the IHA application on February 29, 2012. NMFS Headquarters is anticipated to publish a notice for the proposed incidental harassment authorization on March 30, 2012 with requested comments due by April 30, 2012. The proposed action will not proceed before receipt of the approved IHA, which is anticipated in July 2012.

National Environmental Policy Act

The analysis presented above indicates that construction activities associated with the second year of the Navy's proposed EHW-1 Pile Replacement Project at NBK at Bangor may have impacts to individual marine mammals, but any impacts observed at the population, stock, or species level would be negligible. Therefore, in accordance with NEPA, there would be no significant impact to marine mammal populations from the EHW-1 Pile Replacement Project.

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4 MITIGATION MEASURES

The Navy proposes to employ a number of mitigation measures, discussed below, in an effort to minimize the number of marine mammals potentially affected.

4.1 Shutdown and Buffer Zones

During pile removal with a vibratory driver or chipping hammer, a shutdown zone shall include all areas where the underwater sound pressure levels (SPLs) are anticipated to equal the Level A (injury) harassment criteria for marine mammals (180 dB isopleths for cetaceans; 190 dB isopleths for pinnipeds). However, modeling does not predict a zone of influence for these activities because their anticipated SPLs are below the Level A criteria for injury. To be conservative, 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.

During pile removal with a vibratory driver or chipping hammer, the buffer zone shall include all areas where underwater or airborne SPLs are anticipated to equal or exceed the Level B (disturbance) harassment criteria for marine mammals (underwater: 120 dB RMS isopleths; airborne: 90 dB RMS isopleths for harbor seals or 100 dB RMS isopleths for pinnipeds other than harbor seals). However, because the ZOI for vibratory pile extraction is approximately 35.9 sq. km, the size of this area would make effective monitoring impractical. As a result the Navy proposes to 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 1µPa) for pile removal activities.

The shutdown and buffer zones 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 removal would be completed without cessation, unless the animal approaches or enters the shutdown zone, at which point all pile removal activities will be halted.

4.2 Timing Restrictions

To minimize the number of fish exposed to underwater noise and other disturbance, in-water work will only be conducted during the in-water work window (from July 16 through February 15) for Puget Sound Marine Area 13 as outlined in Washington Administrative Code (WAC)-220-110-271, when juvenile ESA-listed salmonids are least likely to be present. The initial months (July through September) of the timing window overlap with times when Steller sea lions are not expected to be present within the study area.

4.3 Soft Start

The use of a soft-start procedure is believed to provide additional protection to marine mammals by providing warning and/or giving marine mammals a chance to leave the area prior to the

hammer operating at full capacity. Soft-start techniques for vibratory pile extraction will be used, as follows[4]:

> "*The soft-start requires contractors to initiate noise from vibratory hammers for 15 seconds at reduced energy followed by a 30-second waiting period. This procedure should be repeated two additional times.*"

4.4 Daylight Construction

Pile extraction using a vibratory driver or pneumatic chipping hammer and all other in-water construction activities will occur from July 16 through February 15 during daylight hours (sunrise to sunset[5]). Non in-water construction activities could occur between 7:00 AM and 10:00 PM during any time of the year.

[4] The sequence of the soft-start procedures includes a minor deviation from those typically requested by NMFS, which utilize a longer waiting period (one minute vs. 30 seconds). The Navy requested to change the waiting period 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 NMFS found the Navy's reasoning to be valid and accepted the requested modification.

[5] Sunrise and sunset are to be determined based on the National Oceanic and Atmospheric Administration data, which can be found at http://www.srrb.noaa.gov/highlights/sunrise/sunrise.html.

5 MONITORING AND REPORTING MEASURES

5.1 Acoustic Measurements

The Navy will conduct acoustic monitoring for pneumatic chipping of concrete piles to determine the actual distances to the 120 dB re 1µPa RMS isopleths for behavioral harassment relative to background levels. The monitoring plan will address underwater and airborne sounds measurements from pneumatic chipping. Underwater sound levels were measured at the project site in 2011 in the absence of construction activities to determine background sound levels; therefore, they will not be recorded again during this work window. The background levels were recorded over the frequency range from 10 Hz to 20 kHz.

