

**Protected Species Monitoring Report: Marine  
Mammals and Marbled Murrelet  
Naval Base Kitsap at Bangor  
EHW1 Pile Replacement Project**

1035 Trident Boulevard  
Silverdale, Washington 98135

*for*  
**Triton Marine Construction Corporation**

May 7, 2024



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EHW1 Pile Replacement Project**

**1035 Trident Boulevard  
Silverdale, Washington 98315**

**File No. 0144-590-00**

**May 7, 2024**

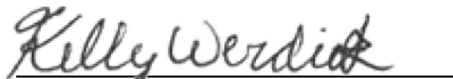
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## 1.0 INTRODUCTION

The U.S. Department of the Navy (Navy) is conducting maintenance, pile replacement, and repair activities at marine waterfront structures over a 5-year period at six installations within Navy Region Northwest (Region). These installations, which are located in the Puget Sound region of Washington State, include: Naval Base (NAVBASE) Kitsap Bangor, NAVBASE Kitsap Bremerton, NAVBASE Kitsap Keyport, NAVBASE Kitsap Manchester, Zelatched Point, and Naval Station (NAVSTA) Everett. During the 2023-2024 in-water work season, the Navy conducted a pile replacement project at NAVBASE Kitsap Bangor Explosives Handling Wharf 1 (EHW1) (Figure 1, Vicinity Map).

The project included installation of eight (8) 30-inch-diameter steel piles and four (4) 12-inch-diameter steel guide piles. The piles were installed with a vibratory hammer until they hit refusal at which point an impact hammer was used. As required by the Letter of Authorization (LOA) issued by the National Oceanic and Atmospheric Administration (NOAA) under the Marine Mammal Protection Act (MMPA) a bubble curtain was employed during impact installation of steel piles where water depths were greater than 0.67 meters (2 feet).

This report summarizes the marine mammal and marbled murrelet monitoring effort implemented for the pile installation activities at EHW1 which occurred from August 14 through September 26, 2023. The effort was implemented in accordance with the LOA dated July 5, 2023 (NOAA 2023) and Marine Mammal Monitoring Plan (MMMP) dated April 2023 for marine mammals (NAVFAC 2023a). Additionally, marbled murrelet monitoring was implemented during impact installation in accordance with the Marbled Murrelet Monitoring Plan dated April 2023 (NAVFAC 2023b).

## 2.0 METHODS

### 2.1. Project Area

Naval Base Kitsap (NBK) at Bangor, Washington is located on the eastern shoreline of Hood Canal approximately 20 miles (32.19 kilometers) due west of Seattle, Washington (Figure 1). NBK at Bangor provides berthing and support services to Navy submarines and other fleet assets. EHW1 is located within the northern portion of NBK at Bangor's Waterfront Restricted Area (WRA) (Figure 1). The entire NBK at Bangor waterfront, as well as the adjacent water areas in the Hood Canal, is restricted to the general public.

The wharf is a U-shaped concrete structure built in 1977 for ordnance handling operations in support of the Trident Submarine squadron home ported at NBK Bangor (Navy 2011). EHW1 consists of two 100-foot (30.5 meters) access trestles and a main pier deck, which measures approximately 700 feet (213 meters) in length and is approximately 500 feet (183 meters) wide. The wharf is supported by both 18-inch and 24 inch-diameter hollow, octagonal, pre-cast concrete piles (approximately 130 feet [40 meters] in length) (Navy 2011). Protected species monitoring was focused on the immediate vicinity of the structure within the WRA, and in the waters immediately adjacent, where sound pressure levels (SPL) associated with pile installation and removal activities could potentially be transmitted.

## **2.2. Project Staffing**

Staff for the EHW1 Project included the Project Manager, marine mammal observers (MMOs), and marbled murrelet observers (MAMUs). MMOs were experienced in marine mammal identification and had the ability to identify marine mammal species and describe relevant behaviors that may occur in proximity to in-water construction activities. MAMUs were experienced in avian identification and certified by the United States Fish and Wildlife Service (USFWS). A total of seven certified MMOs and two certified MAMUs participated in the project. All observers were pre-approved by Navy environmental staff prior to monitoring activities.

## **2.3. Marine Mammal Observation Effort**

### **2.3.1. Observation Stationing**

Observers were outfitted with rangefinders, binoculars, compasses, and tablets with ArcGIS survey123 installed for data collection modeled after the Marine Mammal Observation Record Form. Observers used very high frequency (VHF) radios to communicate during the marine mammal surveys. All observers were supplied with copies of the monitoring plan, LOA, and Biological Opinions on waterproof paper.

#### **2.3.1.1. Vessel Based**

One vessel with an observer was positioned at a distance of approximately 500 meters to monitor the shutdown zones for all cetaceans and the behavioral (level B) zone for harbor seals and sea lions. The vessel would launch for the pre-activity survey, making a pass along the naval perimeter fence from the north end to the south end before stationing for observation approximately 500 meters northwest of the EHW1 trestle.

#### **2.3.1.2. Pier Based**

Two observers were positioned on the EHW1 trestle north and south of the piles to be removed or driven. The positioning of each observer was adjusted in-field to ensure a direct line of site to the shutdown zone around each pile. Care was taken to have line of sight by an observer for the exclusion zone inside as well as outside of the structure.

### **2.3.2. Monitoring Zones**

The monitoring zones were established in the MMMP and included injury and behavioral disturbance monitoring zones (Figure 2, Example Monitoring Zones and Observer Locations).

The behavioral disturbance monitoring zone was established and encompassed as much of the zone where underwater sound pressure levels were estimated to be at or above 160 decibels (dB) re 1 micro-Pascal ( $\mu\text{Pa}$ ) for impact driving and for vibratory driving, the zone where vibratory pile driving noise levels were estimated to be at or above 120 dB Root Mean Square (RMS). The zones were monitored as feasible while being limited to areas inside the security perimeter fence at NBK. During all vibratory pile driving, the shutdown zone for all cetaceans also included the injury zone in addition to the behavioral zone.

The injury zone was calculated to prevent injury to marine mammals from noise due to impact pile driving steel piles and physical interaction with construction equipment. Shutdown zones were conservatively based on calculated injury zones (i.e. slightly larger to be conservative) in order to better shut down injurious activities prior to the potential for marine mammals to enter the injury zone. As such, the shutdown zones

were established by species, pile size, and equipment type. For cetaceans the shutdown zone (harbor porpoise, humpback whale, and transient killer whale) included the injury zone and a portion of the behavioral disturbance zone and that could be practicably monitored from observer positions. Observer positions were established to ensure shutdown reaction times were consistent with limiting injury where possible. Shutdown zones are presented below in Table 1.

**TABLE 1 MINIMUM SHUTDOWN AND MONITORING ZONE (METERS)**

Pile Size/Install Method	Minimum Shutdown Zone					Minimum Observation Zone <sup>1</sup>
	Phocid	Otariid	Cetacean, Low Frequency	Cetacean, Mid Frequency	Cetacean, High Frequency	
30-inch Steel, Impact	160	10	740	630	630	740 <sup>2</sup>
30-inch steel, Vibratory	20	10	40	40	40	<sup>3</sup>
12-inch steel, impact	25	10	400	400	400	400
12-inch steel, vibratory	10	10	20	20	20	<sup>4</sup>

Notes:

<sup>1</sup>Observation of any cetacean within these zones requires shutdown of pile driving activity.

<sup>2</sup>The estimated Level A harassment zone for low-frequency cetaceans exceeds the estimated Level B harassment zone. Therefore, while the shutdown requirement described applies to the monitoring zone for mid- and high-frequency cetaceans, the de facto minimum monitoring zone is equivalent to the largest shutdown zone (i.e., the 740-meter zone for low-frequency cetaceans, Figure 2).

<sup>3</sup>The estimated Level B harassment zone is 11,700 meters. Pursuant to Section 2.5 of the Marine Mammal Monitoring Plan, two observers will be positioned on the pier or shore. Observers at these locations will monitor the Level B harassment zone to the maximum extent possible based on daily visibility conditions.

