

**APPENDIX C:**  
**NMFS ENDANGERED SPECIES ACT**  
**CONSULTATION, BIOLOGICAL ASSESSMENT**  
**AND BIOLOGICAL OPINION**



**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
*National Marine Fisheries Service*  
*P.O. Box 21668*  
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March 5, 2025

Colonel Jeffrey Palazzini, District Commander  
U.S. Army Corps of Engineers  
Regulatory Division  
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Re: Sitka Harbor Seaplane Base, POA-2023-00433; NMFS ECO Reference No. INQ-2025-00024

Dear Colonel Palazzini:

On February 20, 2025, the National Marine Fisheries Service issued an Essential Fish Habitat (EFH) early coordination letter for the above referenced project. Our comments were in response to a U.S. Army Corps of Engineers' (Corps) Public Notice of Application for Permit dated February 10, 2025. The Public Notice indicated that the lead Federal agency, the U.S. Department of Transportation Federal Aviation Administration (FAA), is responsible for compliance with the required EFH consultation under the Magnuson-Stevens Act. The Public Notice also indicated that the Corps would review the FAA's documentation and either concur or continue to work with them until any issues are resolved. The FAA completed an EFH consultation for this project on February 6, 2021, and provided an updated EFH assessment in April 2021. In that consultation process, we provided conservation recommendations, which the FAA addressed.

Our conservation recommendations contained in the consultation with FAA included compensatory mitigation be required to mitigate direct project related impacts on EFH. In the FAA's response to us, they indicated deferring to the Corps for guidance on compensatory mitigation required for the placement of fill in Section 404 wetlands attributable to this project. Enclosed for reference is the FAA's final EFH assessment, our comments, and the FAA's response. As indicated in the Corps' Public Notices, approximately 2.4 acres of habitat below the high tide line would be filled to support the proposed action. We maintain our recommendation to require compensatory mitigation for this proposed action.



Contact Lucas Byker at (907) 531-6765 or [lucas.byker@noaa.gov](mailto:lucas.byker@noaa.gov) if you have any questions about the consultation process or if this proposed action changes.

Sincerely,



Catherine Coon  
Assistant Regional Administrator  
Habitat Conservation

Enclosure: Sitka Harbor Seaplane Base FAA consultation documents

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# Revised Essential Fish Habitat Assessment

## City and Borough of Sitka Sitka Seaplane Base Project Sitka Channel, Sitka, Alaska

April 2021

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Submitted to:  
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**ACRONYMS AND ABBREVIATIONS**

ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish and Game
AWC	Anadromous Waters Catalog
BMP	best management practices
CBS	City and Borough of Sitka
dB	decibels
EFH	Essential Fish Habitat
FAA	Federal Aviation Administration
FMP	Fisheries Management Plan
ft	feet
GOA	Gulf of Alaska
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act
MLLW	mean lower low water
μPa	micropascal
NOAA	National Oceanic and Atmospheric Administration
NMFS	National Marine Fisheries Service
NPFMC	National Pacific Fisheries Management Council
SEL	sound exposure level
SPB	Seaplane Base

USACE

U.S. Army Corps of Engineers

## 1 INTRODUCTION

The City and Borough of Sitka (CBS) is proposing to construct a new seaplane base (SPB) in Sitka Channel on the northern shore of Japonski Island in Sitka, Alaska. The new SPB will replace the existing SPB (Federal Airline Administration [FAA] identifier A29) currently located on the eastern shore of Sitka Channel, near Eliason Harbor and downtown Sitka. The new SPB will address existing capacity, safety, and condition deficiencies for critical seaplane operations, and allow seaplanes to more safely transit Sitka Channel. Construction, which includes the installation of piles to support a floating ramp dock, floating transient dock, landing gangway, wave attenuators, and a shore-access transfer span and trestle, is anticipated to begin in January 2023 and be completed in June 2025.

Currently, the SPB A29 off Katlian Street is at the end of its useful life and has a number of shortcomings, including limited docking capacity. A29 has only eight spaces, four of which cannot be accessed during low tide. The facility also lacks on-site fueling infrastructure, is expensive to maintain, has wildlife conflicts with a nearby seafood processing plant, and requires pilots to navigate a busy channel with ship traffic. The new SPB will improve the safety of seaplane operation in the channel, along with reducing traffic and congestion in Sitka Channel. The proposed SPB will provide, among other improvements, 14 permanent slips, space for 5 transient planes, on-site fuel storage, a drive down ramp, a seaplane haul-out ramp, and upland seaplane and car parking.

This assessment of Essential Fish Habitat (EFH) for the Sitka Seaplane Base project is being provided in compliance with The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267). EFH is defined by the Magnuson-Stevens Act as those “waters and substrates necessary to fish for spawning, breeding, feeding or growth to maturity”.

The 1996 amendment established procedures designed to identify, conserve, and enhance EFH for those species regulated under a Federal fisheries management plan (FMP). Section 305(b)(2) of the Magnuson-Stevens Act requires Federal action agencies to consult with National Oceanic and Atmospheric Association (NOAA)’s National Marine Fisheries Service (NMFS) on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH. The proposed SPB on Japonski Island is located within an area designated as EFH and the below assessment satisfies EFH consultation requirements.

## 2 PROJECT PURPOSE

The purpose of this project is to construct a new SPB on Japonski Island in Sitka Channel and address capacity, safety, operational, and condition deficiencies at the existing Sitka SPB. This project is needed to support critical seaplane operations and transportation in Southeast Alaska, to resolve existing seaplane and boat conflicts, and to replace the existing base which is 65 years old and in poor condition.

The CBS identified the need for a new SPB in 2002, and the planning process progressed as conditions at the facility continued to degrade. In 2002, CBS completed a Sitka Seaplane Base Master Plan to assess the need for a new SPB and layout a proposed facility and location (HDR Alaska, Inc. 2002). In 2012, CBS completed a Siting Analysis to reevaluate SPB sites and confirmed Japonski Island as the recommended location (DOWL KHM 2012). In 2016, CBS conducted another Siting Analysis which confirmed aviation stakeholder interest, resolved FAA funding concerns, and provided an economic impact study (DOWL 2016). The CBS has now received funding for planning and environmental review for the new SPB (CBS 2019).

### **3 PROPOSED ACTION**

#### **3.1 PROJECT LOCATION**

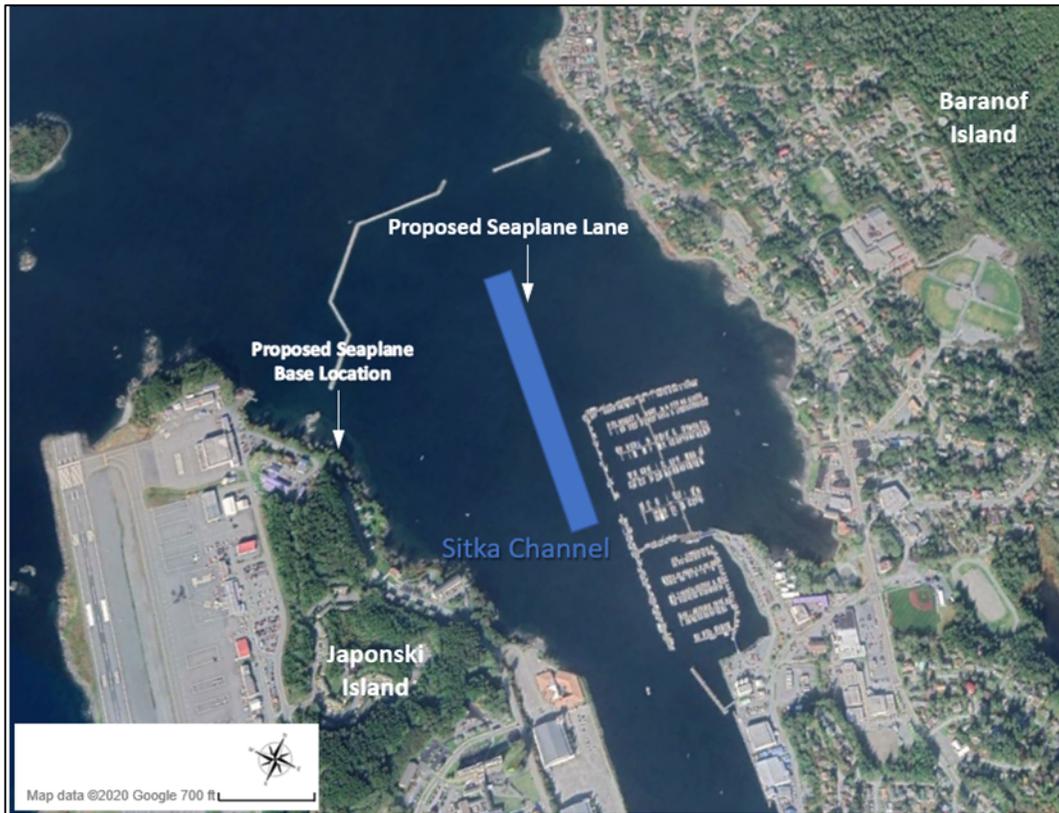
The new SPB will be located on the north shore of Japonski Island, along the eastern side of Sitka Channel, approximately 1.5 miles north of downtown Sitka, in Southeast Alaska; Township 55S, Range 63E, Sections 34 and 35, Copper River Meridian; United States Geologic Survey (USGS) Quad Map Sitka A-latitude 57.0575 and longitude -135.7382 (Figure 1-2) (Earthpoint 2020). Sitka Channel is a high traffic passage and the main way to access Sitka by water, a commonly used method of transportation in Southeast Alaska.

The proposed project will be located within the Channel Rock Breakwaters in the Sitka Channel on the northeast side of Japonski Island. The Channel Rock Breakwaters were built perpendicular to the Sitka Channel, a little more than half a mile northwest of Thomsen Harbor, in order to provide protection for the harbor and other facilities and structures located throughout the channel. The distance from Channel Rock Breakwaters to the James O'Connell Bridge is about 6,500 feet (ft), and Sitka Channel is about 150 ft wide and about 22 ft deep at the narrowest (NOAA 2020). The mean tide range is 7.7 ft, the diurnal tide range is 9.94 ft, and the extreme range is 18.98 ft (NOAA 2020a). The Sitka Channel connects to the larger Sitka Sound, an active fishery and transportation corridor.

Figure 1. New Sitka SPB Location



Figure 2. Location of New Sitka SPB in Sitka Channel



### **3.2 DEFINITION OF ACTION AREA**

The project action area designates the area where any effect will or could occur from the proposed action. For EFH, the action area is the area of water that at any given time could be ensonified above acoustic thresholds for fish species with EFH. The action area will be ensonified where direct underwater noise levels from vibratory installation of 16-inch and 24-inch piles is expected. The action area is confined to marine waters within the northern half of Sitka Channel, extending approximately 1.5 miles from the western opening in the Channel Rock Breakwaters and over 1 mile from the eastern opening in the Channel Rock Breakwaters (Figure 3).

There is one anadromous stream across Sitka Channel from the action area. Peterson Creek is anadromous (Anadromous Waters Catalog [AWC] #113-41-10185) for all five species of salmon and Dolly Varden and located along the eastern perimeter of the action area (ADF&G 2020). Since the proposed project will be exclusively located in marine waters opposite Sitka Channel from Peterson Creek, impacts beyond the mouth of the creek are not anticipated (Figure 4).