5.2 Visual Marine Mammal Observations

The Navy will monitor the shut down zone and buffer zone before, during, and after vibratory pile extraction or pneumatic chipping. Based on NMFS requirements, the Marine Mammal Monitoring Plan will include the following procedures for vibratory pile or pneumatic chipping pile extraction and other in-water construction activities not involving a vibratory driver or chipping hammer:

- Qualified and trained marine mammal observers (hereafter "observer") will conduct visual monitoring. An observer is a biologist with prior training and experience conducting marine mammal monitoring or surveys who has the ability to identify marine mammal species and describe relevant behaviors that may occur in proximity to in-water construction activities.
- Observers would be located at the best vantage points practicable (e.g., from a small boat, barge, or any other suitable location) in order to properly see the entire shut down zone and safety zone. This may require the use of a small boat to monitor certain areas while also monitoring from one or more land-based vantage points. At least one observer would be assigned to monitor the shutdown zone.
- During all observation periods, observers would use binoculars and the naked eye to search continuously for marine mammals.
- If the shut down zone is obscured by fog or poor lighting conditions, vibratory pile extraction or pneumatic chipping would not be initiated until the shut down zone is visible.
- The shut down and buffer zones around the pile will be monitored for the presence of marine mammals before, during, and after any vibratory pile extraction or pneumatic chipping.
- Pre-Activity Monitoring:
    - The shut down and buffer zones will be monitored for 15 minutes prior to initiating pneumatic chipping, the soft start for vibratory pile extraction, or other in-water construction activities not involving a vibratory driver or chipping hammer (i.e., dead pull, etc.). If a marine mammal(s) is present within the shut down zone prior to start of these activities or during the soft start, the start of pile removal would be delayed until the animal(s) leave the shut down zone. Pile removal would resume only after the observer has determined, through visual

observation or by waiting approximately 15 minutes, the animal(s) has moved outside the shut down zone.

- During Activity Monitoring:
    - The shutdown and buffer zones will also be monitored throughout the time required to remove a pile or complete other in-water construction activities. If a marine mammal is observed entering the buffer zone, an exposure would be recorded and behaviors documented. However, that pile removal or other in-water construction activities would be completed without cessation, unless the animal enters or approaches the shut down zone, at which point all pile removal activities will be halted. However, the shut down provision may be waived in situations where shut down would create an imminent concern for human safety. Pile removal or other in-water construction activities can only resume once the animal has left the shutdown zone of its own volition or has not been re-sighted for a period of 15 minutes.
- Post-Activity Monitoring:
    - Monitoring of the shutdown and buffer zones would continue for 30 minutes following the completion of pile removal.
- The individuals that implement the monitoring protocol will assess its effectiveness using an adaptive approach. Monitoring biologists will use their best professional judgment throughout implementation and will seek improvements to these methods when deemed appropriate. Any modifications to protocol will be coordinated between the Navy and NMFS.

5.3 Data Collection

NMFS requires that at a minimum, the following information be collected on the sighting forms:

- Date and time that pile removal begins or ends;
- Construction activities occurring during each observation period;
- Weather parameters identified in the acoustic monitoring (e.g., percent cover, visibility);
- Water conditions (e.g., sea state, tidal state [incoming, outgoing, slack, low, and high]);
- Species, numbers, and if possible sex and age class of marine mammals;
- Marine mammal behavior patterns observed, including bearing and direction of travel, and if possible, the correlation to sound pressure levels;
- Distance from pile removal activities to marine mammals and distance from the marine mammal to the observation point;
- Locations of all marine mammal observations; and
- Other human activity in the area.

Additionally, based on recent discussions with NMFS Headquarters, they request that the Navy record behavioral observations such that, if possible, the Navy can attempt to determine whether animals can be (or are) "taken" by more than one sound source in a day's operations. For instance, the Navy has agreed to: "Note in behavioral observations, to the extent practicable, if an animal has remained in the area during construction activities. Therefore, it may be possible to identify if the same animal or different individuals are being taken."

5.4 Reporting

A draft report will be submitted to NMFS within 90 workdays 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 would be prepared and submitted to 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 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
  - 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

6 CUMULATIVE IMPACTS

The Final EA concluded that implementation of the proposed action would not result in significant impacts to the environment. The EHW-1 Pile Replacement Project would utilize mitigation measures and monitoring to ensure marine mammals, fish, and birds are protected to the maximum extent possible. Implementation of the proposed action, in conjunction with other past, present, and reasonably foreseeable future actions, would not be expected to result in significant cumulative impacts to the environment. Based on analysis of the new information in the SEA, no significant impacts are expected; therefore, the cumulative impacts analysis provided in the Final EA are accurate.