<sup>4</sup>The estimated Level B harassment zone for 12-inch steel piles is 2,200 meters. Pursuant to Section 2.5 of the Marine Mammal Monitoring Plan, two observers will be positioned on the pier or shore. Observers at these locations will monitor the Level B harassment zone to the maximum extent possible based on daily visibility conditions.

### 2.3.3. Visual Monitoring Protocol

Observers surveyed the injury and behavioral threshold zones 15 minutes prior to the start of any pile driving through 30 minutes after the completion of pile driving work. General site conditions, including weather, visibility, and sea state were recorded along with species occurrence and behavioral observations.

## 2.4. Marbled Murrelet Monitoring

### 2.4.1. Observation Stationing

The spacing and placement of the monitoring location was implemented to provide coverage of the entire shutdown zone and make general observations on seabird occurrence at regular intervals. Locations were generally outside of EHW1 along the trestle closest to the impact pile driving activity with a secondary observer inside EHW1 to monitor the residual shutdown zone. In all cases, the monitoring location allowed for the entire monitoring area to be fully surveyed within 5 minutes. After several monitoring events, monitoring locations were refined in the field to drop the secondary observer as the residual shutdown zone

was always eclipsed by the work barge. The marbled murrelet exclusion zone available for marbled murrelets to occur (i.e., not obstructed by the pile driving barge) could be effectively monitored by a single marbled murrelet observer located on the trestle closest to impact pile driving operations by moving plus or minus 10 meters and completing two sweeps within the 5-minute period. This field refinement in observation approach was implemented for future impact pile driving operations with a rationale transmitted to Triton Marine Construction Corporation (Titan) on September 7, 2023.

#### **2.4.2. Monitoring Zone**

The monitoring zone for marbled murrelets was calculated to be 36 meters for impact pile driving of 30 inch steel piles. Any instance of a marbled murrelet (or bird not positively identified) seen within this zone or approaching the zone during impact pile driving would result in a shutdown of pile driving activities. Observer(s) were positioned at an appropriate land-based vantage point(s) to scan for marbled murrelets within the monitoring zone. The land-based vantage points always had an unobstructed view of the open water monitoring zone.

#### **2.4.3. Visual Monitoring Protocol**

Pile driving did not begin until the monitoring pre-sweep had been conducted. The pre-sweep monitoring started once there is enough daylight for adequate visibility and must begin at least 30 minutes before the initiation of pile driving through 15 minutes post-completion of impact pile driving. Since impact pile installation operations began in August 2023 and were completed before September 23, 2023 during the nesting season, pile driving was held until 2 hours after sunrise and completed 2 hours prior to sunset.

The observers were tasked with documenting the number and general location of all marbled murrelets in the monitoring area. Additional information on other seabirds and behaviors were also collected during observations to improve general data knowledge on seabird presence and distribution as well as potential project impacts on various seabirds. Each observer recorded information such as species, number, location, and behavior of any seabirds during observation efforts every 2 hours at a minimum. Other alcid present in the area were also documented when observed outside of the prescribed seabird monitoring interval.

All marbled murrelet observers were land based for this pile installation effort. No impact pile driving was allowed when visibility is significantly limited such as during heavy rain, fog, glare, or in a Beaufort Sea state greater than 2.

Once impact pile driving was completed for the day, a shoreline survey was performed each day looking for birds potentially adversely impacted by pile driving activities. Approximately 0.6 kilometers of shoreline was surveyed from a slow-moving vessel by an observer using binoculars with the intention of detecting recent seabird mortality.

### **2.5. Piles and Pile Driving Equipment**

Pile driving operations were conducted between August 10 through September 26, 2023. During the EHW1 repairs a total of 12 hollow steel pipe piles were subject to installation or extraction. This includes eight 30 inch steel piles and four 12-inch steel piles. All piles were installed to proposed tip elevation unless refusal was met. All four 12-inch piles were installed with a vibratory hammer only, while all 30-inch piles required a combination of vibratory and impact hammer installation.



Pile-driving equipment was provided and operated by American Construction Co. One APE 200-6 vibratory hammer was used for all vibratory installation and one APE (Delmag) D50 diesel piston driven impact hammer was used for all impact driving for the duration of the project.

### 3.0 RESULTS

Weather conditions were variable as the project occurred during the transition from summer to fall. Conditions were largely clear with no precipitation between August 14 and August 21, 2023. Precipitation continued to be minimal while cloud cover became more consistently overcast moving into September 2023. Primary observed impacts on visibility included instances of fog and smoke.

Mitigative action was taken when protected species were observed within the shutdown zones. The pile driving operators were flagged and driving was stopped until the animal was either confirmed out of the shutdown zone and/or not resighted for a period of 15 minutes. A total of 9 shutdowns were initiated over the course of the project for a total duration of 86 minutes.

All pile driving activity for the project is summarized in Table 2. Raw data collected is provided in Appendix A.

**TABLE 2. GENERAL PILE DRIVE SCHEDULE**

Date	Activity Type	Pile Type	Pile Location	Monitoring Start and Stop	Daily Pile Driving Duration (min)	Total Shutdowns (Count; Duration)
August 14, 2023	Vibratory Installation	30-inch steel	North Bent	0755-1100	46	None
August 15, 2023	Vibratory Installation	30-inch steel	North Bent	0800-1130	41	None
August 21, 2023	Vibratory Installation	30-inch steel	North Bent	0800-1100	79	None
August 22, 2023	Impact Installation	30-inch steel	North Bent	<sup>1</sup>	N/A	None
August 24, 2023	Impact Installation	30-inch steel	North Bent	0930-1630	250	None
August 28, 2023	Vibratory Withdrawal/Installation and Impact Installation	30-inch steel	North Bent	0820-1130	V – 10 I – 9	None
August 30, 2023	Vibratory and Impact Installation	30-inch steel	North Bent	0750-1650	V – 62 I – 244	<b>3; 37 minutes</b>
September 6, 2023	Vibratory Installation	30-inch steel	South Bent	1015-1510	29	None
September 8, 2023	Vibratory Installation	30-inch steel	South Bent	0745-1510	78	None

Date	Activity Type	Pile Type	Pile Location	Monitoring Start and Stop	Daily Pile Driving Duration (min)	Total Shutdowns (Count; Duration)
September 11, 2023	Vibratory and Impact Installation	30-inch steel	South Bent	0730-1500	V - 37 I - 66	<b>1; 7 minutes</b>
September 13, 2023	Vibratory and Impact Installation	30-inch steel	South Bent	1000-1500	V - 16 I - 43	<b>1; 4 minutes</b>
September 14, 2023	Impact Installation	30-inch steel	North Bent	1200-1330	4	None
September 19, 2023	Vibratory Installation	30-inch steel	South Bent	0800-0940	33	None
September 20, 2023	Vibratory and Impact Installation	30-inch steel	South Bent	1000-1520	V-28 I-60	None
September 26, 2023	Vibratory Installation	12-inch steel	Float Piles	0930-1650	117	None

Note:

<sup>1</sup> Observers were on standby; no activity commenced due to construction constraints concerning impact hammer overhead clearance.

V = Vibratory, I = Impact

### 3.1. Marine Mammal Sightings

There are six marine mammal species (three cetacean and three pinniped), that occur regularly in the waters nearby NBK at Bangor in the Hood Canal: harbor seal (*Phoca vitulina richardii*), California sea lion (*Zalophus californianus*), Steller sea lion (*Eumetopias jubatus*), killer whale (*Orcinus orca*), Dall's porpoise (*Phocoenoides dalli dalli*), and the harbor porpoise (*Phocoena phocoena vomerina*). Of these six marine mammal species, four were observed during the EHW1 Pile Replacement Program: harbor porpoise, California sea lion, Steller sea lion, and harbor seal (Appendix A, Raw Mammal Sightings Data). All marine mammals sighted in the Hood Canal are managed by the National Marine Fisheries Service (NMFS).

A total of 254 marine mammal sightings were observed during the EHW1 Pile Replacement Project timeframe (Figure 3, All Observed Marine Mammal Sightings). Four species were sighted: the California sea lion, stellar sea lion, harbor porpoise, and harbor seal. The harbor seal was the most frequently sighted species by far, followed by California sea lion, stellar sea lion, and harbor porpoise. Potentially resighted individuals were recorded with a probability of re-sightings of 0 to 50, 50 to 70, 70 to 90, and 90 to 100. Sightings included both individuals and groups of individuals.