Figure 3. New Sitka SPB Action Area and Pile Driving Location

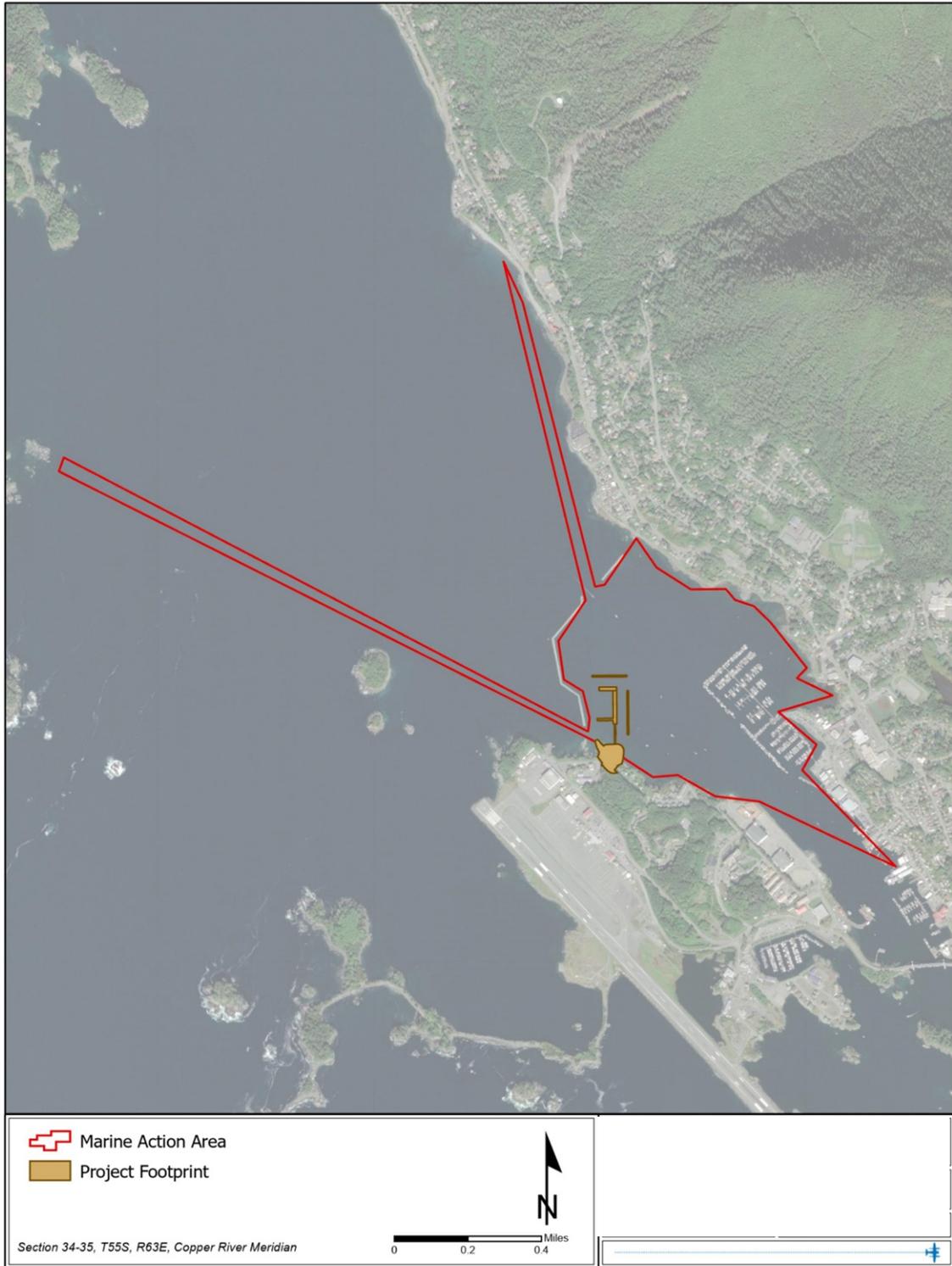
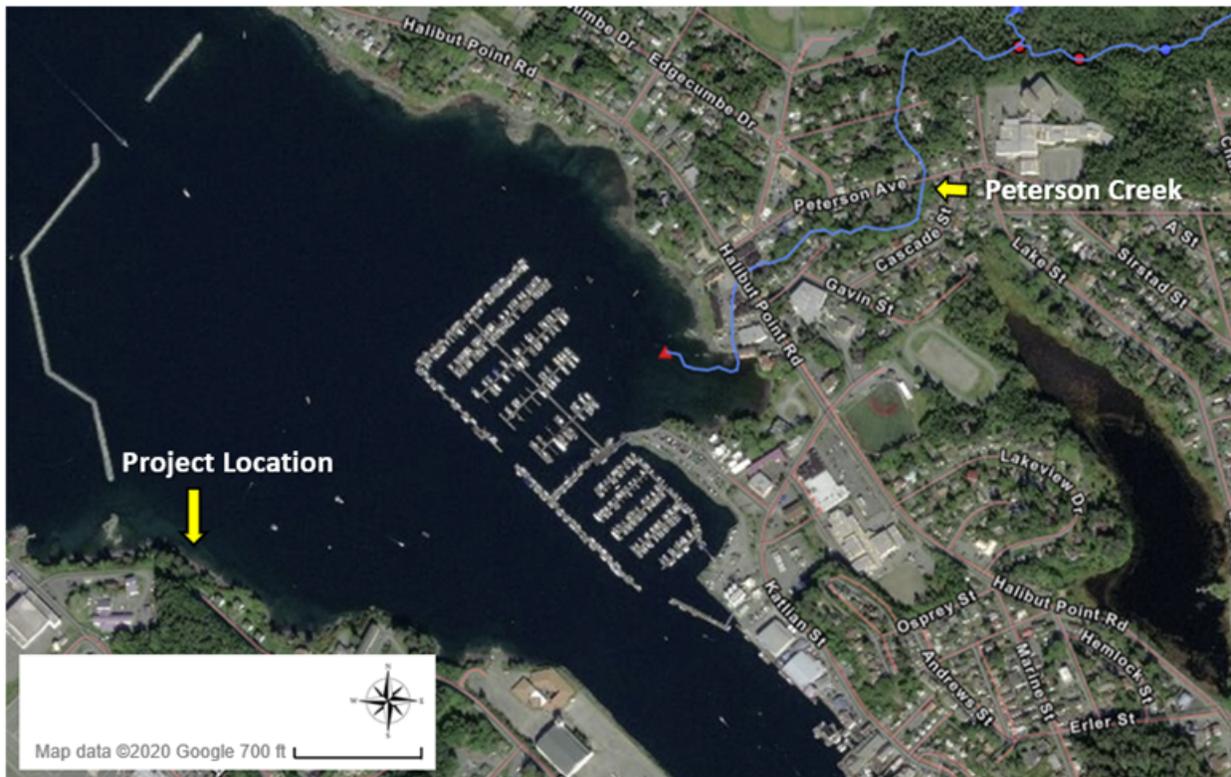


Figure 4. Location of Peterson Creek



### 3.3 CONSTRUCTION DETAILS

Construction of the proposed project will include the installation of piles to support a based seaplane ramp float, transient seaplane float, drive-down gangway, landing dock, trestle, and wave attenuator(s) (Table 1-2 and Figure 5-6). The project will:

- Install 30 temporary 18-inch-diameter steel piles as templates to guide proper installation of permanent piles (these temporary piles will be removed prior to project completion).
- Install 32 permanent 24-inch-diameter piles and 36 permanent 16-inch-diameter piles to support the ramp float, transient float, vehicle turnaround float, drive-down gangway, landing dock, and trestle.
- Construct and install 350-foot by 46-foot ramp float, 220-foot by 30-foot transient float, 120-foot by 12-foot drive-down gangway, 30-foot by 20-foot turnaround float, 120-foot by 46-foot landing dock, and 240-foot by 16-foot trestle (Table 1-2 and Figure 5-6).
- Install 50 permanent 24-inch-diameter piles to support two 20-foot by 600-foot wave attenuators (25 piles per wave attenuator).
- Install other SPB float components such as bull rail, floating fenders, mooring cleats, electricity connections, waterlines, lighting, passenger walkway, hand rail, and mast lights. Additional upland features include a haul-out ramp, aviation fueling infrastructure, fuel storage, vehicle driveway, curb, gravel parking for seaplanes and

vehicles, security fencing, landscape buffer, and a covered shelter (Note: all upland components will be installed out of the water).

- Discharge of 1.7 acres of fill in Section 404 wetlands and waters of the U.S. to develop project (1.64 acres of fill in marine and intertidal waters) uplands and conduct blasting of 24,000 cubic yards of material extending 200 feet inshore from the high tide line. The side slopes of fill will have ratio of 2 horizontal to 1 vertical (2H:1V) slopes with heavy open graded armor rock and interstitial spaces.
- Conduct about two months of rock blasting and excavation of about 22,000 cubic yards of material extending from about 16 feet to 60 vertical feet above mean lower low water (MLLW; 0.00 datum) located at the end of the Seward Avenue in the southwest corner of the project uplands inland of the high tide line.
  - Rock blasting and excavation will extend 200 horizontal feet inland.

*Table 1. New Sitka SPB Construction Components*

<b>Construction Component</b>	<b>Material</b>	<b>Dimensions (ft)</b>	<b>Distance Above Mean High Water (ft)</b>
Primary Seaplane Float	Treated timber, galvanized steel, coated polystyrene billets and polyethylene floatation tubs	350 x 46	2
Transient Seaplane Float	Treated timber, galvanized steel, coated polystyrene billets and polyethylene floatation tubs	200 x 30	2
Vehicle Turnaround Float	Treated timber, galvanized steel, coated polystyrene billets and polyethylene floatation tubs	30 x 20	2
Drive-Down Gangway	Marine grade aluminum, fiberglass and polyethylene	120 x 12	2-13 (sloped gangway)
Landing Dock	Treated timber, galvanized steel, coated polystyrene billets and polyethylene floatation tubs	120 x 46	2
Trestle	Galvanized steel and treated timber	240 x 16	13
Haul-out Ramp	Concrete	Part of Uplands	N/A
Wave Attenuator(s)	Concrete	2 each @ 20 x 600	3
Piles	Galvanized Steel	See Table 2	15 to top of pile

Table 2. New Sitka SPB Pile Installation and Removal Summary

Description	Project Component			
	Temporary Pile Installation	Temporary Pile Removal	Permanent Pile Installation	Permanent Pile Installation
Diameter of Steel Pile (inches)	18	18	24	16
# of Piles	30	30	82	36
<b>Vibratory Pile Driving</b>				
Total Quantity	30	30	82	36
Diameter	18	18	24	16
Max # Piles Vibrated per Day	4	4	4	4
Vibratory Time per Pile	15 min	15 min	15 min	15 min
Vibratory Time per Day	60 min	60 min	60 min	60 min
Number of Days (46 days)	8	8	21	9
Vibratory Time Total (44 hours 30 min)	7 hours 30 min	7 hours 30 min	20 hours 30 min	9 hours
<b>Socketing Pile Driving</b>				
Total Quantity	--	--	82	36
Diameter	--	--	24	16
Max # Piles Socketed per Day	--	--	2	2
# of Strikes per Pile	--	--	0	0
Socketing Time per Pile	--	--	5 hrs	5 hrs
Socketing Time per Day	--	--	10 hrs	10 hrs
Number of Days (59 days)	--	--	41	18
Socketing Time Total (590 hours)	--	--	410 hours	180 hours
<b>Impact Pile Driving</b>				
Total Quantity	30	--	82	36
Diameter	18	--	24	16
Max # Piles Impacted per Day	2	--	2	2
Impact Time per Pile	5 min	--	5 min	5 min
Impact Time per Day	10 min	--	10 min	10 min
Number of Days (74 days)	15	--	41	18
Impact Time Total (12 hours 20 min)	2 hours 30 min	--	6 hours 50 min	3 hours

Figure 5. Proposed Action

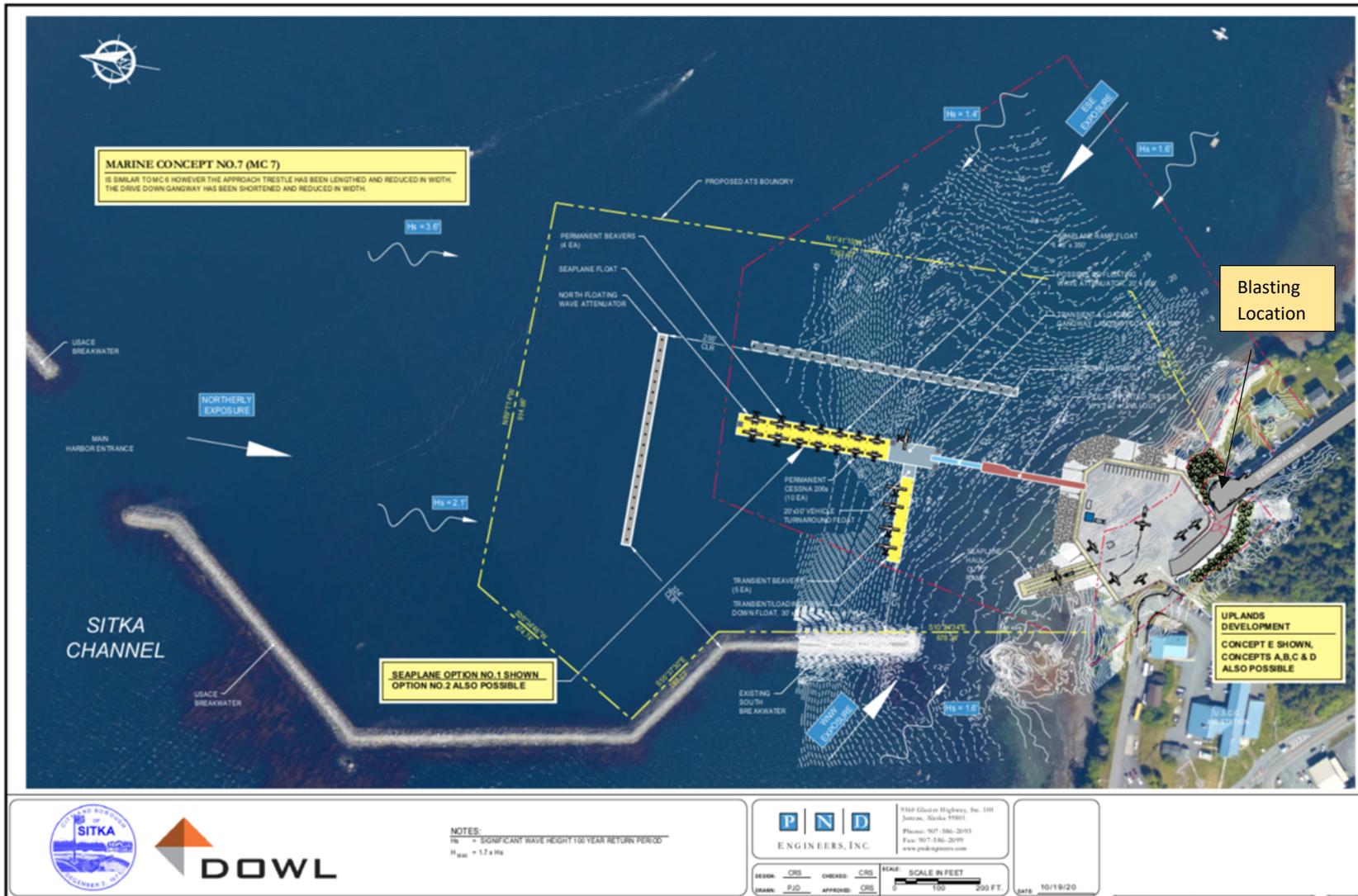
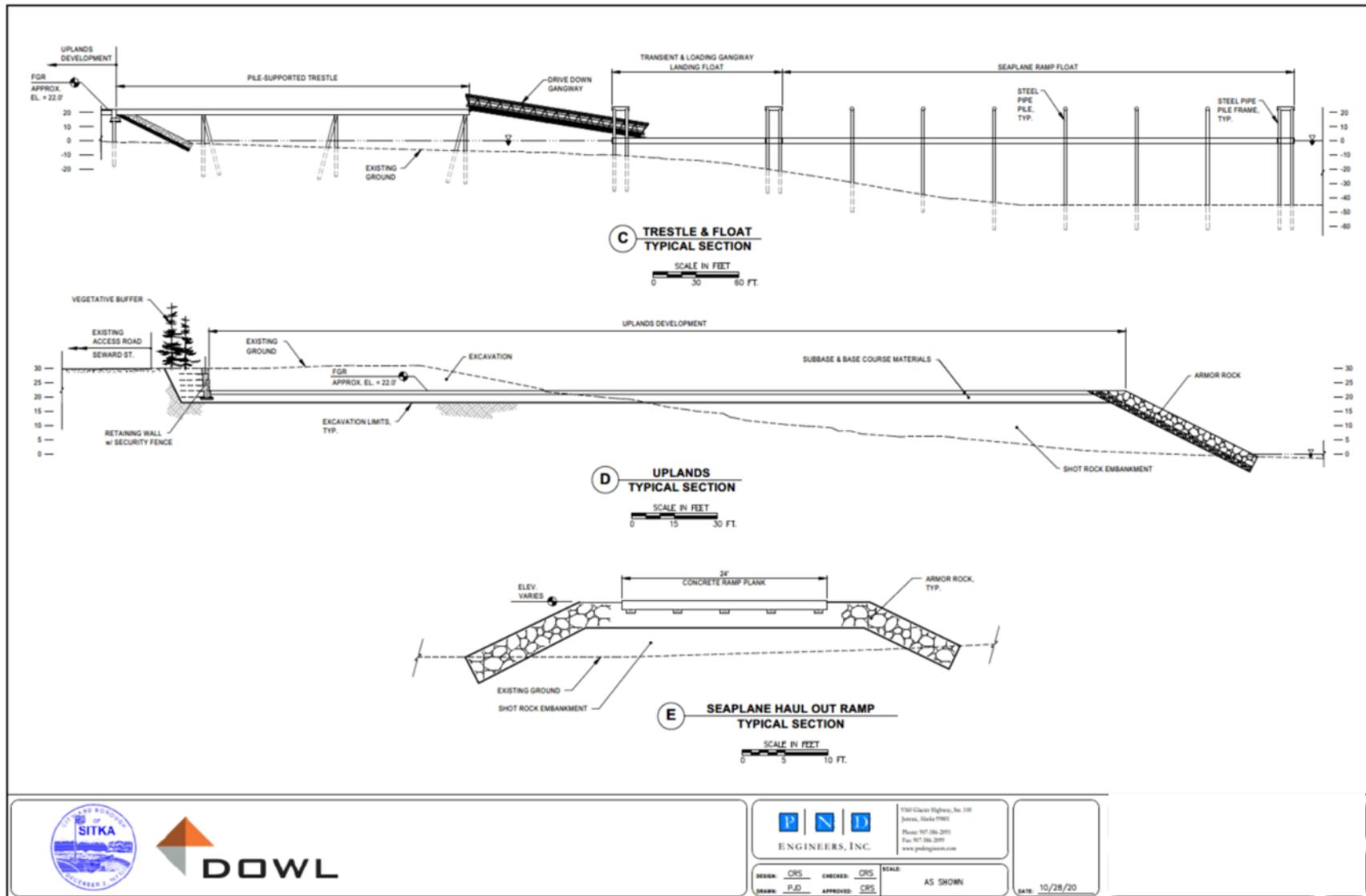