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7 REFERENCES

Agness, A., and B.R. Tannenbaum. 2009a. Naval Base Kitsap at Bangor marine mammal resource report. Prepared by Science Applications International Corporation, Bothell, WA. Prepared for BAE Systems Applied Technologies, Inc., Rockville, MD.

Allen. B. M., and R. P. Angliss. 2011. Alaska Marine Mammal Stock Assessments, 2010. U.S. Dep. Commerce, NOAA Technical Memorandum NMFS-AFSC-223, 301 p.

Angliss, R.P. and R.B. Outlaw. 2008. Alaska Marine Mammal Stock Assessments, 2007. NOAA Technical Memorandum NMFS-AFSC-180.

Barlow, J. 1988. Harbor porpoise, Phocoena phocoena, abundance estimation for California, Oregon, and Washington: 1. Ship surveys. Fishery Bulletin. 86(3): 417-432.

Bhuthimethee, M. 2008. Mary Bhuthimethee, Marine Scientist, Science Applications International Corporation, Bothell, WA. 25 November, 2008. Personal communication with Bernice Tannenbaum, Wildlife Biologist, Science Applications International Corporation, Bothell, WA, re: Steller sea lions at NBK at Bangor.

Bigg, M.A. 1985. Status of the Steller sea lion (*Eumetopias jubatus*) and California sea Lion (*Zalophus californianus*) in British Columbia. Vol. 77, Canadian Special Publication of Fisheries and Aquatic Sciences. Ottawa: Dept. of Fisheries and Oceans.

Bonnell, M.L., M.O. Pierson, and G.D. Farrens. 1983. Pinnipeds and sea otters of central and northern California, 1980 - 1983: Status, abundance, and distribution. Volume III, Book 1. OCS Study MMS 84-0044. Los Angeles, California: Minerals Management Service.

Calambokidis, J. 2010. John Calambokidis, senior marine mammal biologist and co-founder of Cascadia Research, Olympia, WA. 15 September, 2001. Personal communication with Chris Hunt, Marine Scientist, Science Applications International Corporation, Bothell, WA, re: the rare occurrence of large whales (e.g., gray/humpback whales) occurring south of the Hood Canal Bridge since its construction.

Calambokidis, J. 2012. John Calambokidis, senior marine mammal biologist and co-founder of Cascadia Research, Olympia, WA. 16 February, 2012. Personal communication with Sharon Rainsberry, Biologist, Naval Facilities Engineering Command, U.S. Navy, Bangor WA. re: Information and number of humpback whales present in Hood Canal from January/February 2012 sightings and other documented sightings of humpback whales in Hood Canal.

Calambokidis, J., J. C. Cubbage, J. R. Evenson, S. D. Osmek, J. L. Laake, P. J. Gearin, B. J. Turnock, S. J. Jeffries, and R. F. Brown. 1993. Abundance estimates of harbor porpoise in Washington and Oregon waters. Final Report by Cascadia Research, Olympia, WA, to National Marine Mammal Laboratory, AFSC, NMFS, Seattle, WA. 55 pp.

Carretta, J.V., B.L. Taylor, and S.J. Chivers. 2001. Abundance and depth distribution of harbor porpoise (*Phocoena phocoena*) in northern California determined from a 1995 ship survey. Fishery Bulletin. 99(1): 29-39.

Carretta, J.V., K.A. Forney, E. Oleson, K. Martien, M.M. Muto, M.S. Lowry, J. Barlow, J. Baker, B. Hanson, D. Lynch, L. Carswell, R.L.J. Brownell Jr., J. Robbins, D.K. Mattila, K.

Ralls, M.C Hill. 2011. U.S. Pacific Marine Mammal Stock Assessments: 2010. NOAA-TM_NMFS-SWFSC-476. U.S. Department of Commerce.

Falcone, E., J. Calambokidis, G. Steiger, M. Malleson, J. Ford. 2005. Humpback whales in the Puget Sound/Georgia Strait Region. Proceedings of the 2005 Puget Sound Georgia Basin Research Conference.