#### 3.1.1. Observed Takes

Injury and behavioral harassment takes were calculated for marine mammals sighted during EHW-1 construction, including vibratory and impact events. Takes were calculated by: (1) quantifying sightings and measuring the sighting distance to the pile for all animals observed during construction activities; and (2) comparing this distance to underwater and airborne injury and behavioral harassment thresholds on a *per-species* and *per-pile* basis. Sighting distance to piles was calculated by plotting animal locations based

on distance and direction from the observers and relating these locations to pile location in a Geographical Information System (ESRI, ArcGIS). Observers recorded probable re-sightings and communicated direction of travel to track individuals and to avoid double-counting sightings of the same animal. Takes are reported as the number of individuals (not sightings) observed within a given zone. The total number of marine mammal takes for the EHW-1 is summarized in Table 3.

A total of nine (9) Level B and five (5) Level A marine mammal takes were observed over the duration of the project (Figure 4, Observed Marine Mammal Takes). All reported takes were related to harbor seal sightings. The majority of takes were recorded within the EHW1 pier/trestle area, with one instance of Level B take occurring during vibratory pile driving located exterior to the perimeter fence. There were no other takes of other species observed.

**TABLE 3. REPORTED TAKES**

Date	Species Sighting	Level of Take	Pile Location
August 14, 2023	Harbor Seal	Level B	North Bent
	Harbor Seal	Level B	
	Harbor Seal	Level B	
	Harbor Seal	Level B	
August 15, 2023	Harbor Seal	Level B	North Bent
August 30, 2023	Harbor Seal	Level A	North Bent
	Harbor Seal	Level A	
	Harbor Seal	Level A	
	Harbor Seal	Level B	
September 11, 2023	Harbor Seal	Level A	South Bent
	Harbor Seal	Level B	
September 13, 2023	Harbor Seal	Level A	South Bent
	Harbor Seal	Level B	
September 20, 2023	Harbor Seal	Level B	South Bent

### 3.2. Marbled Murrelet Observations

To comply with the requirements of the ESA Section 7 consultation for the project, marbled murrelet observers were deployed during impact pile driving activity. There were no marbled murrelet sightings recorded during the project (Appendix B, Raw Bird Sightings Data). Other alcids observed were limited to pigeon guillemots (*Cepphus columba*). All bird species observed and identified during impact driving are present in Table 4 below. No seabird carcasses were observed at any time during post impact pile driving surveys.

**TABLE 4. MARINE BIRD OBSERVATION SUMMARY**

Date	Species Sighting	Number of Sightings
08/22/23	Pigeon Guillemot ( <i>Cephus columba</i> )	6
	Red necked Grebe ( <i>Podiceps grisegena</i> )	1
	Glaucous-winged gull ( <i>Larus glaucescens</i> )	7
	Great Blue Heron ( <i>Ardea Herodias</i> )	3
	Belted King fisher ( <i>Alcedo atthis</i> )	1
	Mallard ( <i>Anas platyrhynchos</i> )	1
08/28/23	Glaucous-winged gull	2
08/30/23	Glaucous-winged gull	3
	Pigeon Guillemot	1
	Cormorant ( <i>Palacrocorax pelagicus</i> )	1
09/13/23	Glaucous-winged gull	7
	Great Blue Heron	3
	Belted King fisher	1
	Common Loon ( <i>Gavia immer</i> )	1
09/14/23	Glaucous-winged gull	2
	Great blue heron	2
	Pigeon guillemot	1
09/20/23	Canada geese ( <i>Branta canadensis</i> )	2
	Green winged teal ( <i>Anas carolinensis</i> )	1
	Mallard ( <i>Anas platyrhynchos</i> )	1
	Glaucous-winged gull	5
	Cormorant	1
	Belted King fisher	1
	Common crow ( <i>Corvus brachyrhynchos</i> )	1

Notes:

1. Sightings may include individuals and/multiple individuals, see Appendix B for raw sighting data.

#### 4.0 SUMMARY

A total of nine (9) Level B and five (5) Level A marine mammal takes were observed over the duration of the project. All reported takes were related to harbor seal sightings. The majority of takes were recorded within the EHW1 pier/trestle area, with one instance of Level B take occurring during vibratory pile driving located exterior to the perimeter fence. There were no other takes of other species observed.

No marbled murrelets were observed during any portion of impact driving. Species diversity was relatively low at the beginning of the project and increased consistently with the change in migratory season. Species of similar likeness included the pigeon guillemot which was observed periodically over the course of the project. Great blue herons occupy a communal roost on the shoreline at EHW1 and one nest was observed on the lightning tower landward of EHW1.

## **5.0 REFERENCES**

Naval Facilities Engineering Command Northwest (NAVFAC). 2023a. Marine Mammal Monitoring Plan. Marine Structure Maintenance and Pile Replacement Program. April 2023.

Naval Facilities Engineering Command Northwest (NAVFAC). 2023b. Marbled Murrelet Monitoring Plan. Marine Structure Maintenance and Pile Replacement Program. April 2023.

U.S. Department of the Navy (Navy). 2011. Final Environmental Assessment. Explosives Handling Wharf 1 Pile Replacement Project Naval Base Kitsap at Bangor Silverdale WA.