Figure 6. Side Profile of Proposed Action



### 3.3.1 Pile Installation Equipment

The following pile installation equipment is expected to be used:

- Vibratory Hammer: ICE 44B/Static weight 12,250 pounds
- Socketing Hammer: Holte 100,000 feet-pounds top drive with down-the-hole hammer and bit
- Diesel Impact Hammer: Delmag D46/Max Energy 107,280 feet-pounds

### 3.3.2 Pile Installation Methods

#### *Installation and Removal of Temporary (Template) Piles*

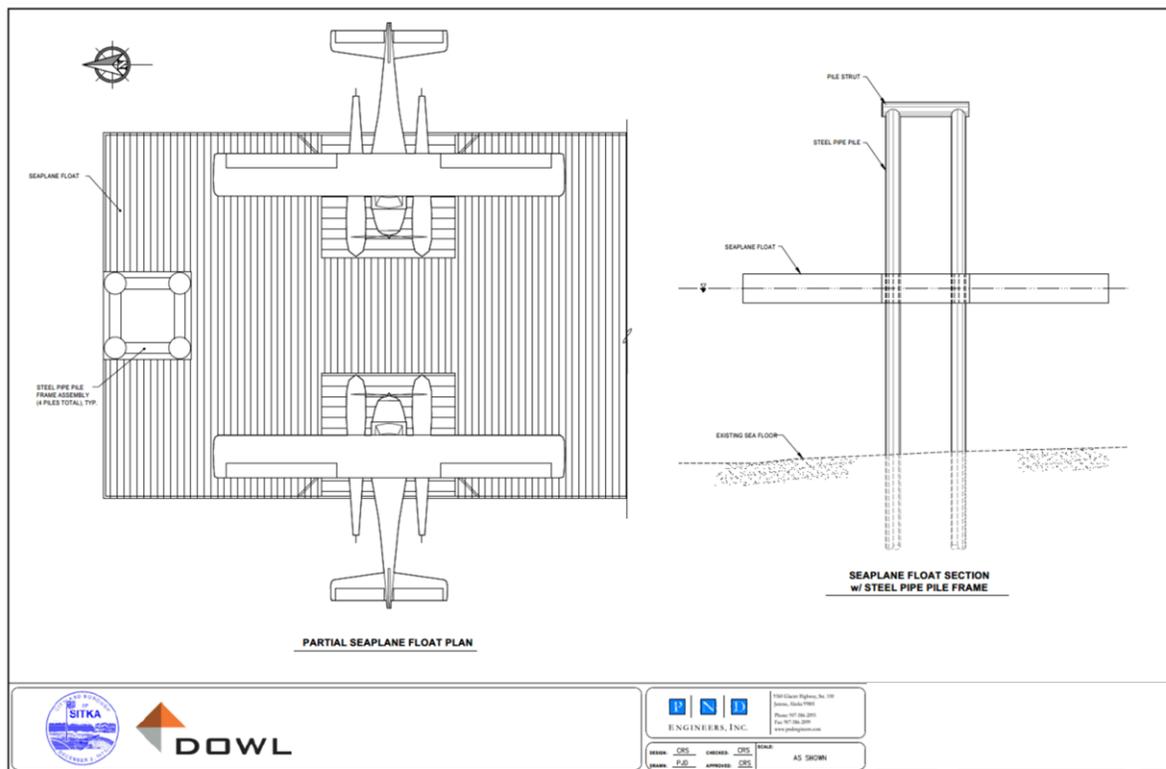
A maximum of 30 temporary 18-inch-diameter piles will be installed and removed using a vibratory hammer in constructing the project trestle.

#### *Installation of Permanent Piles*

All permanent 24-inch-diameter and 16-inch-diameter piles will be initially installed with a vibratory hammer. After vibratory driving, piles will be socketed into the bedrock with down-the-hole drilling equipment. Finally, piles will be driven the final few inches of embedment with an impact hammer.

Piles at the end of the based seaplane float and the corners of the landing dock will be installed as a steel pipe pile frame for added stability and reinforcement (Figure 7). Please see Table 2 for a conservative estimate of the amount of time required for pile installation and removal.

Figure 7. Steel Pipe Pile Frame



### 3.3.3 Construction Vessels

The following vessels are expected to be used to support construction:

- One material barge (approximately 250 ft by 76 ft by 15.5 ft) to transport materials from Washington to the project site and to be used onsite as a staging area during construction.
- One construction barge (crane Barge 280 ft by 76 ft by 16 ft) to transport materials from Washington to the project site and to be used onsite to support construction.
- 1 skiff (25-foot skiff with a 125–250 horsepower outboard motor) transported to the project site on the material barge or acquired locally in Sitka to support construction activities.
- 1 skiff (25-35-foot skiff powered with a 35-50 horsepower outboard motor) transported to the project site on the material barge or acquired locally in Sitka to support Protected Species Observer efforts.

### 3.3.4 Other In-water Construction and Heavy Machinery Activities

In addition to the activities described above, the proposed action will involve other in-water construction and heavy machinery activities. Examples of other types of activities include using standard barges, tug boats, or other equipment to place and position piles on the substrate via a crane (i.e., “stabbing the pile”).

The seaplane floats will be constructed of treated timber and galvanized steel fasteners. The submerged timber structural elements of the floats will be pressure treated with creosote because it is the only effective preservative for wood that will remain wet at all times. All other timber components that will not be fully submerged will be pressure treated with ammoniacal copper zinc arsenate. All preservative treatment will be in accordance with best management practices (BMP’s) as set forth by the Western Wood Preservers Institute. Floatation includes closed cell expanded polystyrene billets covered with 100 percent solid polyurethane and/or polyethylene floatation tubs to protect from physical damage, water absorption, colonization by encrusting organisms, and other factors.

### 3.3.5 Project Operation Activities

The new SPB includes operation of a new seaplane takeoff and landing lane and taxi path, which will not require any construction. The new water lane is farther north of but overlapping with the existing seaplane water lane, away from the O’Connell Bridge and seafood processing facilities. The new water lane is 4,000 ft long by 200 ft.

Use and operation of the SPB float will include seaplane loading and unloading, general maintenance, connections for water and electric power, and fueling. SPB uplands will provide above ground fuel tank storage, an access ramp for hauling out seaplanes, seaplane and vehicle parking, general storage, and covered shelter for passenger waiting.

SPB operation protocols will incorporate BMP's to prevent or minimize contamination from seaplane accidents, general maintenance, fueling, and nonpoint source contaminants from upland facilities

#### **4 ESSENTIAL FISH HABITAT IN THE ACTION AREA**

The waters southwest of the breakwaters on the northern shore of Japonski Island in the Sitka Channel are designated as EFH under the Magnuson-Stevens Act for all 5 species of Pacific salmon and 23 species of Gulf of Alaska (GOA) groundfish (NMFS 2020; Balsiger 2019). Alaska Department of Fish and Game (ADF&G) also identified Pacific Herring and Pacific Halibut as important in the project area (ADF&G 2019). Additionally, U.S. Army Corps of Engineers (USACE) identified 11 additional EFH fish species when conducting work on the nearby Channel Rock Breakwaters, suggesting additional EFH listed species in Sitka Channel and the general project vicinity (USACE 2011). EFH listings are summarized in Tables 3 and 4 and a description of each EFH species is provided below.

*Table 3. Essential Fish Habitat Salmon Species in Action Area*

Salmon Species	Juvenile	Immature	Mature	Juvenile-marine	Adult-marine waters	Spawning-freshwater only
Coho Salmon				X	X	
Chum Salmon		X		X	X	
Pink Salmon				X	X	
Chinook Salmon		X			X	
Sockeye Salmon		X		X	X	

*Table 4. Essential Fish Habitat Groundfish Species in Action Area*

Ground Fish Species	Egg	Larvae	Late Juvenile	Adult	Spawning
Aleutian Skate				X	
Pacific Cod			X	X	
Walleye Pollock	X			X	
Shortspine Thornyhead Rockfish				X	
Shortraker Rockfish			X		
Pacific Ocean Perch		X			
Redbanded Rockfish			X		
Black Rockfish				X	
Dusky Rockfish			X		
Silvergray Rockfish			X		
Quillback Rockfish				X	
Redstriped Rockfish			X		
Rosethorn Rockfish			X	X	
Sablefish		X			
Yellow Irish Lord				X	
Great Sculpin			X	X	
Bigmouth Sculpin			X	X	
Arrowtooth Flounder			X	X	
Northern Rock Sole				X	
Dover Sole		X	X		
Yellowfin Sole	X			X	
Alaska Plaice				X	
Octopus				X	

## 4.1 ESSENTIAL FISH HABITAT SPECIES DESCRIPTIONS

### 4.1.1 Salmonid Species Descriptions

#### Coho Salmon (*Oncorhynchus kisutch*)

Coho Salmon EFH inhabit Sitka Channel off the north shore of Japonski Island (NMFS 2020). Coho Salmon enter spawning streams from July to November, usually during periods of high runoff. The eggs hatch early in the spring, where the embryos remain in the gravel using the egg yolk until emerging in May or June. Juvenile Coho Salmon spend up to three winters in streams and may spend five winters in lakes before migrating to the sea as smolt (ADF&G 2008). Coastal streams, lakes, estuaries, and tributaries to large rivers provide Coho Salmon rearing habitat. Coho Salmon juveniles may also use brackish-water estuarine areas in summer and migrate upstream to fresh water to overwinter. They spend about 16 months at sea before returning to coastal areas and entering fresh water to spawn (North Pacific Fishery Management Council [NPFMC] 2018). Because Coho Salmon have been documented in nearby Peterson Creek, it is likely that they could be found in marine waters of the action area at certain times of the year.

#### Chum Salmon (*O. keta*)

Chum Salmon EFH inhabit Sitka Channel off the north shore of Japonski Island (NMFS 2020). Returning after 2 to 7 years, Chum Salmon spawn between June and November in gravel in streams, side-channel sloughs, and intertidal portions of streams when the tide is below the spawning grounds (NPFMC 2018). Chum Salmon fry do not overwinter in the streams, but instead migrate out of the streams directly to the sea shortly after emergence (ADF&G 2008). This outmigration occurs between February and June, with most leaving streams during April and May. Chum Salmon tend to linger and forage in the intertidal areas at the head of bays. Estuaries are important for Chum Salmon rearing during spring and summer. Chum Salmon have been documented in nearby Peterson Creek; therefore, they could be found in marine waters of the action area at some point in their lifecycle.

#### Pink Salmon (*O. gorbuscha*)

Pink Salmon EFH inhabit Sitka Channel off the north shore of Japonski Island (NMFS 2020). Pink Salmon are distinguished from other Pacific salmon by having a fixed two-year life span. Because of the life span, pink salmon spawning in a particular river system in odd and even years are reproductively isolated from each other and have developed into genetically different lines (NPFMC 2018). Adult Pink Salmon enter spawning streams between late June and mid-October. They spawn within a few kilometers of the coast, and spawning within the intertidal zone or the mouth of streams is very common. Shallow riffles where flowing water breaks over coarse gravel or cobble-size rock and the downstream ends of pools are favored spawning areas. The eggs hatch in early to mid-winter, and fry emerge from gravel to migrate downstream into salt water by late winter or spring (ADF&G 2008). Pink Salmon have been documented in nearby Peterson Creek and could be found in marine waters of the action area at some point in their lifecycle.

### Chinook Salmon (*O. tshawytscha*)

Chinook Salmon EFH inhabit Sitka Channel off the north shore of Japonski Island (NMFS 2020). Adult Chinook Salmon are found over a broad geographic range, encompassing different ecotypes and very diverse habitats in Southeast Alaska. Chinook Salmon generally spawn from mid-June to mid-August in waters ranging from a few centimeters deep to several meters deep. Eggs hatch in the late winter or early spring, and juveniles typically remain in fresh water for at least one year before migrating to the ocean in springtime (ADF&G 2008). Chinook Salmon spend up to six years at sea before returning to freshwater streams to spawn between July through September (NPFMC 2018; Morrow 1980). Because Chinook Salmon have been documented in nearby Peterson Creek, it is likely that they could be found in marine waters of the action area at certain times of the year.

### Sockeye Salmon (*O. nerka*)

Sockeye Salmon EFH inhabit Sitka Channel off the north shore of Japonski Island (NMFS 2020). Sockeye Salmon exhibit a greater variety of life history patterns than other Pacific salmon and are known to use lake-rearing habitats in the juvenile stages (NPFMC 2018). Sockeye Salmon generally spawn in late summer and autumn. They use a wide variety of spawning habitats, including rivers, streams, and upwelling areas along lake beaches. Eggs hatch during the winter, and the young salmon move into the rearing areas. In systems with lakes, juveniles usually spend up to three years in fresh water before migrating to the ocean in the spring as smolts. However, in systems without lakes, many juveniles migrate to the ocean shortly after emerging from the gravel (ADF&G 2008). Sockeye Salmon have been documented in nearby Peterson Creek and could be found in marine waters of the action area at some point in their lifecycle.

## 4.1.2 Ground Fish Species Descriptions

### Aleutian Skate (*Bathyraja aleutica*)

Juvenile and adult skates use the outer shelf regions of the GOA and feed on bottom invertebrates and fish. Not much is known about seasonal movements or early life stage habitat requirements; however, skates are known to use a broad range of substrate types (mud, sand, gravel, and rock) and can typically be found in the lower portion of the water column (NPFMC 2019). It is probable that Aleutian Skates occasionally inhabit Sitka Channel and surrounding waters.