Jeffries, S.J., P.J. Gearin, H.R. Huber, D.L. Saul, and D.A. Pruett. 2000. Atlas of seal and sea lion haul-out sites in Washington. Washington State Department of Fish and Wildlife, Wildlife Science Division, Olympia, WA. 150 pp. http://wdfw.wa.gov/wlm/research/papers/seal_haulout/

Laake, J. L., J. Calambokidis, S. D. Osmek, and D. J. Rugh. 1997. Probability of detecting harbor porpoise from aerial surveys: estimating g(0). Journal of Wildlife Management. 61(1):63-75.

Loughlin, T. R. 1997. Using the phylogeographic method to identify Steller sea lion stocks. Pp. 329-341 In A. Dizon, S. J. Chivers, and W. Perrin (eds.), Molecular genetics of marine mammals, incorporating the proceedings of a workshop on the analysis of genetic data to address problems of stock identity as related to management of marine mammals. Soc. Mar. Mammal., Spec. Rep. No. 3.

Merrick, R. L., and T. R. Loughlin. 1997. Foraging behavior of adult female and young-of-the-year Steller sea lions in Alaskan waters. Canadian Journal of Zoology. 75:776-786.

Navy. 2010. Marine mammal surveys at Naval Base Kitsap Bangor – sighting reports.

Navy. 2011. Marine mammal surveys at Naval Base Kitsap Bangor – sighting reports. NAVFAC Northwest Environmental. Naval Base Kitsap at Bangor, Silverdale, WA.

Navy. 2011, In prep. Report on marine mammal monitoring of Test Pile Program at Naval Base Kitsap Bangor (2011). NAVFAC Northwest Environmental. Naval Base Kitsap at Bangor, Silverdale, WA.

NMFS. 2008. Recovery Plan for the Steller Sea Lion (*Eumetopias jubatus*). Revision. National Marine Fisheries Service, Silver Spring, MD. 325 pages.

NMFS. 2012. Humpback Whale (*Megaptera novaeangliae*) http://www.nmfs.noaa.gov/pr/species/mammals/cetaceans/hummpbackwhale.htm accessed on 18 February, 2012.

Olesiuk, P.F. 2008. Abundance of Steller sea lions (*Eumetopias jubatus*) in British Columbia. Research Document 2008/063. Canadian Science Advisory Secretariat, Ottawa.

Orca Network. 2012. Orca Network sighting reports and archives accessed January and February 2012 at http://www.orcanetwork.org.

Pitcher, K. W., P. F. Olesiuk, R. F. Brown, M. S. Lowry, S. J. Jeffries, J. L. Sease, W. L. Perryman, C. E. Stinchcomb, and L. F. Lowry. 2007. Status and trends in abundance and distribution of the eastern Steller sea lion (*Eumetopias jubatus*) population. Fish. Bull. 107(1):102-115.

Scheffer, V.B., and J.W. Slipp. 1948. The whales and dolphins of Washington State with a key to the cetaceans of the west coast of North America. American Midland Naturalist. 39(2):257-337.

Southall, B.L., Bowles, A.E., Ellison, W.T., Finneran, J.J., Gentry, R.L., Greene, C.R. Jr., Kastak, D., Ketten, D.K., Miller, J.H., Nachtigall, P.E., Richardson, W.J., Thomas, J.A. and Tyack, P.L. 2007. Marine mammal noise exposure criteria: initial scientific recommendations. Special Issue of Aquatic Mammals. 33(4): 412-522.

Tannenbaum, B.R., M. Bhuthimethee, L. Delwiche, G. Vedera, and J.M. Wallin. 2009. Naval Base Kitsap at Bangor 2008 Marine Mammal Survey Report. Prepared by Science Applications International Corporation, Bothell, WA. Prepared for BAE Systems Applied Technologies, Inc., Rockville, MD.

Tannenbaum, B.R., W. Hafner, J. Wallin, L. Delwiche, and G. Vedera. 2011. Naval Base Kitsap at Bangor 2009-2010 Marine Mammal Survey Report. Prepared by Science Applications International Corporation, Bothell, WA. Prepared for NAVFAC Northwest, Silverdale, WA.

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APPENDIX A

ESA CONSULTATION

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