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**Legend**

 ProjectSite



**Vicinity Map**

NAVFAC NW EHW1 Critical Pile Replacement  
Silverdale, Washington

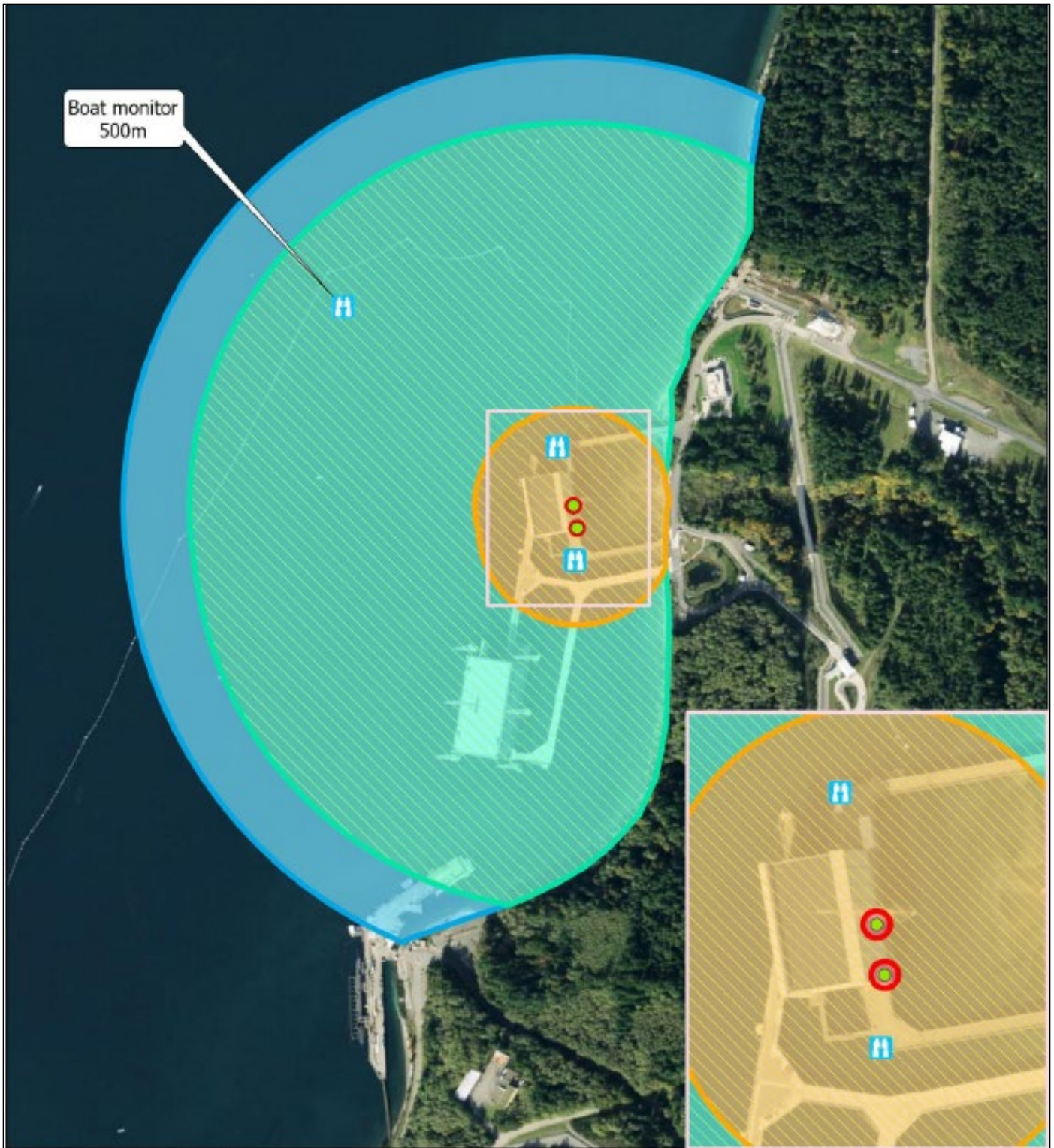


**Figure 1**

Coordinate System: GCS WGS 1984

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**Legend**

- Sea Lions: 10m Shutdown Zone
- Harbor Seal: 160m Shutdown Zone
- Behavioral Threshold: 631m
- Harbor Porpoise, Transient Killer Whale: 631m Shutdown Zone
- Humpback: 740m Shutdown Zone
- 30in Steel Pile Location
- H Representative Monitoring Location

Note: Locations and zones dependent on type of equipment used and size of piles. See report for detailed zone descriptions.

Source(s): NAVFAC NW

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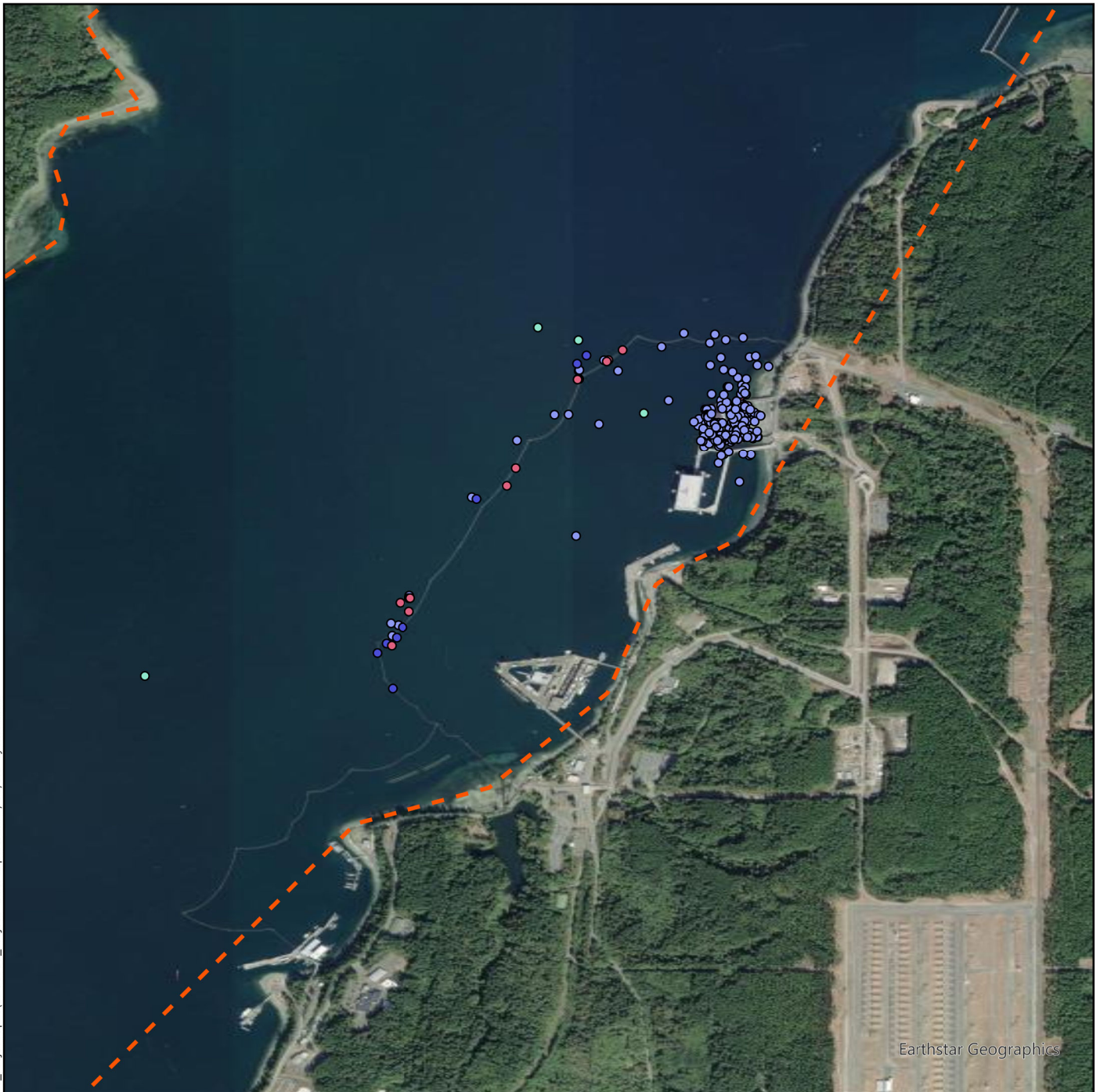
**Example Monitoring Zones and Observer Locations**

NAVFAC NW EHW1 Critical Pile Replacement  
Silverdale, Washington



**Figure 2**









Earthstar Geographics

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**Legend**

 Monitoring Zone

**Species Observed**

-  California sea lion
-  Steller sea lion
-  Harbor porpoise
-  Harbor seal



**All Observed Marine Mammal Sightings**

NAVFAC NW EHW1 Critical Pile Replacement  
Silverdale, Washington



**Figure 3**

Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere  
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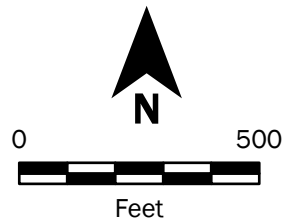


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**Legend**

**Harbor Seal**

- Level A Take
- Level B Take



**Observed Marine Mammal Takes**

NAVFAC NW EHW1 Critical Pile Replacement  
Silverdale, Washington



**Figure 4**

Source(s): ESRI Imagery.

Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet

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**APPENDIX A**  
**Raw Mammal Sightings Data**

**Appendix Table A-1**  
**Raw Mammal Sightings Data**  
 NAVFAC NW EHW1 Critical Pile Replacement  
 Silverdale, Washington