### Pacific Cod (*Gadus macrocephalus*)

Pacific Cod prefer soft substrate such as mud, sandy mud, muddy sand, or sand in deeper waters (Marrow 1980). Pacific Cod are concentrated along the continental shelf edge and upper slope from 100 to 200 meters of water during winter and spring before overwintering in shallower waters (<100 meters) (DiCosimo 2001). Larvae are epipelagic and most commonly found in the upper 45 meters of the water column. Juveniles use nearshore waters from 60 to 150 meters deep and often use eelgrass and kelp beds (NMFS 2003). Based on available habitat in Sitka Channel, it is likely Pacific Cod are present in the area.

### Walleye Pollock (*Gadus chalcogrammus*)

Walleye Pollock is the second most abundant groundfish stock in the Gulf of Alaska and accounts for 25 to 50 percent of the catch and 20 percent of the biomass. Based upon mid-water trawler surveys, Pacific Walleyes prefer waters less than 300 meters. Peak spawning in the GOA happens in late March in Shelikof Strait generally over 100 to 200 meters of water. Juveniles have a widespread distribution and have no known habitat preferences. Adult Walleye Pollock occur throughout the water column on the outer and mid-continental shelf of the GOA (NPFMC 2019). The proposed project is within the GOA stock area which extends from Southeast Alaska to the Aleutian Islands; however, because of the available habitat, it is questionable whether Walleye Pollock inhabit Sitka Channel.

### Shortspine Thornyhead Rockfish (*Sebastolobus alascanus*)

Shortspine Thornyhead is a demersal species common throughout the GOA and found along the Pacific Rim from Japan to Baja California as deep as 1,500 meters. Spawning takes place in the late spring (April) and early summer (July) in the GOA. Juveniles remain pelagic period for over a year and settle out in shallow benthic habitats between 100 and 600 meters. They migrate deeper as they grow and range from 90 to 1500 meters. Thornyhead Rockfish prefer muddy areas, sometimes near rocks or gravel (NPFMC 2019). It is questionable whether Shortspine Thornyhead Rockfish inhabit Sitka Channel and surrounding waters; however, they are considered here.

### Shortraker Rockfish (*Sebastes borealis*)

Shortraker Rockfish are found in the highest abundance along the continental slope in areas of steep slopes and numerous boulders between 300 to 500 meters. Little is known about the early life stages of this species. It is estimated that Shortraker Rockfish spawn from February to April. The larvae are pelagic and have been found in offshore waters and some larvae have been sampled in coastal Southeast Alaskan waters. Juveniles share the same habitat as adults; however, they have been found in shallower areas (NPFMC 2019). It is questionable whether they Shortraker Rockfish inhabit Sitka Channel and surrounding waters; however, they are considered here.

### Pacific Ocean Perch (*S. alutus*)

Pacific Ocean Perch have a wide range throughout the North Pacific. They can be found in Alaskan waters during all life stages. Adults are primarily found offshore during fall and winter months in 150 to 420 meters waters along the outer continental shelf and the upper continental slope. During the summer, adults migrate to shallower depths (150 to 300 meters). Not much is known about the early life stages of Pacific Ocean Perch; however, larvae released offshore in April and May are thought to be pelagic and drift with the current. Larvae release likely occurs offshore, but it is suggested that small juveniles prefer rocky, high relief areas inshore and progressively move into deeper waters (NPFMC 2019). It is questionable whether Pacific Ocean Perch inhabit Sitka Channel and surrounding waters; however, they are considered here.

### Redbanded Rockfish (*S. babcocki*)

Redbanded Rockfish are distributed from the central Bering Sea and Aleutian Islands to southern California (Byersdorfer and Watson 2010). This large deep-water species prefers offshore reefs and depths from 50 to approximately 600-meter depths (Mecklenburg et al. 2002). Based on available habitat, it is questionable whether they Redbanded Rockfish inhabit Sitka Channel and surrounding waters; however, they are considered here.

### Black Rockfish (*S. melanops*)

Black Rockfish are part of the pelagic shelf rockfish complex and are distributed from Aleutian Islands to southern California. They prefer rocky reefs in shallower waters, but can be found as deep as 350 meters. Spawning generally occurs in the spring from January to May, and typically have a small home range (ADF&G No Date). This species is a likely inhabitant of Sitka Channel and surrounding waters.

### Dusky Rockfish (*S. ciliatus*)

Much of the information that has been obtained about Dusky Rockfish comes from data collected during the summer months from the commercial fishery or in research surveys. Based upon this data, Dusky Rockfish appear to be abundant in the GOA. It is presumed that spawning occurs in spring and may extend into summer. Juveniles share the same 100 to 200 meters depth preferences possibly along rocky areas of the outer continental as adults, but they have been found in shallower water during this early life stage (NPFMC 2019). It is questionable whether Dusky Rockfish inhabit Sitka Channel and surrounding waters; however, they are considered here.

### Silvergray Rockfish (*S. brevispinis*)

Silvergray Rockfish can be found from the western GOA to Baja California (NMFS No Date). Considered as other rockfish for GOA, EFH for late juveniles is the general distribution area for this life stage and includes the lower portion of the water column along the middle and outer shelf throughout the GOA (50 to 200 meters) (NPFMC 2019). It is questionable whether Silvergray Rockfish inhabit Sitka Channel and surrounding waters; however, they are considered here.

### Quillback Rockfish (*S. maliger*)

Quillback Rockfish are part of the demersal shelf rockfish complex and are distributed from Kodiak Island to southern California. They prefer shallow waters up to 100 meters, but can be found as deep as 250 meters. Spawning generally occurs in the spring from March to June. Juveniles are known to be at the margins of kelp beds, while adults are found over rock substrates or cobble and sand next to reefs (NPFMC 2019). This species is a likely inhabitant of Sitka Channel and surrounding waters.

### Redstriped Rockfish (*S. proriger*)

Redstriped Rockfish can be found from the Bering Sea to Baja California (NMFS No Date). Considered as other Rockfish for GOA, EFH for late juveniles is the general distribution area for

this life stage and includes the lower portion of the water column along the middle and outer shelf throughout the GOA (50 to 200 m) (NPFMC 2019). It is questionable whether Redstriped Rockfish inhabit Sitka Channel and surrounding waters; however, they are considered here.

#### Rosethorn Rockfish (*S. helvomaculatus*)

Rosethorn Rockfish are part of the demersal shelf rockfish complex and are distributed from Kodiak Island to southern California. They can be found as deep as 550 meters. Spawning takes place in the spring from February to September, but most commonly takes place in May. Although not much is known about Rosethorn Rockfish lifecycle, juveniles have been observed at the margins of kelp beds and adults are found over rock substrates or cobble and sand next to reefs (NPFMC 2019); therefore, they could be found in Sitka Channel and surrounding waters.

#### Sablefish (*Anoplopoma fimbria*)

Most adult and late juvenile Sablefish are found in depths of 370 to 920 meters along the continental shelf, the lope, and the deep-water coastal fjords over any substrate (NPFMC 2019). Spawning occurs in late spring and larvae have been found in pelagic waters at 300 to 500 meters (McFarlane 1997). It is questionable whether Sablefish inhabit Sitka Channel and surrounding waters; however, they are considered here.

#### Yellow Irish Lore (*Hemilepidotus jordani*)

Yellow Irish Sole are bottom-dwelling fish that live in tide pools and in shallow marine waters, but can be found in deeper waters. They can occasionally be found in freshwater. Sculpins generally spawn in the winter; however, larvae have been found year-round. Adults and late juveniles are distributed from subtidal areas near shore to the edge of the continental shelf (down to 200 meters), and Sitka is the eastern most known location that Yellow Irish Lore have been observed. Because Yellow Irish Lore are known to use a wide range of habitats, including intertidal pools and all shelf habitats, e.g., mud, sand, gravel, etc. (NPFMC 2019), it is likely that they are found in Sitka Channel and surrounding waters.

#### Great Sculpin (*Myoxocephalus polyacanthocephalus*)

Great Sculpins are bottom-dwelling fish that live in tide pools and in shallow marine waters, but can be found in deeper waters. They can occasionally be found in freshwater. Sculpins generally spawn in the winter; however, larvae have been found year-round. Adults and late juveniles can be found throughout the intertidal area to 200 meters, most commonly on sand at moderate depths (50 to 100 meters). Sculpins are known to use a wide range of habitats, including intertidal pools and all shelf habitats, e.g., mud, sand, gravel, etc. (NPFMC 2019), and it is likely that they inhabit Sitka Channel and surrounding areas.

#### Bigmouth Sculpin (*Hemitripterus bolini*)

Bigmouth Sculpins are bottom-dwelling fish that live in tide pools and in shallow marine waters, but can be found in deeper waters. They can occasionally be found in freshwater. Sculpins generally spawn in the winter; however, larvae have been found year-round. Adults and late

juveniles can be found throughout deeper offshore waters in the GOA and grow up to 70 centimeters in length. Bigmouth Sculpins are known to use a wide range of habitats, including intertidal pools and all shelf habitats, e.g., mud, sand, gravel, etc. (NPFMC 2019); therefore, they could inhabit Sitka Channel and surrounding waters.

#### Arrowtooth Flounder (*Atheresthes stomias*)

Arrowtooth Flounder have a benthic lifestyle with distinct summer and winter grounds along the eastern Bering Sea shelf. Spawning occurs as early as September and as late as March at depths of 100 to 360 meters (NPMFC 2019; DiCosimo 2001). Pelagic (open seas) eggs and larvae inhabit all areas of the continental shelf, though predominantly inhabiting only the inner and middle shelf regions. Juveniles and adults are demersal (bottom dwelling) in gravel and muddy sand. Juveniles typically inhabit shallow areas until they are about 10 centimeters long. During winter, the flounder migrate to shelf margins and upper continental slopes to avoid cold temperatures (NPMFC 2019). This species is a likely inhabitant of Sitka Channel and surrounding waters.

#### Northern Rock Sole (*Lepidopsetta polyxystra*)

Northern Rock Sole, a shallow water flatfish, has a wide distribution from the southern Bering Sea and throughout the Aleutian Islands to as far south as Washington (Byersdorfer and Watson 2010). Northern Rock Sole migrate to shallow waters on the continental shelf for feeding after spawning in the spring (NPFMC 2019). They are most often found at depths from 50 to 100 meters in the summer before returning to deeper waters in the winter (Armistead and Nichol 1993). Juveniles spend their first year in shallow waters on the continental shelf (Forrester 1964). It is questionable whether Northern Rock Sole inhabit Sitka Channel and surrounding waters; however, they are considered here.

#### Dover Sole (*Microstomus pacificus*)

There is a wide spread distribution of Dover Sole in the GOA with a presence in waters deeper than 300 meters, but more common between 100 to 200 meters during the summer (Turnock et al. 2002). Spawning occurs in deeper waters from February through May with peak spawning occurring in May (Abookire and Macewicz 2003). As Dover Sole go through life stages and reach sexual maturity, they move down the continental slope and into deeper waters (NPMFC 2019). Because Dover Sole primarily inhabit deeper waters, it is questionable whether they inhabit Sitka Channel and surrounding waters.

#### Yellowfin Sole (*Limanda aspera*)

Yellowfin Sole are part of the shallow water flatfish management complex in the GOA and are distributed from waters off of British Columbia to the Sea of Japan. They over-winter near the shelf margins, before migrating to inner shelf in April or early May for spawning. Spawning periods can happen anytime from late May through to August, primarily in shallow water. Juveniles separate from adults and remain in shallow areas until 15 cm. During the summer, eggs are found pelagic waters along the shelf and upper slope (from 0 to 500 meters) and

adults prefer sandy substrates in nearshore shallow shelf areas (NPFMC 2019). Yellowfin Sole could inhabit Sitka Channel and surrounding waters.

#### Alaska Plaice (*Pleuronectes quadrituberculatus*)

Alaska Plaice are present in continental shelf waters year-round and travel seasonally throughout their range. A majority of Alaska Plaice have been sampled along the Alaska Peninsula and around Kodiak Island, but they have also been found within the GOA. Sampling events have obtained fish from near shore waters at depths less than 100 meters. Alaska Plaice spawning typically occurs from March to April on hard sandy ground (Zhang 1987; NPMFC 2019). Alaska Plaice could inhabit Sitka Channel and surrounding waters.

#### Octopus (*unidentified*)

Octopus can be found from subtidal waters to deep waters close to the outer slope, with the highest diversity along the shelf break and an abundance on the shelf. Life histories of some octopus species in this region are relatively unknown but generally, life spans anywhere from 1 to 2 years or 3 to 5 years depending on species. Adults are preferential to substrate with rocks and cobble, and on sand and mud (NPFMC 2019). This species is a likely inhabitant of Sitka Channel and surrounding waters.

#### **4.1.3 Non-EFH Protected Species**

Pacific Herring (*Chupea harengus*) and Pacific Halibut (*Hippoglossus stenolipsis*) do not have EFH in the project action area; however, they serve an important ecological role within Sitka Sound (ADF&G 2019) and are described here due to an expressed interest from NMFS and ADF&G in their December 2019 letters regarding the project. Pacific Herring specifically provide an abundant, high energy food source for a wide variety of fishes, mammals, and birds. Herring are also commercially important and support a roe fishery in Sitka that remains one of the largest and most valuable roe fisheries in Alaska.

The largest herring stock in Southeast Alaska migrates to Sitka Sound each spring for an annual spawning event, spanning several days to several weeks from mid-March to mid-May. Pacific Herring spawn on intertidal and subtidal substrates within the project area in spring, and incubating eggs hatch about two weeks later (ADF&G 2019). Based on ADFG surveys over the last 30 years, herring spawning areas have been highly variable, but observed on marine vegetation around the perimeter of the Sitka Airport which includes the Channel Rock Breakwaters. Herring spawn from the intertidal zone down to about mean lower low water, targeting areas with substantial macroalgae concentrations. Egg deposition occurs on all species of kelp in the Sitka area, particularly *Macrocystis* and *Saccharina*, but herring also use eelgrass, *Fucus*, coralline algae, red algae, and hard rocky substrates.

## 4.2 EXISTING CONDITIONS IN THE ACTION AREA

### 4.2.1 Sitka Channel and Channel Rock Breakwaters

Sitka Channel is a narrow passage between Japonski Island and the much larger Baranof Island. Downtown Sitka and multiple harbors are located along the east shore of the channel, and there is a United States Coast Guard Wharf on the west shore. The channel, about 6,500 ft long, 150 ft wide, and about 50 ft at the deepest, is bookended by the Channel Rock breakwaters to the north and the John O'Connell bridge to the south (NOAA 2020).