Proj Name	psostation	constructactv	precipitatio	cloudcover	visibility	wind	mmobsrvd	resightings	mmcount	sightdir	psodist	behavior	traveldir	comments	obsrvharass	shutdowncount	harasscount	harasscomment	obsrdate	Pile	NEAR_DIST
EHW1PRP	EHW1BM	SP30Vibe	None	Clear	None	Beaufort3	Pv	0-50	1	90	10	Looking	ind		OutZone	0	0		8/14/2023 8:05	North Bent	1302.94
EHW1PRP	EHW1BM	SP30Vibe	None	Clear	None	Beaufort3	Pv	0-50	1	270	10	Looking	S		OutZone	0	0		8/14/2023 8:35	North Bent	38922.50
EHW1PRP	EHW1NT	SP30Vibe	None	Clear	None	Beaufort1	Pv	0-50	1	160	80	Transiting	N	Actual time 0750	NAPZone	0	0		8/14/2023 11:42	North Bent	262.60
EHW1PRP	EHW1ST	SP30Vibe	None	Clear	None	Beaufort1	Pv	0-50	1	290	55	Transiting,Diving	S		745 NAPZone	0	0		8/14/2023 11:43	North Bent	198.80
EHW1PRP	EHW1NT	SP30Vibe	None	Clear	None	Beaufort1	Pv	50-70	1	160	80	Looking	ind	Actual time of observation 0758	NAPZone	0	0		8/14/2023 11:50	North Bent	274.37
EHW1PRP	EHW1ST	SP30Vibe	None	Clear	None	Beaufort1	Pv	0-50	1	32	30	Transiting	SE		750 NAPZone	0	0		8/14/2023 11:51	North Bent	329.66
EHW1PRP	EHW1NT	SP30Vibe	None	Clear	None	Beaufort1	Pv	50-70	1	160	80	Looking	W	Actual time of sighting 0808	NAPZone	0	0		8/14/2023 11:54	North Bent	225.58
EHW1PRP	EHW1ST	NAP	None	Clear	None	Beaufort1	Pv	0-50	1	270	100	Transiting	S		810 NAPZone	0	0		8/14/2023 11:55	North Bent	242.47
EHW1PRP	EHW1NT	SP30Vibe	None	Clear	None	Beaufort1	Pv	70-90	2	210	150	Looking,Stationary,Diving	W	Actual time of sighting 0817	NAPZone	0	0		8/14/2023 11:57	North Bent	282.96
EHW1PRP	EHW1ST	NAP	None	Clear	None	Beaufort1	Pv	50-70	1	240	75	Transiting,Looking	S		845 NAPZone	0	0		8/14/2023 11:58	North Bent	347.33
EHW1PRP	EHW1ST	NAP	None	Clear	None	Beaufort1	Pv	0-50	1	60	50	Looking,Transiting	NE		850 NAPZone	0	0		8/14/2023 12:01	North Bent	246.12
EHW1PRP	EHW1NT	SP30Vibe	None	Clear	None	Beaufort1	Pv	50-70	1	180	110	Looking,Diving	ind	Actual sighting 0847	NAPZone	0	0		8/14/2023 12:01	North Bent	240.78
EHW1PRP	EHW1ST	NAP	None	Clear	None	Beaufort1	Pv	50-70	1	300	140	Transiting,Diving	S		858 NAPZone	0	0		8/14/2023 12:04	North Bent	290.70
EHW1PRP	EHW1NT	SP30Vibe	None	Clear	None	Beaufort1	Pv	50-70	1	180	100	Looking	ind	Actual sighting time 0853	NAPZone	0	0		8/14/2023 12:05	North Bent	213.35
EHW1PRP	EHW1ST	NAP	None	Clear	None	Beaufort1	Pv	50-70	1	150	100	Transiting	W		910 NAPZone	0	0		8/14/2023 12:06	North Bent	507.40
EHW1PRP	EHW1NT	SP30Vibe	None	Clear	None	Beaufort1	Pv	50-70	1	160	50	Transiting	W	Actual sighting time 0906, transited into ehw1 before pile driving	NAPZone	0	0		8/14/2023 12:07	North Bent	158.69
EHW1PRP	EHW1ST	NAP	None	Clear	None	Beaufort1	Pv	0-50	2	300	60	Foraging,Transiting	NW		930 NAPZone	0	0		8/14/2023 12:08	North Bent	344.85
EHW1PRP	EHW1ST	SP30Vibe	None	Clear	None	Beaufort1	Pv	0-50	1	80	30	Transiting,Looking,Diving	N		1025 LvIB	0	1		8/14/2023 12:11	North Bent	256.42
EHW1PRP	EHW1NT	SP30Vibe	None	Clear	None	Beaufort1	Pv	50-70	1	180	130	Looking	S	Actual time of sighting 1008, during low power driving	LvIB	0	1	Outside of harbor seal shutdown zone	8/14/2023 12:11	North Bent	231.33
EHW1PRP	EHW1ST	NAP	None	Clear	None	Beaufort1	Pv	70-90	1	240	60	Transiting	N		1045 NAPZone	0	0		8/14/2023 12:15	North Bent	541.81
EHW1PRP	EHW1NT	SP30Vibe	None	Clear	None	Beaufort1	Pv	70-90	1	180	130	Resting,Diving	ind	Actual sighting time 1013	NAPZone	0	0		8/14/2023 12:16	North Bent	212.42
EHW1PRP	EHW1ST	NAP	None	Clear	None	Beaufort1	Pv	90-100	1	70	40	Transiting	S		1048 NAPZone	0	0		8/14/2023 12:17	North Bent	322.34
EHW1PRP	EHW1NT	SP30Vibe	None	Clear	None	Beaufort1	Pv	70-90	1	160	150	Stationary	S	Actual time of sighting 1016	NAPZone	0	0		8/14/2023 12:18	North Bent	236.77
EHW1PRP	EHW1NT	SP30Vibe	None	Clear	None	Beaufort1	Pv	50-70	1	180	160	Transiting,Diving	S		1025 LvIB	0	1	Actual time of sighting 1025, sighted during full power driving	8/14/2023 12:22	North Bent	247.44
EHW1PRP	EHW1NT	SP30Vibe	None	Clear	None	Beaufort1	Pv	50-70	1	180	175	Transiting,Diving	S	Actual time of sighting 1028	LvIB	0	1	Full driving	8/14/2023 12:27	North Bent	348.33
EHW1PRP	EHW1NT	SP30Vibe	None	Clear	None	Beaufort1	Pv	70-90	1	180	110	Transiting	N	Actual time of sighting 1036 during post driving observation	NAPZone	0	0		8/14/2023 12:32	North Bent	260.17
EHW1PRP	EHW1NT	SP30Vibe	None	Clear	None	Beaufort1	Pv	50-70	1	190	200	Looking,Diving	W	Actual time of sighting 1046. Heading west into ehw	NAPZone	0	0		8/14/2023 12:34	North Bent	519.83