The mean tide range is 7.7 ft, the diurnal tide range is 9.94 ft, and the extreme range is 18.98 ft (NOAA 2020a). The channel is characterized by multiple marine habitats that support a wide variety of fish and wildlife species. Habitats in the channel range from calm protected embayments to high energy wave-swept exposed coastlines. Much of the developed Sitka waterfront area has a rocky shoreline (USACE 2012). The seafloor in the channel contains a mosaic of bottom types including a mixed-soft bottom (mixture of silt, sand, pebbles, cobbles, boulders, and shell) and bedrock outcrops.

The three Channel Rock breakwaters were authorized in 1992, and initial construction was completed in 1995 with placement of a total of 310,500 cubic yards of rock to provide wave protection for expanded harbor capacity in the Sitka Channel (USACE 2012). The Channel Rock breakwaters were expanded to fill a gap in the existing structure following a 2011 USACE feasibility study in response to elevated wave action and erosion in the channel.

A marine survey conducted June 5-6, 2020 documented habitats and mapped eelgrass present south of the proposed development area.

According to the ShoreZone Mapper, the shoreline at the proposed project site in Sitka Channel has the following characteristics (ShoreZone 2019):

- Habitat Class: protected/partially mobile/sediment or rock and sediment; protected/mobile/sediment; semi-protected/partially mobile or rock and sediment; semi-protected/anthropogenic permeable.
- Coastal Class: ramp with gravel/sand beach; cliff with gravel/sand beach; sand and gravel flat fan; gravel beach, narrow; man-made permeable.
- Biological Wave Exposure: protected; semi-protected; semi-exposed.

#### *Eelgrass Extent*

During a June 2020 intertidal habitat survey, one eelgrass bed was identified near the project location (Figure 8). The eelgrass bed is approximately 409 square meters in size with 90% eelgrass coverage and located east of the project footprint (SolsticeAK 2020).

*Figure 8. Eelgrass Bed Extent within the Project Area*



#### *Contamination History*

There are no known contamination issues and no active contaminated sites monitored by the Alaska Department of Environmental Conservation (ADEC) within the project site (ADEC 2020). There are active contaminated sites and locations of known contamination closed with institutional controls near the proposed project on Japonski Island. Previous marine sediment sampling in the project area indicated no marine contamination despite the area's long history of commercial marine activity, including ongoing seaplane operations (USACE 2011).

#### **4.2.2 Anadromous Waterways**

There is one anadromous stream across Sitka Channel from the action area. Peterson Creek is anadromous (AWC #113-41-10185) for all five species of salmon and Dolly Varden and located along the eastern perimeter of the action area (ADF&G 2020). See Figure 4 in Section 3.2.

## 5 EFFECTS ASSESSMENT

In general, construction activities and marine vessel operations in estuarine habitats and in coastal marine areas have the potential to impact EFH. The construction and use of the SPB and associated structures may adversely impact marine resources directly and indirectly through increased sound levels, increased turbidity, habitat loss and/or modification. Other impacts that may occur as a result of the proposed project include the following: increased vessel traffic, increased human access (e.g., tourism), and cumulative development of shoreline habitat for commercial uses. Impacts as a result of each construction activity and indirect impacts are described below. Table 5 (see below) details each activity that could impact EFH and what potential adverse impacts the activity may have (NOAA 2017).

*Table 5. Potential Adverse Impacts to Essential Fish Habitat and EFH-listed Species for Activities Associated with the Proposed Project*

Potential Impacts	Project Activity			
	Discharge of Fill Material and Uplands Development	Overwater Structures	Pile Driving and Temporary Pile Removal	Seaplane and Vessel Traffic
Fish Avoidance/Displacement	X	X	X	
Fish Injury or Mortality	X		X	
Loss or Alteration of Fish Habitat	X	X		X
Release of Contaminants		X	X	X
Increased Mechanism for Invasive Species Introduction or Dissemination				X
Decrease in Ambient Light		X		
Reduction in Wave and Current Regimes	X	X		X

### 5.1 DISCHARGE OF FILL MATERIAL AND UPLANDS DEVELOPMENT

Approximately 1.64 acres of Sitka Channel below the high tide line will be filled to support upland staging and vehicle and seaplane parking. Since blasting will take place upland of the high tide line, there will be no in-water noise impacts to species with EFH in the project action area.

#### 5.1.1 Short-Term Impacts

##### *Sedimentation*

Discharge of fill material for the creation of SPB uplands will temporarily increase sedimentation, turbidity, and available light in the process of creating new uplands from fill material. Blasting will not affect sedimentation from uplands development given its proximity inshore from the high tide line and anticipated sedimentation from discharging of fill. These

impacts will be temporary, but contribute to the long-term habitat loss impacts to biological functions and hydrologic conditions addressed below. Increased turbidity during upland excavation and fill activities can injure fish by temporarily impacting feeding efficiency and clogging or damaging fish gills from suspended solids, leading to possible suffocation and increased energy demands (NOAA 2017).

### **5.1.2 Long-term Impacts**

#### *Habitat Loss*

Discharge of fill material to create project uplands reduces available fish habitat, potentially impacting productive habitats with important biological functions and hydrologic conditions. Given the project's location in a tidal area, discharge of fill will alter both biotic and abiotic conditions. Productive fish habitat can support fish spawning, breeding, and feeding, facilitating growth to maturity. Fill permanently eliminates area fish habitat (NOAA 2017). Reduced low gradient habitat or native substrate in coastal waters could likely negatively affect salmon rearing, by altering shelter important to juvenile salmonids. Changing habitat gradients may impact abundance and productivity of adult salmon, salmon prey, and intertidal rearing flatfish.

Establishing SPB uplands has the potential to impact hydrological conditions by obstructing flow, changing water velocity and direction, and altering coastal profile which collectively can alter aquatic communities, erosion and deposition, and overall water stratification.

Zooplankton abundance, an important food source for juvenile Pink and Chum Salmon, depend on currents for transport from offshore to nearshore areas (NOAA 2017).

Within the direct fill footprint, there is a large patch of the invasive algal species *Sargassum muticum*. The process of converting a 1.64-acre area to uplands will eradicate the known population of this invasive species from the action area. During a habitat assessment of the area, the algae species was not identified anywhere else within the footprint of project infrastructure (SolsticeAK 2020); however, it is found in other locations in Sitka Channel and Sitka Sound could be transported within the project footprint.

### **5.1.3 Indirect Impacts**

Development of hardened impervious upland surfaces for the proposed project, including parking and shelter structures, will exacerbate stormwater runoff. Stormwater runoff can affect sedimentation and siltation and increase contaminants in tidal habitats. Nonpoint source contamination and debris may increase from introduced hardened surfaces and reduced land use buffers (NOAA 2017).

Injured fish as a result of increased turbidity and the potential release of contaminants during discharge of fill to create SPB uplands may have indirect impacts on other species and the local marine system as a whole. Decreased visibility and an increase in suspended particles in the water column from discharge of fill can have indirect impacts on prey species by making them more susceptible to predation. These effects will be over a minimal project footprint relative to available habitat in the area. When combined with fish displacement from the area during

construction, there is a small potential to affect future fish populations in the area and a minimal risk to local commercial, sport, and subsistence harvests (NOAA 2017).

#### **5.1.4 Cumulative Effects**

Development along and within the Sitka Channel has occurred for several decades. There are no known future or foreseeable actions planned in the action area that will contribute to cumulative effects on EFH or EFH-managed species/species complexes and other fish and marine resources.

#### **5.1.5 Conservation and Mitigation Measures**

Incorporating the following conservation measures related to fill will help minimize adverse impacts to EFH and EFH-managed species/species complexes.

- The Project design minimizes the areal extent of fill in EFH to the extent practicable, especially in areas that support managed species (eelgrass, Figure 8).
- The side slopes of fill will be shallow to follow current tidal conditions which facilitates photic zone productivity; allows for unrestricted fish migration; and provides refuge for juvenile fish in interstitial spaces.
- A Section 404 Permit will be obtained to ensure fill activity is essential to the project, project impacts have been reduced, and unavoidable impacts compensated sufficiently.

## **5.2 VESSEL TRAFFIC**

### **5.2.1 Short-Term Impacts**

Short-term impacts to EFH from project vessel traffic during construction could increase wakes and surge in the action area, which could lead to shoreline erosion, disrupted coastal habitats, and increased turbidity.

### **5.2.2 Long-term Impacts**

Seaplane operations could have long-term impacts to EFH. Seaplanes takeoffs, landings, and transiting in the area could cause wakes, leading to shoreline erosion, disrupted coastal habitats, and increased turbidity.

There is a minor but potential risk of contamination, most likely oil spills, from the operation of the new SPB. Seaplanes are permitted to use avgas fuel, an especially toxic petroleum product, necessitating proper mitigation and preventative protocols. There is also a minor risk that seaplane operations could introduce invasive species, requiring proper mitigation and preventative SPB protocols.

Seaplane operations have occurred in the area for several decades, and while the new seaplane base may result in more operations, impacts are expected to remain at a minor level. Sitka Channel experiences high levels of marine traffic, including ongoing seaplane operations. The new SPB will relocate seaplane operations within the channel to an area that currently has less marine traffic, reducing congestion from vessel traffic in Sitka Channel.

### 5.2.3 Indirect Impacts

Operation of the new SPB has the potential to increase water and air traffic in the Sitka Channel vicinity. With additional vessel traffic there will be an increased potential for shoreline wake impacts, increased turbidity, and spills from vessels or planes which could impact EFH.

### 5.2.4 Conservation and Mitigation Measures

Incorporating the following vessel and seaplane operation conservation measures will help minimize adverse impacts to EFH and EFH-managed species/species complexes.

- A storm drain system including manholes with catchment sumps to trap solids and an oil water separator will be installed in the upland area to collect surface runoff and to remove contaminants prior to delivery to any receiving waters.
- SPB facilities will be designed to include practical measures to reduce, contain, and clean up petroleum spills.
- Oil spill response equipment will be located at the new SPB facility.
- SPB operation protocols and user agreements will require seaplanes to operate at no wake speeds in Sitka Channel (with the exception of operating within the taxi lane) in compliance with the Sitka Harbor no wake designations (CBS 2020).
- SPB operation protocols will incorporate BMP's to prevent or minimize contamination from seaplane accidents, general maintenance, fueling, and nonpoint source contaminants from upland facilities.

## 5.3 PILE INSTALLATION AND REMOVAL

### 5.3.1 Short-Term Impacts

#### *Sound*

An action area for the SPB has been determined by the area of water that will be ensonified above the acoustic threshold of 155 decibels (dB) re 1 $\mu$ Pa (micropascal) (root mean square) for impacting; this is the area where received noise levels from pile driving could expose fish to impacts described below. The action area includes approximately 4 square kilometers of northern Sitka Channel near downtown Sitka in Southeast Alaska (Figure 3).

Piles will be a central component of the new SPB's marine structures. Steel piles will support the trestle, gangway landing dock, and floating dock structures. To install and remove these piles a vibratory hammer, down-the-hole system, and impact hammer will be used. Each piece of equipment produces sound that exceeds known acoustic thresholds for fish species (Carlson et al 2001; Wursig et al 2000). Impact hammers produce sharp, short bursts of sound, while vibratory hammers produce sound with a longer duration that have more energy in the lower frequency range and create more sensitivity for fish (Carlson et al 2001; Wursig et al 2000).

There are several methods used to remove temporary piles from the substrate. For the proposed project, piles will primarily be removed from the substrate using direct pull and a vibratory hammer will only be used if deemed necessary to complete extraction. The use of the

vibratory hammer will cause similar sound impacts as present during pile installation; however, the direct pull method creates little in-water noise.

Considering sound profiles and area topography, the estimated area in which sound will exceed injury thresholds for fish will extend from 500 and 3,000 meters from pile driving at the new SPB site for impact pile driving (Figure 3).<sup>1</sup> Sound will be truncated by landforms, and may radiate across Sitka Channel to the shores of Baranof Island near downtown Sitka and through narrow openings in the Channel Rock Breakwaters reaching the Apple Islands.

Vibratory pile driving will occur for approximately 60 minutes each day; therefore, ensonification of the area by vibratory pile driving will be for approximately 45 hours over 46 days (not concurrent). Socketing pile driving will occur for approximately 10 hours each day; therefore, ensonification of the area by socketing will be for approximately 590 hours over 59 days (not concurrent). Impact driving will occur for approximately 10 minutes each day; therefore, ensonification of the area by impacting will be for approximately 12 hours over 74 days (not concurrent). Total ensonification from pile driving will be for approximately 647 hours over 647 days.

Little is known about the effects of sound on juvenile and adult fish; however, current research accepted by NMFS supports that physical injury can occur when SPLs reach 206 dB re 1  $\mu$ Pa during a single strike and/or when the accumulated sound exposure level (SEL) from multiple strikes reaches 187 dB re 1  $\mu$ Pa for large fishes ( $\geq 2$  grams) or 183 dB re 1  $\mu$ Pa for small fishes (<2 grams). There is currently not enough research to determine how sound impacts the earlier life stages of fish though it is known that smaller fish are more affected than larger fish by sound pollution (NOAA 2017).

During pile installation and removal, pile driving sound can affect the distribution and behavior of juvenile pink salmon and chum salmon. Other species of fish may change migration routes to avoid the area or leave the area entirely and habitat (NOAA 2017). SPLs of 155 dB re 1  $\mu$ Pa can stun small fish and make them more susceptible to predation. Physical injury to fish such as fatal damage to swim bladders in small fish and compromised swim bladders in larger fish can also result from exposure to underwater sound.

### *Sedimentation*

As piles are installed, it is expected approximately 1.5 cubic meters of material will be excavated of each trestle pile and 4 cubic meters of material will be excavated from each float pile. Less than two piles will be drilled in a day to minimize the volume of sediment disturbance. About 2 cubic meters per day will be released during construction of the trestle and about 8

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<sup>1</sup> Impact pile driving source level of 186.7 SEL/ 198.6 SPL8 is estimated from documented median received levels at 10 meters from impact hammering of 48-inch piles for the Port of Anchorage test pile project (Austin et al. 2016, Tables 9 and 16).

cubic meters per day will be released during the construction of the floats, with a total of 182 cubic meters overall for the project.

### **5.3.2 Long-term Impacts**

No long-term impacts are expected from the placement of piles.

### **5.3.3 Indirect Impacts**

EFH loss as a result of indirect impacts related to pile driving activities, such as barging and equipment and piles to the site and staging barges in the area, are expected to be temporary and minimal relative to fish populations and overall available EFH.

Piles can support growth of algal and sessile invertebrate species, which can increase and improve the quality of EFH in areas.

### **5.3.4 Conservation and Mitigation Measures**

Incorporating the following pile driving conservation measures will help to minimize adverse impacts to EFH and EFH-managed species/species complexes.