EHW1PRP	EHW1NT	SP30Vibe	None	Clear	None	Beaufort1	Pv	50-70	1	190	160	Transiting,Looking	S	Actual time of sighting 1058. Headed south after milling	NAPZone	0	0		8/14/2023 12:39	North Bent	314.70
EHW1PRP	EHW1NT	SP30Vibe	None	Clear	None	Beaufort0	Pv	0-50	1	180	130	Diving,Looking	SW		NAPZone	0	0		8/15/2023 6:26	North Bent	233.52
EHW1PRP	EHW1NT	SP30Vibe	None	Clear	None	Beaufort0	Pv	50-70	1	200	100	Transiting,Looking	SE		NAPZone	0	0		8/15/2023 6:42	North Bent	218.52
EHW1PRP	EHW1NT	SP30Vibe	None	Clear	None	Beaufort0	Pv	50-70	1	180	120	Transiting,Diving	W		NAPZone	0	0		8/15/2023 6:52	North Bent	237.37
EHW1PRP	EHW1BM	SP30Vibe	None	Clear	None	Beaufort0	Pv	0-50	1	80	1	Resting	ST		OutZone	0	0		8/15/2023 7:01	North Bent	4818.71
EHW1PRP	EHW1ST	SP30Vibe	None	Clear	None	Beaufort0	Pv	0-50	2	180	60	Looking	N		NAPZone	0	0		8/15/2023 7:08	North Bent	453.91
EHW1PRP	EHW1NT	SP30Vibe	None	Clear	None	Beaufort0	Pv	50-70	1	190	120	Transiting,Diving	N		NAPZone	0	0		8/15/2023 7:09	North Bent	301.16
EHW1PRP	EHW1NT	SP30Vibe	None	Clear	None	Beaufort0	Pv	90-100	1	10	100	Transiting,Diving	N		NAPZone	0	0		8/15/2023 7:13	North Bent	617.07
EHW1PRP	EHW1NT	SP30Vibe	None	Clear	None	Beaufort0	Pv	50-70	1	180	125	Transiting,Diving	W		LvIB	0	1	Not in shutdown zone. No changes in behavior	8/15/2023 7:23	North Bent	430.48
EHW1PRP	EHW1NT	SP30Vibe	None	Clear	None	Beaufort0	Pv	50-70	1	200	40	Transiting	N		NAPZone	0	0		8/15/2023 7:59	North Bent	178.09
EHW1PRP	EHW1NT	SP30Vibe	None	Clear	None	Beaufort0	Pv	90-100	1	10	50	Transiting,Diving	NW		NAPZone	0	0		8/15/2023 8:02	North Bent	449.01
EHW1PRP	EHW1NT	SP30Vibe	None	Clear	None	Beaufort0	Pv	50-70	1	180	45	Transiting,Diving	N		NAPZone	0	0		8/15/2023 8:16	North Bent	118.27
EHW1PRP	EHW1ST	SP30Vibe	None	Clear	None	Beaufort0	Pv	0-50	1	270	20	Transiting	SE		NAPZone	0	0		8/15/2023 8:23	North Bent	388.57
EHW1PRP	EHW1NT	SP30Vibe	None	Clear	None	Beaufort0	Pv	50-70	1	250	120	Resting,Transiting	W	In bents underneath west side of wharf	NAPZone	0	0		8/15/2023 8:41	North Bent	156.79
EHW1PRP	EHW1ST	SP30Vibe	None	Clear	None	Beaufort0	Pv	0-50	1	90	10	Resting,Grooming	ind	Small juvenile	NAPZone	0	0		8/15/2023 8:45	North Bent	239.21
EHW1PRP	EHW1NT	SP30Vibe	None	Clear	None	Beaufort1	Pv	50-70	1	10	30	Transiting,Diving	S		NAPZone	0	0		8/15/2023 8:50	North Bent	223.36
EHW1PRP	EHW1ST	SP30Vibe	None	Clear	None	Beaufort0	Pv	90-100	1	90	20	Transiting	SW	Small juvenile resight	NAPZone	0	0		8/15/2023 8:57	North Bent	477.91
EHW1PRP	EHW1NT	SP30Vibe	None	Clear	None	Beaufort1	Pv	50-70	2	180	130	Diving,Transiting	W	Perhaps mom and juvenile	NAPZone	0	0		8/15/2023 9:02	North Bent	378.84
EHW1PRP	EHW1NT	SP30Vibe	None	Clear	None	Beaufort1	Pv	50-70	1	180	130	Looking,Diving	ind		NAPZone	0	0		8/15/2023 9:06	North Bent	299.95
EHW1PRP	EHW1NT	SP30Vibe	None	Clear	None	Beaufort1	Pv	90-100	1	190	140	Transiting,Looking	SW		NAPZone	0	0		8/15/2023 9:07	North Bent	292.92
EHW1PRP	EHW1NT	SP30Vibe	None	Clear	None	Beaufort1	Pv	70-90	2	180	140	Looking,Transiting,Diving	ind		NAPZone	0	0		8/15/2023 9:12	North Bent	416.39
EHW1PRP	EHW1ST	SP30Vibe	None	Clear	None	Beaufort0	Pv	90-100	1	90	70	Resting	ind		NAPZone	0	0		8/15/2023 9:12	North Bent	371.46
EHW1PRP	EHW1NT	SP30Vibe	None	Clear	None	Beaufort1	Pv	50-70	2	180	130	Transiting,Looking,Diving	W	Adult and juvenile	NAPZone	0	0		8/15/2023 9:27	North Bent	353.94
EHW1PRP	EHW1NT	SP30Vibe	None	Clear	None	Beaufort1	Pv	50-70	1	190	150	Transiting,Diving	W		NAPZone	0	0		8/15/2023 9:34	North Bent	360.68
EHW1PRP	EHW1ST	SP30Vibe	None	Clear	None	Beaufort0	Pv	70-90	1	90	10	Diving	ind	Small juvenile	NAPZone	0	0		8/15/2023 10:03	North Bent	403.94
EHW1PRP	EHW1NT	SP30Vibe	None	Clear	None	Beaufort1	Pv	50-70	2	190	165	Grooming,Diving	ind	Adult and juvenile. Adult grooming juvenile	NAPZone	0	0		8/15/2023 10:10	North Bent	389.72
EHW1PRP	EHW1ST	SP30Vibe	None	Clear	None	Beaufort0	Pv	50-70	2	90	70	Resting	ST		NAPZone	0	0		8/15/2023 10:10	North Bent	366.40
EHW1PRP	EHW1NT	SP30Vibe	None	Clear	None	Beaufort1	Pv	50-70	1	180	160	Resting,Diving	ind		NAPZone	0	0		8/15/2023 10:15	North Bent	361.20
EHW1PRP	EHW1NT	SP30Vibe	None	Clear	None	Beaufort1	Pv	70-90	1	180	140	Resting,Diving	ind		NAPZone	0	0		8/15/2023 10:20	North Bent	371.46
EHW1PRP	EHW1NT	ISP30	None	Clear	Smoke	Beaufort0	Pv	0-50	1	180	120	Diving	N		OutZone	0	0		8/21/2023 7:33	North Bent	338.96
EHW1PRP	EHW1NT	ISP30	None	Clear	Smoke	Beaufort0	Pv	0-50	2	180	200	Looking	N	Mom and baby	OutZone	0	0		8/21/2023 7:54	North Bent	542.63
EHW1PRP	EHW1BM	NAP	None	Clear	Smoke	Beaufort0	Pv	0-50	1	280	4	Looking	ST		NAPZone	0	0		8/21/2023 8:25	North Bent	4856.32





Proj Name	psostation	constructactiv	precipitatio	cloudcover	visibilityimg	wind	mmobsrvd	resightings	mmcount	sightdir	psodist	behavior	traveldir	comments	obsrvharass	shutdowncount	harasscount	harasscomment	obsrvdate	Pile	NEAR_DIST
<b>Legend</b>																					
EHW1PRP	EHW1 Pile Replacement Project																				
Pv	Harbor seal																				
Ac	California sea lion																				
Ej	Stellars sea lion																				
Pp	Harbor porpoise																				
NAP	No Active Pile driving																				
SP30Vibe	Steel Pile 30-inch - Vibratory																				
ISP30	Impact Steel Pile - 30-inch																				
Broken	Partly Cloudy																				
SD	Shutdown																				
OutZone	Outside of Shutdown Zone																				
resightings	Probability of sighting as the same individual vs new animal (response options are: 0 to 50%, 50-70%, 70-90%, and 90-100%)																				
ind	Indeterminate																				
	Level B Take																				
	Level A Take																				
NEAR_DIST	Post-processing calculation in GIS, distances variable and approximate																				





projname	postation	constructactiv	precipitationso	cloudcover	visibilityimpact	wind	mmobsrvd	resightings	mmcount	sightdir	psodist	behavior	traveldir	comments	obsrvharass	shutdowncount	harasscount	harasscomment	obsrdate	Pile	NEAR_DIST_M
EHW1PRP	EHW1ST	NAP	None	Scattered	None	Beaufort2	Pv	90-100	1	210	70	Transiting,Diving	SW	Edge of the zone headed away	NAPZone	0			9/13/2023 13:20	South Bent	356.91
EHW1PRP	EHW1ST	SP30Vibe	None	Overcast	None	Beaufort1	Pv	0-50	1	0	110	Transiting	SW		OutZone	0			9/19/2023 6:59	South Bent	424.84
EHW1PRP	EHW1NT	SP30Vibe	None	Overcast	None	Beaufort1	Pv	70-90	1	0	140	Diving	S		OutZone	0			9/19/2023 7:03	South Bent	552.36
EHW1PRP	EHW1BM	ISP30	None	Overcast	None	Beaufort2	Pv	0-50	1	40	5	Transiting	S		OutZone	0			9/19/2023 7:04	South Bent	2902.96
EHW1PRP	EHW1NT	SP30Vibe	None	Overcast	None	Beaufort1	Pv	0-50	45	0	150	Transiting	SE		OutZone	0			9/19/2023 7:15	South Bent	497.57
EHW1PRP	EHW1NT	SP30Vibe	None	Overcast	None	Beaufort0	Pv	0-50	1	45	100	Transiting	S		OutZone	0			9/19/2023 7:17	South Bent	482.00
EHW1PRP	EHW1ST	SP30Vibe	None	Overcast	None	Beaufort0	Pv	50-70	1	0	100	Transiting,Diving	S		OutZone	0			9/19/2023 7:40	South Bent	300.34
EHW1PRP	EHW1BM	NAP	None	Overcast	None	Beaufort2	Ej	0-50	1	40	5	Transiting	S		NAPZone	0			9/19/2023 8:19	South Bent	2866.00
EHW1PRP	EHW1NT	SP30Vibe	None	Broken	None	Beaufort0	Pv	0-50	1	0	10	Diving	ind	Post drive survey	NAPZone	0			9/19/2023 8:54	South Bent	140.62
EHW1PRP	EHW1ST	SP30Vibe	None	Overcast	None	Beaufort1	Pv	0-50	1	15	40	Transiting	SW	Moving slowly with head out	NAPZone	0			9/20/2023 7:20	South Bent	101.27
EHW1PRP	EHW1ST	SP30Vibe	None	Overcast	None	Beaufort1	Pv	50-70	1	90	80	Transiting	S		NAPZone	0			9/20/2023 7:31	South Bent	275.22
EHW1PRP	EHW1ST	SP30Vibe	None	Overcast	None	Beaufort0	Pv	50-70	1	0	40	Transiting	S		NAPZone	0			9/20/2023 7:40	South Bent	226.43
EHW1PRP	EHW1ST	NAP	None	Overcast	None	Beaufort0	Pv	0-50	1	340	2020	Diving,Stationary	NE		NAPZone	0			9/20/2023 7:50	South Bent	166.78
EHW1PRP	EHW1ST	NAP	None	Overcast	None	Beaufort0	Pv	50-70	2	340	30	Resting,Stationary	NE		NAPZone	0			9/20/2023 8:16	South Bent	374.36
EHW1PRP	EHW1BM	ISP30	None	Overcast	None	Beaufort1	Ej	0-50	7	180	100	Resting	ST	Hauled out on fencing	NAPZone	0			9/20/2023 8:35	South Bent	4790.02
EHW1PRP	EHW1BM	ISP30	None	Overcast	None	Beaufort1	Ac	0-50	9	180	100	Resting,Stationary	ST	Hauled out on fence floats	NAPZone	0			9/20/2023 8:40	South Bent	2317.26
EHW1PRP	EHW1ST	NAP	None	Scattered	None	Beaufort0	Pv	0-50	1	10	50	Resting,Stationary	ind		NAPZone	0			9/20/2023 8:41	South Bent	266.33
EHW1PRP	EHW1ST	SP30Vibe	None	Broken	None	Beaufort2	Pv	0-50	1	270	40	Transiting	S		NAPZone	0			9/20/2023 9:06	South Bent	98.07
EHW1PRP	EHW1BM	ISP30	None	Broken	None	Beaufort2	Ac	0-50	1	110	20	Transiting	SW	Moderate speed looking at boat	NAPZone	0			9/20/2023 9:07	South Bent	1883.98
EHW1PRP	EHW1ST	NAP	None	Scattered	None	Beaufort0	Pv	50-70	1	310	15	Diving	NE		NAPZone	0			9/20/2023 9:12	South Bent	126.40
EHW1PRP	EHW1ST	SP30Vibe	None	Broken	None	Beaufort2	Pv	90-100	1	90	40	Transiting	S	Delayed for resight out of SD zone, green light to drive	OutZone	0			9/20/2023 9:13	South Bent	338.37
EHW1PRP	EHW1BM	ISP30	None	Broken	None	Beaufort2	Pv	0-50	1	120	300	Looking	ST	Head up looking around	LvlB	0	1	Did not appear to be actually harassed	9/20/2023 9:14	South Bent	1884.97
EHW1PRP	EHW1BM	ISP30	None	Isolated	None	Beaufort2	Ac	70-90	10	185	100	Resting	ST	Hauled out on fence	NAPZone	0			9/20/2023 11:39	South Bent	4415.19
EHW1PRP	EHW1BM	ISP30	None	Isolated	None	Beaufort2	Ej	70-90	6	180	100	Resting	ST	Hauled out on fence	NAPZone	0			9/20/2023 11:43	South Bent	4934.66
EHW1PRP	EHW1ST	SP30Vibe	None	Isolated	None	Beaufort1	Pv	0-50	1	90	50	Transiting	S		NAPZone	0			9/20/2023 11:45	South Bent	105.60
EHW1PRP	EHW1ST	ISP30	None	Isolated	None	Beaufort1	Pv	90-100	1	45	150	Transiting	N	Resighted outside SD zone	NAPZone	0			9/20/2023 11:47	South Bent	483.89
EHW1PRP	EHW1ST	ISP30	None	Isolated	None	Beaufort1	Pv	0-50	1	45	120	Transiting	S		NAPZone	0			9/20/2023 12:25	South Bent	374.82
EHW1PRP	EHW1ST	ISP30	None	Isolated	None	Beaufort1	Pv	50-70	1	0	60	Diving	S		NAPZone	0			9/20/2023 12:28	South Bent	211.24
EHW1PRP	EHW1BM	ISP30	None	Isolated	None	Beaufort3	Ej	0-50	1	170	10	Looking	ST	Looking at boat with head high above water, adult male	NAPZone	0			9/20/2023 12:40	South Bent	1811.23
EHW1PRP	EHW1ST	ISP30	None	Isolated	None	Beaufort1	Pv	0-50	1	45	20	Diving	ind		NAPZone	0			9/20/2023 12:47	South Bent	231.76
EHW1PRP	EHW1BM	ISP30	None	Isolated	None	Beaufort3	Ac	0-50	1	30	12	Transiting	SW	Surfaced, then swam underwater close to boat, then under fence	NAPZone	0			9/20/2023 12:49	South Bent	1822.43
EHW1PRP	EHW1ST	NAP	None	Isolated	None	Beaufort1	Pv	0-50	1	80	20	Diving,Resting	W		NAPZone	0			9/20/2023 12:51	South Bent	184.27
EHW1PRP	EHW1BM	ISP30	None	Isolated	None	Beaufort3	Ac	50-70	1	30	5	Transiting	SW	Stopped to look at people in boat, would still be in level b zone when impacting resumed	NAPZone	0			9/20/2023 13:02	South Bent	1821.87
EHW1PRP	EHW1BM	ISP30	None	Isolated	None	Beaufort2	Pv	0-50	1	190	40	Resting	ST	Hauled out on fence	NAPZone	0			9/20/2023 13:49	South Bent	2242.79
EHW1PRP	EHW1BM	ISP30	None	Isolated	None	Beaufort3	Ac	50-70	10	190	50	Resting	ST	Haujued out on fence	NAPZone	0			9/20/2023 13:54	South Bent	4915.75
EHW1PRP	EHW1BM	ISP30	None	Isolated	None	Beaufort3	Ej	70-90	2	170	150	Resting	ST	Hauled out on fence	NAPZone	0			9/20/2023 13:58	South Bent	5109.68

Legend

EHW1PRP	EHW1 Pile Replacement Project
Pv	Harbor seal
Ac	California sea lion
Ej	Stellars sea lion
Pp	Harbor porpoise
NAP	No Active Pile driving
SP30Vibe	Steel Pile 30-inch - Vibratory
ISP30	Impact Steel Pile - 30-inch
Broken	Partly Cloudy
SD	Shutdown
OutZone	Outside of Shutdown Zone
resightings	Probability of sighting as the same individual vs new animal (response options are: 0 to 50%, 50-70%, 70-90%, and 90-100%)
ind	Indeterminate
	Level B Take
	Level A Take
NEAR_DIST	Post-processing calculation in GIS, distances variable and approximate

**Appendix Table A-3**  
**Raw Mammal Sightings Data**  
 NAVFAC NW EHW1 Critical Pile Replacement  
 Silverdale, Washington