#### ***Sound Conservation and Mitigation Measures***

- The project will use the fewest number of piles necessary to support the new SPB facilities and allow light to reach under-pier areas and minimize impacts to the substrate.
- Pile installation and removal timeframes would be negotiated with ADF&G and NMFS to minimize impacts during sensitive time periods when larval and juvenile stages of EFH fish species are present. Pile installation will not occur during Herring spawning periods.
- Impact hammer use will be minimized. When impact hammers are used, the pile will first be driven as deep as possible with a vibratory hammer and socketing, before using an impact hammer to drive the pile to its final position.
- As possible, the impact hammer will be operated at a reduced energy setting and impacted into bedrock.

#### ***Sedimentation Conservation and Measures***

- A silt curtain will surround the pile driving and temporary pile removal operation.
- Temporary piles will be removed slowly to allow sediment to slough off at or near the mudline.

## **5.4 OVERWATER STRUCTURES**

### **5.4.1 Short Term Impacts**

No short-term impacts are expected as a result of installing overwater structures.

### **5.4.2 Long-term Impacts**

Long-term impacts as a result of installing new SPB overwater structures will include changes in ambient light conditions and alterations of wave and current energy regimes. As a result of the

project, there is also an increase in the risk of contamination released from activities associated with seaplanes using the overwater facilities (NOAA 2017). While eelgrass beds, which are important fish rearing habitat, will be mostly avoided by this project (Figure 8), the new SPB's overwater structures will shade approximately 1.34 acres of EFH which could permanently reduce or cause fragmentation of eelgrass and algae beds.

Ambient light is often reduced as a result of overwater structures. Shade caused by overwater structures may limit the distributions of plants, invertebrates, and fish or reduce complexity of the habitat below the structures. This is due to a decrease in available light for photosynthesis to occur in diatoms, benthic algae, eelgrass, and other photosynthesizers that marine and estuarine fishes rely on for food, protection, and rearing young. Structure height, width, composition, and orientation relative to the sun can all influence shading footprints of overwater structures (NOAA 2017).

The height, width, and composition of the project structures, as well as the orientation of the structures in relation to the sun, can influence how large a shade footprint an overwater structure may produce and how much of an adverse impact that shading effect may have on the localized habitat (NOAA 2017).

Juvenile salmonoids may avoid swimming under overwater structures with high activity like floats and docks. Reduced-light conditions can also directly adversely impact fish species that rely on visual cues for spatial orientation, prey capture, schooling, predator avoidance, and migration, encouraging avoidance of shaded areas. However, the protected, low energy nature of certain structures, including the nearby breakwaters or project wave attenuators, may attract some juvenile fish to change behavior and congregate in those spaces (NOAA 2017).

In addition to SPB float structures altering available light, other overwater structures, such as project wave attenuators, can adversely alter wave and current energy regimes in the area. The wave attenuators for the new SPB may interrupt the transportation of detrital materials and alter substrate composition in nearshore habitats (Hanson et al 2005; NOAA 2017). Adequate substrate is required for plant propagation, fish and shellfish settlement and rearing, and forage fish spawning (NOAA 2017).

Some treated wood is incorporated into the overwater marine structures. Contaminants from project materials such as the submerged wood used with creosote and ammoniacal copper zinc arsenate used in the trestle and floating dock structures are commonly known to leak into the marine environment for a short period after installation. These chemicals are known to cause harmful effects to fish such as, but not limited to: cancer, reproductive anomalies, immune dysfunction, and growth and development impairment (NOAA 2017).

### **5.4.3 Indirect Impacts**

A decrease in aquatic vegetation and phytoplankton as a result of a decrease in light from project overwater structures can indirectly impact fish by reducing prey abundance and habitat complexity (NOAA 2017).

### **5.4.4 Conservation and Mitigation Measures**

Incorporating the following conservation measures will help to minimize adverse impacts to EFH and EFH-managed species/species complexes.

- Wherever possible, the materials used for the overwater portions of the trestle and gangway, will allow some ambient light to penetrate to the water surface and water flow below the structure through grating and openings.
- The largest section of the dock will be installed in a north-south orientation to allow the arc of the sun to cross perpendicular to the structure to reduce the and intensity of shading.
- The float will be located in deep water to avoid light limitation and grounding impacts to the intertidal or shallow subtidal zones.
- All preservative treatment will be in accordance with the Western Wood Preservers Institute BMPs.

## **6 CONCLUSIONS AND DETERMINATION OF EFFECTS**

Approximately 1.64 acres of fill in Section 404 marine and intertidal water, including EFH, will be lost from the implementation of the proposed project due to filling for the upland staging area; however, fill will be minimized as much as possible and conservation measures will help to mitigate the impacts. Construction methods and proposed conservation measures will help to minimize short-term adverse impacts to EFH and EFH-managed species/species complexes. Few long-term adverse impacts to EFH from overwater structures and operations of the SPB are expected. Adverse impacts to EFH will occur over a minimal footprint relative to available fish habitat throughout Sitka Sound, and most will be mitigated through conservations measures. Indirect impacts to EFH and EFH-managed species, including those caused by potential increases in marine traffic will be mitigated through conservation measures, including SPB operating protocols and spill response plans.

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**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**

*National Marine Fisheries Service*

*P.O. Box 21668*

*Juneau, Alaska 99802-1668*

December 4, 2020

Kerry B. Long, Alaska Region Regional Administrator  
U.S. Federal Aviation Administration  
222 West 7th Ave. #14  
Anchorage, AK 99513

RE: Sitka Seaplane Base Project

Dear Mr. Long:

The U.S. Federal Aviation Administration (FAA) is gathering input and recommendations for the construction of a new seaplane base (SPB) in Sitka, Alaska. Construction of the new SPB will include the installation of: 82 permanent 24-inch diameter piles and 36 permanent 16-inch diameter piles; primary, transient and vehicle turnaround seaplane floats of dimensions 350 x 46 ft, 200 x 30 ft, and 30 x 20 ft, respectively; discharge fill to develop 1.47 acres of uplands; as well as upland features including aviation fueling infrastructure and fuel storage. Additionally, 30 temporary 18-inch diameter template piles will be installed, and then removed prior to project completion. The proposed project location is on the north shore of Japonski Island in Sitka Channel.

The National Marine Fisheries Service (NMFS) has reviewed the application. Under section 305(b)(4)(A) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), NMFS is required to provide Essential Fish Habitat (EFH) Conservation Recommendations for actions that would adversely affect EFH.

### **Essential Fish Habitat**

The North Pacific Fishery Management Council has identified EFH for five species of salmon and 19 groundfish species within the affected zone of the project (NPFMC 2018, 2019). The Alaska ShoreZone mapper indicates the coastal class in the project area is “cliff with gravel/sand beach,” and the habitat class is “protected/partially mobile sediment or rock and sediment” (Cook et al. 2017). The shoreline is characterized by soft brown kelps, green algae, rockweed, dune grass, and barnacles (Cook et al. 2017). According to the Anadromous Waters Catalog, the closest anadromous creek to the project site is Peterson Creek, located approximately half a mile from the site. Coho and pink salmon are identified as present at the creek (Johnson and Blossom 2019).

### **Assessment of EFH Effects**

NMFS thanks the FAA for committing to EFH conservation measures in their Essential Fish Habitat Assessment, particularly with regards to the sound mitigation measures for pile driving



activities in section 5.3.4 of the assessment. Additional project impacts are worth highlighting to enable conservation recommendations below. First, pile removal can cause the suspension of sediments, potentially resulting in harmful levels of turbidity and contaminant release (Limpinsel et al., 2017). Second, creosote-treated wood acts as a long-lived point source of polycyclic aromatic hydrocarbons (PAHs) that harm Pacific herring, an important prey component of salmon EFH (Duncan et al. 2016, NPFMC 2018).

## **EFH Conservation Recommendations**

In accordance with Section 305(b)(4)(A) of the MSA, NMFS makes the following EFH Conservation Recommendations:

1. Remove temporary piles with a vibratory hammer, rather than using direct pull or clamshell methods, to minimize the suspension of sediments and introduction of contaminants.
2. Rather than using creosote-treated timber for seaplane float construction, use a different, non-toxic treatment for the timber or a different material entirely to avoid the long-term release of PAHs into the marine environment.
3. Implement BMPs to minimize adverse effects of runoff and potential fuel leaks from the developed upland area to the marine environment.
4. Provide appropriate compensatory mitigation for the 1.47 acres of channel below mean high water that will be filled.

Under section 305(b)(4)(B) of the MSA, the Federal action agency is required to respond to NMFS EFH Conservation Recommendations in writing within 30 days. If your response is inconsistent with our recommendations, please explain the reasons for not following our recommendations, including the scientific justification for any disagreements over the anticipated effects of the proposed action and the measures needed to avoid, minimize, mitigate, or offset such effects (50 CFR 600.920(k)).

If you have questions regarding our recommendations for this project, please contact Ellen Ward at [ellen.ward@noaa.gov](mailto:ellen.ward@noaa.gov) or Molly Zaleski at [molly.zaleski@noaa.gov](mailto:molly.zaleski@noaa.gov).

Sincerely,

  
for James W. Balsiger, Ph.D.  
Administrator, Alaska Region

CC:

Robin Reich, Solstice Alaska Consulting, Inc., [robin@solsticeak.com](mailto:robin@solsticeak.com)

Kelli Cropper, City and Borough of Sitka, [kelli.cropper@cityofsitka.org](mailto:kelli.cropper@cityofsitka.org)

Kate Kanouse, Alaska Department of Fish and Game, [kate.kanouse@alaska.gov](mailto:kate.kanouse@alaska.gov)

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February 6, 2021

Mr. James W. Balsiger, Ph.D.  
Administrator  
Alaska Regional Office  
National Marine Fisheries Service  
National Oceanic and Atmospheric Administration  
PO Box 21668  
Juneau, Alaska 99802

Re: Sitka Seaplane Base Project Essential Fish Habitat Conservation Recommendations

Dear Mr. Balsiger:

Thank you for your December 4, 2020 letter in response to the Essential Fish Habitat (EFH) Assessment submitted by the Federal Aviation Administration (FAA) for the Sitka Seaplane Base (SPB) Project transmitted to you on November 16, 2020. In accordance with Section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act, as amended Magnuson-Stevens Act, we are responding to the Conservation Recommendations provided in your letter.

NMFS provided the following EFH Conservation Recommendations:

1. Remove temporary piles with a vibratory hammer, rather than using direct pull or clamshell methods, to minimize the suspension of sediments and introduction of contaminants.
2. Rather than using creosote-treated timber for seaplane float construction, use a different, non-toxic treatment for the timber or a different material entirely to avoid the long-term release of PAHs into the marine environment.
3. Implement Best Management Practices (BMPs) to minimize adverse effects of runoff and potential fuel leaks from the developed upland area to the marine environment.
4. Provide appropriate compensatory mitigation for the 1.47 acres of channel below mean high water that will be filled.

**Regarding recommended Conservation Measure #1:** Based on a telephone conversation between Ellen Ward, NMFS Habitat Division representative, and Robin Reich, project consultant, on December 11, 2020, pile removal via vibratory methods is now NOT recommended by NMFS. NMFS's Protected Resources Division would prefer to remove temporary pile via the direct pull method due to the potential impacts of vibratory impacts on marine mammals. Based on our conversation, temporarily pile removal will be initiated by direct pull method and resort to vibratory methods if deemed necessary.

**Regarding recommended Conservation Measure #2:** It is not feasible to incorporate this conservation measure into the project. Creosote treatment for submerged timber allows structural elements to last 50 years whereas other waterborne treatments lifespans are typically 20-25 years. Rebuilding the SPB after 25 years is cost prohibitive and will incur additional environmental impacts from pile driving to remove and replace SPB components.

For this project, all wood preservative (creosote) treatment will be in accordance with BMPs as set forth by the Western Wood Preservers Institute, including selecting a wood preservative and amount of preservative that best fits the project and environmental conditions and applying the preservative to the wood in a manner that ensures retention of the preservative within the wood. In addition, prior to shipping to the

treated wood materials to the Sitka for installation, the manufacturer ensures that: 1) the preservative is placed on clean wood free of dirt and saw dust; 2) there is no excessive residual or surface deposits of preservative on the wood; and 3) the wood has no excessive bleeding of preservative. (For more information, please see [https://preservedwood.org/portals/0/documents/BMP\\_Specifiers\\_Guide.pdf](https://preservedwood.org/portals/0/documents/BMP_Specifiers_Guide.pdf))

Based on guidance from the *Selection of Preservatives for Marine Structural Timbers in Herring Spawning Areas Final Report* (Perkins 2013), construction will be suspended before the likely start of the herring spawning season and will resume after the spawning season concludes. Installation involving creosote treated wood specifically will not occur within 60 days of the likely start of the herring spawning season; therefore, creosote treated wood materials will not be installed between January 15-May 1 (assuming herring run is between March 15 and April 30).

Finally, the water in the project environment is not stagnant (velocity in Sitka Channel is 0.5 knots [NOAA 2020]), and there is no known PAH sediment contamination at the project site (USACE 2011). It is expected that the PAH levels will remain very low in the area and that the treated wood will not cause water quality issues in the area.

**Regarding recommended Mitigation Measure #3:** The EFH Assessment includes mitigation measures and BMPs specific to the risks of runoff from upland areas reaching the marine environment, including:

- A storm drain system including manholes with catchment sumps to trap solids and an oil water separator will be installed in the upland area to collect surface runoff and to remove contaminants prior to delivery to any receiving waters.
- SPB operation protocols will incorporate BMPs to prevent or minimize contamination from seaplane accidents, general maintenance, fueling, and nonpoint source contaminants from upland facilities.

**Regarding recommended Conservation Measure #4:** Compensation for unavoidable impacts to approximately 1.7 acres of Section 404 wetlands will be determined through the U.S. Army Corps of Engineers' permitting process, which may require a mitigation plan based on the functions and values of the affected wetlands, and compensatory mitigation for federally-funded projects. (Note that this acreage has increased from the original 1.47 acre based on a recalculation.)

If you have questions or need additional information, please do not hesitate to contact Solstice Alaska Consulting, Inc (FAA's ESA Delegate) at 907.929.5960 or [robin@solsticeak.com](mailto:robin@solsticeak.com). Thank you for your efforts regarding this project.