Project Name	PSO Station	constructactiv	precipitationps	cloudcover	visibilityimpact	wind	mmobsrwd	resightings	mmcount	sightdir	psodist	behavior	traveldir	comments	obsrvharass	shutdowncount	harasscount	obsrvdate	Pile	NEAR_DIST_M
EHW1PRP	EHW1BM	SP12vibe	Rain	Overcast	Rain	Beaufort4	Ej	0-50	1	40	7	Looking	N	-	OutZone	0	0	9/26/2023 8:53	Float	1715.4
EHW1PRP	EHW1NT	SP12vibe	None	Broken	None	Beaufort1	Pv	90-100	1	45	240	Diving,Transiting	SW	-	NAPZone	0	0	9/26/2023 7:28	Float	772.2
EHW1PRP	EHW1NT	SP12vibe	None	Broken	None	Beaufort1	Pv	90-100	1	0	200	Looking	S	-	NAPZone	0	0	9/26/2023 7:37	Float	532
EHW1PRP	EHW1NT	SP12vibe	None	Broken	None	Beaufort1	Pv	90-100	1	35	50	Looking,Transiting	S	-	NAPZone	0	0	9/26/2023 8:01	Float	325.5
EHW1PRP	EHW1NT	SP12vibe	None	Broken	None	Beaufort1	Pv	50-70	1	30	220	Resting,Looking	ind	-	NAPZone	0	0	9/26/2023 8:02	Float	811.3
EHW1PRP	EHW1NT	SP12vibe	None	Broken	None	Beaufort1	Pv	0-50	2	0	50	Transiting	N	-	NAPZone	0	0	9/26/2023 8:09	Float	268.2
EHW1PRP	EHW1NT	SP12vibe	None	Broken	None	Beaufort1	Pv	50-70	1	30	60	Looking	SW	-	OutZone	0	0	9/26/2023 8:23	Float	255.1
EHW1PRP	EHW1NT	SP12vibe	None	Broken	None	Beaufort1	Pv	50-70	1	30	120	Looking	S	-	OutZone	0	0	9/26/2023 8:50	Float	440.4
EHW1PRP	EHW1NT	SP12vibe	Rain	Overcast	Haze	Beaufort1	Pv	50-70	1	45	200	Looking	ind	-	OutZone	0	0	9/26/2023 10:28	Float	687.2
EHW1PRP	EHW1NT	SP12vibe	Rain	Overcast	None	Beaufort1	Pv	0-50	1	0	60	Transiting	W	-	NAPZone	0	0	9/26/2023 15:22	Float	500.3
EHW1PRP	EHW1NT	SP12vibe	Rain	Overcast	Snow	Beaufort1	Pv	50-70	1	30	70	Transiting	NE	-	NAPZone	0	0	9/26/2023 15:25	Float	737.4
EHW1PRP	EHW1NT	NAP	None	Broken	None	Beaufort1	Pv	0-50	1	300	50	Indeterminate,Transiting,Diving	SW	-	NAPZone	0	0	9/26/2023 13:38	Float	100.2
EHW1PRP	EHW1NT	SP12vibe	None	Broken	None	Beaufort1	Pv	0-50	1	0	250	Diving	ind	Pre drive survey sighting	NAPZone	0	0	9/26/2023 7:19	Float	725

<b>Legend</b>	<b>Legend</b>
EHW1PRP	EHW1 Pile Replacement Project
Pv	Habor seal
Ej	Stellars sea lion
PRP	Pile Replacement Project
NT	North Trestle
BM	Boat Monitor
NAP	No Active Pile driving
SP12-vibe	Steel Pile 12-inch; Vibratory
Broken	Partly Cloudy
ind	Indeterminate
SD	Shutdown
OutZone	Outside of Shutdown Zone
resightings	Probability of sighting as the same individual vs new animal (response options are: 0 to 50%, 50-70%, 70-90%, and 90-100%)

**APPENDIX B**  
**Raw Bird Sightings Data**

**APPENDIX B. BIRD OBSERVATION DATA**

Date	Time	Species	# of Birds	Wind Speed (Beaufort)	Observed Behavior	Comments
08/22/23	0815	Pigeon Guillemot	3	1	Resting	
		Red necked Grebe ( <i>Podiceps grisegena</i> )	2	1	Resting, Transiting	
		Glaucous-winged gull ( <i>Larus glaucescens</i> )	8	1	Resting, Transiting	
	915	Pigeon Guillemot	3	1	Resting	
	930	Great Blue Heron	2	1	Standing	
		Glaucous-winged gull	1	1	Swimming	Eating barnacles/mollusks on pile
	1015	Glaucous-winged gull	18	1	Resting, Feeding/Diving, Transiting	
	1140	Mallard ( <i>Anas platyrhynchos</i> )	7	1	Swimming	Nearshore
	1215	Pigeon Guillemot	2	1	Resting, Transiting	
		Glaucous-winged gull	21	1	Resting, Preening	
		Belted King fisher ( <i>Alcedo atthis</i> )	1	1	Resting, Feeding/Diving	
		Great Blue Heron ( <i>Ardea Herodias</i> )	3	1	Nesting, Transiting	
		Pigeon Guillemot	2	1	Resting	North of northern trestle walkway
	1400	Pigeon Guillemot	1	2	Diving	
		Glaucous-winged gull	4	2	Feeding	
	1415	Pigeon Guillemot	2	1	Resting	North of northern trestle walkway

Date	Time	Species	# of Birds	Wind Speed (Beaufort)	Observed Behavior	Comments
08/22/2023		Glaucous-winged gull	14	1	Resting, transiting	
		Great Blue Heron	2	1	Nesting	
	1615	Glaucous-winged gull	17	1	Resting, preening	Many on beach
08/28/23	930	Glaucous-winged gull	1	1	Resting	Shoreline
	1030	Glaucous-winged gull	1	1	Resting	Possible Resight
08/30/23	830	Glaucous-winged gull	2	0	Resting	Under Trestle
	1000	Glaucous-winged gull	1	1	Swimming	Under Trestle
	1130	Glaucous-winged gull	1	1	Swimming	Under Trestle
	1230	Pigeon Guillemot	1	1	Swimming	North of Trestle
	1520	Cormorant ( <i>Phalacrocorax pelagicus</i> )			Foraging	Landward of trestle in water
09/13/2023	808	Glaucous-winged gull	11		Resting	Two on beach, one on tower, rest on EHW1 structure
	1008	Glaucous-winged gull	5		Resting, foraging	Shoreline
	1108	Glaucous-winged gull	3		Resting	
		Great blue heron	1		Transiting	
		Belted King Fisher	1		Transiting	
	1208	Glaucous-winged gull	5		Resting	Two on shoreline, two on tower, one on north trestle
	1241	Glaucous-winged gull	1		Transiting	Transiting away from pile
	1308	Glaucous winged gull	5			North trestle
		Great blue heron	1		Nesting	tower

Date	Time	Species	# of Birds	Wind Speed (Beaufort)	Observed Behavior	Comments
09/13/2023	1408	Common loon ( <i>Gavia immer</i> )	1		Transiting North	
		Glaucous-winged gull	7			Six on north trestle, one on shore
		Great blue heron	1		Resting, nesting	Nesting in tower
09/14/2023	1110	Glaucous-winged gull	5		Resting, foraging	Two on EHW1 structure, three on beach resting
		Great blue heron	1		Nesting	On tower
	1135	Pigeon Guillemot	Multiple			Resting in building shadow, resighted north of the training platform north of EHW1 and observed clear of affected zones at 1224
	1310	Glaucous-winged gull	6			Post-work shoreline survey, five on beach, one on
		Great blue heron	1		Nesting	Nesting on tower
09/20/2023	0840	Canada geese ( <i>Branta canadensis</i> )	22		Resting, foraging	Foraging on beach
		Green winged teal ( <i>Anas carolinesis</i> )	7		Resting	Resting on beach
		Mallard ( <i>Anas platyrhynchos</i> )	2		Resting	
		Glaucous-winged gull	7		Resting	North trestle, two resting in water close by
		Pelagic cormorant	1		Foraging	North of north trestle
	1040	Canada geese	27		Resting	Resting on beach
		Glaucous-winged gull	4		Resting	Three on tower, one on beach; pause in driving for splicing work – resume monitoring at 1340

Date	Time	Species	# of Birds	Wind Speed (Beaufort)	Observed Behavior	Comments
09/20/2023	1340	Glaucous-winged gull	3		Resting	Resting on beach – wind is high
	1440	Glaucous-winged gull	4		Resting	One on tower, two on North Trestle, one on beach
	1445	Belted king fisher	1		Transiting	Post work survey sighting
		Glaucous-winged gull	2		Resting	Post work survey sighting
		Common crow ( <i>Corvus brachyrhynchos</i> )	1			Post work survey sighting