Sincerely,



Jack Gilbertsen  
Lead Environmental Protection Specialist, FAA Alaskan Region

Attachments: December 2020 Essential Fish Habitat Assessment

Cc: Kate Kanouse, Alaska Department of Fish and Game, [kate.kanouse@alaska.gov](mailto:kate.kanouse@alaska.gov)  
Ellen Ward, NMFS Alaska Region  
Molly Zaleski, NMFS Alaska Region

Robin Reich, Solstice Alaska Consulting, Inc.  
Kelli Cropper, City and Borough of Sitka  
Maryellen Tuttell, DOWL

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**From:** [Emily Creely](#)  
**To:** [Emily Creely](#)  
**Subject:** FW: [EXT] FW: Sitka Seaplane Base  
**Date:** Thursday, January 2, 2025 10:23:33 AM

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**From:** Robin Reich <[robin@solsticeak.com](mailto:robin@solsticeak.com)>  
**Sent:** Tuesday, December 31, 2024 12:07 PM  
**To:** Emily Creely <[ecreely@dowl.com](mailto:ecreely@dowl.com)>  
**Cc:** Emma Kimball <[emma@solsticeak.com](mailto:emma@solsticeak.com)>  
**Subject:** [EXT] FW: Sitka Seaplane Base

**WARNING:** External Sender - use caution when clicking links and opening attachments.

Emily-

In the email below, NMFS ESA folks let us know that the BO still works and we don't need to consult any further.

Robin Reich  
Solstice Alaska Consulting, Inc.  
Office: 907.929.5960  
Cell: 907.903.0597

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**From:** Sierra Franks - NOAA Federal <[sierra.franks@noaa.gov](mailto:sierra.franks@noaa.gov)>  
**Sent:** Tuesday, December 31, 2024 11:43 AM  
**To:** Robin Reich <[robin@solsticeak.com](mailto:robin@solsticeak.com)>  
**Cc:** Jenna Harlacher - NOAA Affiliate <[jenna.harlacher@noaa.gov](mailto:jenna.harlacher@noaa.gov)>; Leanne Roulson - NOAA Affiliate <[leanne.roulson@noaa.gov](mailto:leanne.roulson@noaa.gov)>; Benjamin Laws - NOAA Federal <[benjamin.laws@noaa.gov](mailto:benjamin.laws@noaa.gov)>; Emma Kimball <[emma@solsticeak.com](mailto:emma@solsticeak.com)>  
**Subject:** Re: Sitka Seaplane Base

Hi Robin,

Thanks for checking in. I can weigh in from the Alaska Region ESA side. We appreciate this notice and do not see anything here that would change our analysis on the already previously issued consultation. We will retain this email as part of our administrative record with the project file.

Happy New Year.

**Sierra E. Franks** (*she/her*)  
Branch Chief &  
Regional Endangered Species Act Section 7 Coordinator  
Alaska Region, Protected Resource Division, Anchorage

Phone: 907-531-6610

<https://www.fisheries.noaa.gov/about/alaska-regional-office>

"You don't have to be one of, to stand with"

On Tue, Dec 31, 2024 at 11:40 AM Robin Reich <[robin@solsticeak.com](mailto:robin@solsticeak.com)> wrote:

Hi-

Happy new year! Did you have any thoughts on the email below?

Robin Reich

Solstice Alaska Consulting, Inc.

Office: 907.929.5960

Cell: 907.903.0597

---

**From:** Robin Reich

**Sent:** Thursday, December 12, 2024 3:53 PM

**To:** Jenna Harlacher - NOAA Affiliate <[jenna.harlacher@noaa.gov](mailto:jenna.harlacher@noaa.gov)>; Sierra Franks - NOAA Federal <[sierra.franks@noaa.gov](mailto:sierra.franks@noaa.gov)>; Leanne Roulson - NOAA Affiliate <[leanne.roulson@noaa.gov](mailto:leanne.roulson@noaa.gov)>

**Cc:** Benjamin Laws - NOAA Federal <[benjamin.laws@noaa.gov](mailto:benjamin.laws@noaa.gov)>; Emma Kimball <[emma@solsticeak.com](mailto:emma@solsticeak.com)>

**Subject:** RE: Sitka Seaplane Base

Hi-

We talked about changes to this project back in May. I believe at the Zoom meeting, PRD requested that we email an explanation of the project changes and said that you would email back with confirmation that the project is still covered under the Biological Opinion (assuming it is) and add the information to your administrative record. Below are details on the minor changes.

-----

Since issuance of the Biological Opinion (BO) under National Marine Fisheries Service (NMFS) Consultation Number: AKRO-2023-02513 on May 1, 2024, the City and Borough of Sitka's Proposed Sitka Seaplane Base project has been updated, but not significantly modified, from its original dimensions or location.

The primary difference between the currently proposed project and the previous

project is:

- Construction of the upland base parking area and approach (fill activities only) will not begin construction until 2026 and pile driving associated with the transfer bridge, drive down dock, transient/loading float, and seaplane ramp float will not begin until 2027. Previously pile driving activities were to occur and Incidental Harassment Authorizations (IHAs) were issued for July 2024 through June 2025 (Phase I) and July 2025 through 2026 (Phase II). (Please note that although we discussed removing the transient float from the project, City and Borough of Sitka has decided to keep it.)
- The area of fill associated with the project below the high tide line (HTL) has decreased to 2.45 acres. Previously, the area of fill was 2.9 acres below HTL and sunflower sea stars take in the BO was based on that area.

City and Borough of Sitka, as designated representative for the Federal Aviation Administration (FAA; funding agency), is currently preparing a Supplemental Environmental Assessment for the project. Because the project has not substantially changed since the BO was issued; we assert that the NMFS' Endangered Species Act finding remains applicable, and no additional consultation is needed.

New IHAs will be sought when the project is closer to construction; however, because pile driving is not expected to start until 2027, the application will not be submitted until 2026.

Please let us know if you have any questions or issues with our assertion. Thanks for your help with this important project.

Robin Reich  
Solstice Alaska Consulting, Inc.  
Office: 907.929.5960  
Cell: 907.903.0597

-----Original Appointment-----

**From:** Emma Kimball <[emma@solsticeak.com](mailto:emma@solsticeak.com)>

**Sent:** Thursday, May 30, 2024 2:42 PM

**To:** Emma Kimball; Robin Reich; Jenna Harlacher - NOAA Affiliate; Sierra Franks -

NOAA Federal; Leanne Roulson - NOAA Affiliate

**Cc:** Benjamin Laws - NOAA Federal; Carrie Connaker

**Subject:** Sitka Seaplane Base

**When:** Friday, May 31, 2024 10:00 AM-10:30 AM (UTC-09:00) Alaska.

**Where:** <https://us06web.zoom.us/j/87446377264>

Solstice Alaska is inviting you to a scheduled Zoom meeting.

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<https://us06web.zoom.us/j/87446377264>

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**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
 National Marine Fisheries Service  
 P.O. Box 21668  
 Juneau, AK 99802-1668

**Endangered Species Act (ESA) Section 7(a)(2) Biological and Conference Opinion**

**Sitka Seaplane Base Construction, Sitka, Alaska**

**NMFS Consultation Number:** AKRO-2023-02513

**Action Agencies:** National Marine Fisheries Service (NMFS), Office of Protected Resources, Permits and Conservation Division; City and Borough of Sitka, *as designated representative for the* Federal Aviation Administration (FAA)

**Affected Species and Determinations:**

ESA-Listed Species	Status	Is the Action Likely to Adversely Affect Species?	Is the Action Likely to Adversely Affect Critical Habitat?	Is the Action Likely to Jeopardize the Species?	Is the Action Likely to Destroy or Adversely Modify Critical Habitat?
North Pacific Right Whale ( <i>Eubalaena japonica</i> )	Endangered	No	No	No	No
Fin Whale ( <i>Balaenoptera physalus</i> )	Endangered	No	N/A	No	N/A
Sperm Whale ( <i>Physeter macrocephalus</i> )	Endangered	No	N/A	No	N/A
Humpback Whale, Mexico DPS ( <i>Megaptera novaeangliae</i> )	Threatened	Yes	No	No	No
WDPS Steller Sea Lion ( <i>Eumetopias jubatus</i> )	Endangered	Yes	No	No	No
Sunflower Sea Star ( <i>Pycnopodia helianthoides</i> )	Proposed	Yes	N/A	No	N/A



**Consultation Conducted By:** National Marine Fisheries Service, Alaska Region

**Issued By:**

  
\_\_\_\_\_  
Jonathan M. Kurland  
Regional Administrator

**Date:** May 1, 2024

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### TERMS AND ABBREVIATIONS

Acronym/ Abbreviation	Definition
ADOT	Alaska Department of Transportation & Public Facilities
AKR	Alaska Region
ARBO	Arctic Regional Biological Opinion
ASLC	Alaska SeaLife Center
BA	Biological Assessment
CBS	City Borough of Sitka
CI	Confidence Interval
CSEL	Cumulative Sound Exposure Level
CV	Coefficient of Variance
CWA	Clean Water Act
dB re 1μPa	Decibel referenced 1 microPascal
District Court	U.S. District Court for the District of Alaska
DOWL	Dowl Engineers
DPS	Distinct Population Segment
EEZ	Exclusive Economic Zone
EPA	Environmental Protection Agency
ESA	Endangered Species Act
°F	Fahrenheit
FR	Federal Register
ft	Feet
g	Gallons
HTL	High Tide Line
Hz	Hertz
IHA	Incidental Harassment Authorization
in <sup>3</sup>	Cubic Inches
IPCC	Intergovernmental Panel on Climate Change
ITA	Incidental Take Authorization
ITS	Incidental Take Statement
IWC	International Whaling Commission
kHz	Kilohertz
km	Kilometers
kn	Knots

<b>Acronym/ Abbreviation</b>	<b>Definition</b>
L	Liter
m	Meter
mi	Mile
MLLW	Mean Lower Low Water
MMPA	Marine Mammal Protection Act
ms	Milliseconds
μPa	Micro Pascal
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollution Discharge Elimination System
NRC	National Research Council
NSF	National Science Foundation
Opinion	Biological Opinion
Pa	Pascals
PR1	NMFS Permits Division
PTS	Permanent Threshold Shift
RMS	Root Mean Square
RPA	Reasonable and Prudent Alternative
s	Second
SEL	Sound Exposure Level
SPLASH	Structure of Populations, Level of Abundance and Status of Humpback Whales
SSB	Sitka Seaplane Base
SSL	Steller Sea Lion
TTS	Temporary Threshold Shift
USACE	United States Army Corps of Engineers
VMS	Vessel Monitoring System
WDPS	Western Distinct Population Segment

## 1 INTRODUCTION

Section 7(a)(2) of the Endangered Species Act of 1973, as amended (ESA; 16 U.S.C. § 1536(a)(2)) requires each Federal agency to ensure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat of such species. When a Federal agency's action "may affect" a protected species, that agency is required to consult with the National Marine Fisheries Service (NMFS) or the U.S. Fish and Wildlife Service (USFWS), depending upon the endangered species, threatened species, or designated critical habitat that may be affected by the action (50 CFR § 402.14(a)). Federal agencies may fulfill this general requirement informally if they conclude that an action may affect, but "is not likely to adversely affect" endangered species, threatened species, or designated critical habitat, and NMFS or the USFWS concurs with that conclusion (50 CFR § 402.14(b)).

Section 7(b)(3) of the ESA requires that at the conclusion of consultation, NMFS and/or USFWS provide an opinion stating how the Federal agency's action is likely to affect ESA-listed species and their critical habitat. If incidental take is reasonably certain to occur, section 7(b)(4) requires the consulting agency to provide an incidental take statement (ITS) that specifies the impact of any incidental taking, specifies those reasonable and prudent measures necessary or appropriate to minimize such impact, and sets forth terms and conditions to implement those measures.

On July 5, 2022, the U.S. District Court for the Northern District of California issued an order vacating the 2019 regulations that were revised or added to 50 CFR part 402 in 2019 ("2019 Regulations," see 84 FR 44976, August 27, 2019) without making a finding on the merits. On September 21, 2022, the U.S. Court of Appeals for the Ninth Circuit granted a temporary stay of the district court's July 5 order. On November 14, 2022, the Northern District of California issued an order granting the government's request for voluntary remand without vacating the 2019 regulations. The District Court issued a slightly amended order two days later on November 16, 2022. As a result, the 2019 regulations remain in effect, and we are applying the 2019 regulations here. For purposes of this consultation and in an abundance of caution, we considered whether the substantive analysis and conclusions articulated in the biological opinion and incidental take statement would be any different under the pre-2019 regulations. We have determined that our analysis and conclusions would not be any different. A more recent proposed rule was published in the *Federal Register* on June 22, 2023 (88 FR 40753).

In this document, the action agencies are the Federal Aviation Administration (FAA) and the National Marine Fisheries Service, Office of Protected Resources, Permits and Conservation Division (from now on referred to as PR1) for their issuance of an Incidental Take Authorization (IHA) under the Marine Mammal Protection Act (MMPA) for each of the two proposed phases of the project. The FAA proposes to make improvements to the Sitka Seaplane Base in Sitka, Alaska. On November 2, 2020, the FAA designated the City and Borough of Sitka (CBS) as its non-federal representative for the purposes of completing this consultation. The CBS has

contracted with DOWL Engineers (DOWL) to provide concept planning and environmental review (Environmental Assessment) for the project. DOWL has subcontracted with Solstice Alaska Consulting, Inc. (Solstice AK) to address biological resources and particularly marine biology issues under the ESA and the Marine Mammal Protection Act (MMPA). PR1 requested consultation on the proposed issuance of the IHAs under section 101(a)(5)(D) of the MMPA for the aforementioned activities. Additionally, PR1 requested consideration of the potential authorization of take in the year following the initial IHA (e.g. Phase II) if the criteria published in the Federal Register (FR 88, 1884, January 11, 2024) are met. The consulting agency for this proposal is NMFS's Alaska Region. This document represents NMFS's biological opinion (opinion) on the effects of this proposal on listed and proposed endangered and threatened species and designated critical habitat.

The opinion and ITS were prepared by NMFS Alaska Region in accordance with section 7(b) of the ESA (16 U.S.C. § 1536(b)) and implementing regulations at 50 CFR part 402.

The opinion and ITS are in compliance with the Data Quality Act (44 U.S.C. § 3504(d)(1)) and underwent pre-dissemination review.

## 1.1 Background

This opinion is based on information provided in the December 8, 2023, Biological Assessment (BA) and subsequent revisions submitted by Solstice AK, and the Incidental Harassment Application (IHA) and subsequent revisions prepared by PR1. A complete record of this consultation is on file at NMFS's Alaska Regional Office.

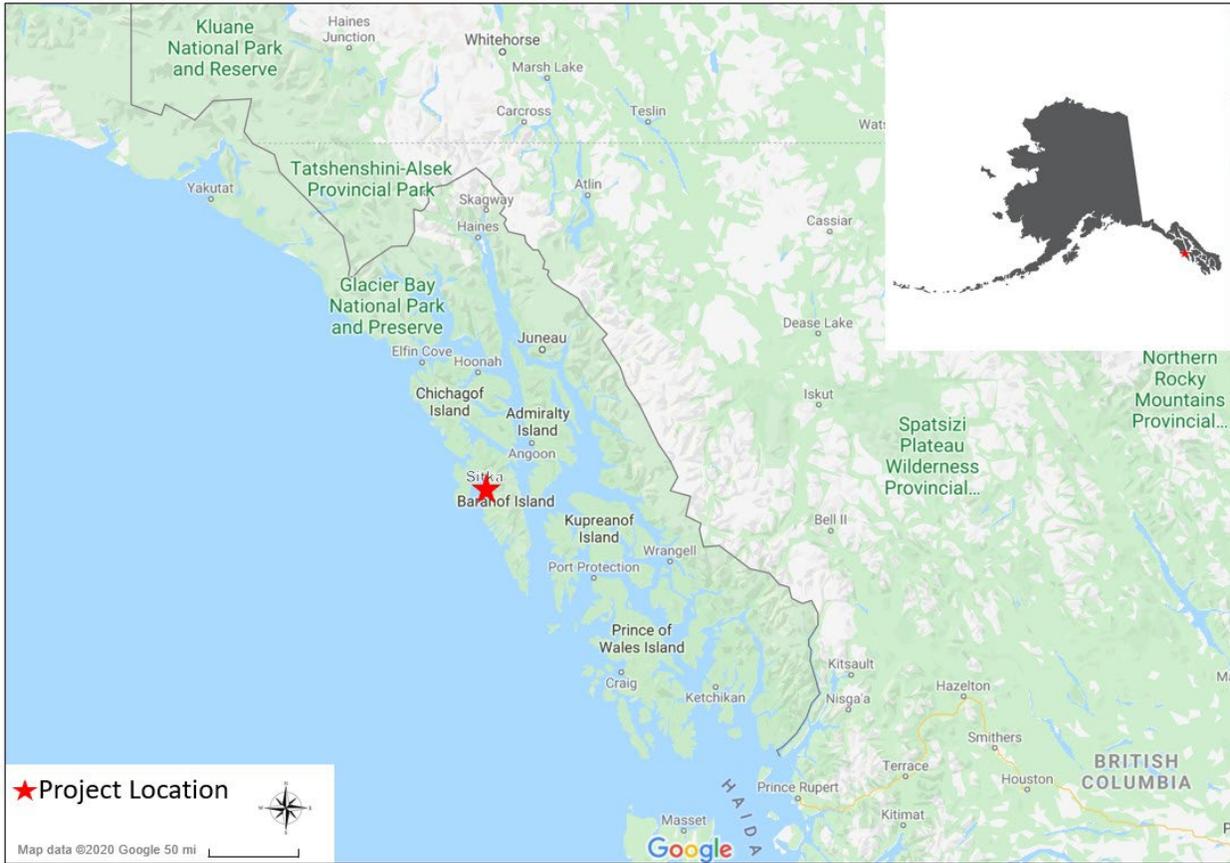
The proposed action involves construction of a new Sitka Seaplane Base (SPB) to replace the existing seaplane base in Sitka, AK (Figure 1). Construction is expected to start in the summer of 2024.

The project would consist of several components, completed over two phases with construction from July 2024 through the end of July 2026:

This opinion considers the effects of the following in-water activities:

1. installation and removal of temporary support/ guidance piles
2. installation of permanent piles
3. support and material supply vessel transit

Additionally, this opinion considers the effects of the associated proposed issuance of an IHA on endangered North Pacific right whale (*Eubalaena japonica*), fin whale (*Balaenoptera physalus*), sperm whale (*Physeter macrocephalus*), threatened Mexico DPS humpback whales (*Megaptera novaeangliae*), endangered Western DPS Steller sea lion (*Eumetopias jubatus*), and associated critical habitat. The action agency also requested a conference on the proposed listing of the sunflower sea star (*Pycnopodia helianthoides*) (88 FR 16212, March 16, 2023) in the consultation, and requested concurrence with a likely to adversely affect determination.



**Figure 1. Project Location in Southeast Alaska (HDR 2022)**



Figure 2. Project Location in Sitka, AK (HDR 2022)

## 1.2 Consultation History

- November 2, 2020 - NMFS Alaska Region (AKR) received a letter from the FAA designating the CBS and their consultants as their non-federal representatives for the purposes of the ESA consultation.
- November 5, 2020 - NMFS AKR received a letter from Solstice AK requesting initiation of formal consultation under Section 7(a)(2) of the ESA for the construction of the Sitka SPB.
- December 16, 2020 - NMFS AKR received a draft Biological Assessment (BA) for the Sitka SPB from Solstice AK.
- The project was paused for several months while planning and engineering was finalized with CBS.
- April 5, 2021 - NMFS AKR received a letter from Solstice AK requesting initiation of formal consultation under Section 7(a)(2) of the ESA for the construction of the Sitka SPB.
- April 12, 2021 - NMFS AKR received an email from the FAA stating that the CBS could proceed with the Finding of No Significant Impact (FONSI) for the SPB contingent upon completion of the ESA consultation.
- April 2021 - NMFS AKR received a revised BA from Solstice AK.
- December 6, 2021 - NMFS AKR received a request for expedited informal consultation

- on the geotechnical investigations for the proposed Sitka sea plane base from the FAA.
- February 7, 2022 - NMFS AKR issued a letter of concurrence to the FAA for their geotechnical investigation project (AKRO-2021-03432).
  - August 11, 2023 - NMFS AKR received a revised BA from Solstice AK.
  - September 1, 2023 - NMFS Permits Division (PR1) received an IHA application for the Sitka Seaplane Base (SPB) project.
  - September 20, 2023 - NMFS PR1 sent revision requests to Solstice AK for the IHA application.
  - October 12, 2023 - Solstice AK submitted responses and revisions to the IHA application.
  - October 27, 2023 - The Early Review Team (ERT) which involves participants from NMFS AKR and PR1, met to discuss the project.
  - November 2023 - Solstice AK and PR1 had email exchanges to clarify additional questions on the project and the IHA.
  - December 5, 2023 - PR1 determined the IHA application adequate and complete.
  - December 8, 2023 - NMFS AKR received the revised BA prepared by Solstice AK.
  - December 18, 2023 - NMFS AKR notified Solstice AK and CBS that formal consultation had been initiated.
  - January 10, 2024 - NMFS AKR received the draft federal register notice and IHA from PR1.
  - January 11, 2024 - The Proposed IHA published in the *Federal Register* (88 FR 1884, January 11, 2024); NMFS AKR received a request for consultation from PR1.
  - February 12, 2024 - The public comment period on the IHA closed.
  - February 13, 2024 - PR1 notified AKR that no comments were received on the IHA.

## **2 DESCRIPTION OF THE PROPOSED ACTION AND ACTION AREA**

### **2.1 Proposed Action**

“Action” means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States or upon the high seas (50 C.F.R. § 402.02).

This opinion considers the effects of CBS’s proposed construction of the new SPB. The project includes the removal and installation of both temporary and permanent piles to support the floating dock structures and an approach ramp. Additional above-water improvements will include blasting and excavation to prepare the area for upland facilities (bridge abutment, vehicle turnaround, parking, basic amenities, curb, vehicle driveway, security fencing, and landscape buffer). The United States Army Corps of Engineers (USACE), Alaska District will issue a Rivers and Harbors Act Section 10 and Clean Water Act Section 404 permit for the project. NMFS PR1 will issue an IHA to take marine mammals by harassment under the MMPA

incidental to these actions in Sitka Sound near Sitka, AK. Construction is expected to occur over approximately two years beginning as early as July 2024.

### **2.1.1 Proposed Activities**

The City and Borough of Sitka is located in Sitka Sound on the west side of Baranof Island, approximately 150 kilometers southwest of Juneau in southeast Alaska (Figure 1). The proposed Sitka SPB site is located on the east side of Japonski Island near the main harbor entrance to the Sitka Channel (Figure 2). The current Sitka SPB (FAA identifier A29) is located on the eastern shore of Sitka Channel, near Eliason Harbor and downtown Sitka. The existing site's proximity to Sitka Sound Seafoods fish processing plant has created additional wildlife conflicts. The new Sitka SPB would address existing capacity, safety, and condition deficiencies for critical seaplane operations, and allow seaplanes to transit Sitka Channel more safely.

The project would consist of several components, completed over two phases:

The following components are proposed for Phase I (construction from July 2024 through July 2025):

- Seaplane ramp float
- Drive-down float
- Pedestrian and vehicle transfer bridge
- Approach dock
- Uplands approach, storage area, and parking

The following components are proposed for Phase II (construction from July 2025 through July 2026):

- Transient seaplane float
- Turnaround float
- Expanded uplands approach, storage area, and parking
- Drive-down launch ramp

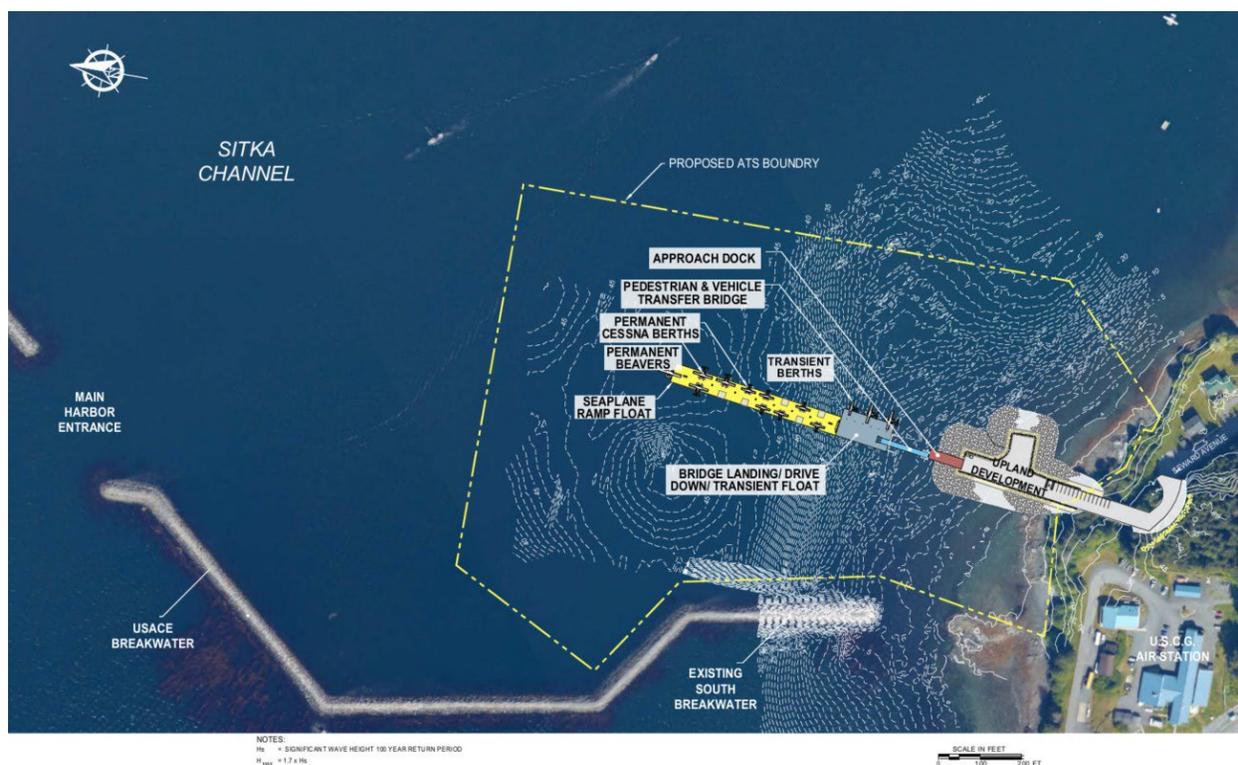
The two proposed construction phases of Sitka SPB Project are detailed below and illustrated in Figure 3 and Figure 4.

#### **2.1.1.1 Phase I (July 2024-July 2025)**

During Phase I, in-water construction activities are expected to occur for a total of approximately 45 hours over 31 days (not necessarily consecutive). Most of the in-water work time would be spent down-the-hole (DTH) pile driving (34 hours). All permanent piles would be initially installed with a vibratory hammer. After vibratory pile driving, piles would be socketed into the bedrock with DTH drilling equipment. Finally, piles would be driven the final few inches of embedment with an impact hammer. Under Phase I (Figure 3; Table 2-1), the proposed project

would construct and install the following pile-supported components:

- 80-foot by 24-foot approach dock
- 120-foot by 12-foot pedestrian and vehicle transfer bridge
- 128-foot by 68-foot drive-down float
- 417-foot by 46-foot seaplane ramp float to support 10 Cessna and 4 Beaver seaplane berths
- Install and remove 12 temporary, 16-inch-diameter steel piles, as templates to guide proper installation of permanent piles (these temporary piles would be removed prior to project completion) (Table 3-1).
- Install 10 permanent 16-inch-diameter galvanized steel piles and 16 permanent 24-inch-diameter galvanized steel piles to support the approach dock, pedestrian and vehicle transfer bridge, bridge landing and drive-down float, and seaplane ramp float (Table 3-1).
- Install other SPB float components such as electricity connections, waterlines, lighting, passenger walkway, handrail, and mast lights.



**Figure 3. Sitka SPB project area and proposed activities for Phase I of construction (Solstice AK 2023).**

*Upland Activities:*

The project would conduct rock blasting and excavation of about 10,100 cubic yards (CY) of material extending from about 16 to 60 vertical feet above mean lower low water (MLLW; 0.00

datum) located at the end of the Seward Avenue in the southwest corner of the project uplands.

- All blasting and excavating would occur above high tide line (HTL; +13 feet).
- Rock blasting and excavation would extend approximately 200 horizontal feet inland.
- One blasting event per day on 47 days (not consecutive) at an estimated 90 decibels (dB; at the blast center) per event (Southeast Earth Movers 2020).
- Construct 2.6 acres of uplands including bridge abutment, vehicle turnaround, parking, basic amenities, curb, vehicle driveway, security fencing, and landscape buffer (Figure 5).
- Discharge of 0.03 acres of fill between mean high water (MHW; +9.16 feet) and HTL (+13 feet) and 1.3 acres below MHW.
- Side slopes of fill would have ratio of 2 horizontal to 1 vertical (2H:1V) slopes with heavy open graded armor rock and interstitial spaces.

### 2.1.1.2 Phase II

Construction of Phase II would follow a sequence similar to Phase I with in-water work occurring for approximately 13 hours over 9 days (not necessarily consecutive). Most of the in-water work time would be spent DTH pile driving (9 hours). As in Phase I, in Phase II all permanent piles would be initially installed with a vibratory hammer. After vibratory driving, piles would be socketed into the bedrock with DTH drilling equipment. Finally, piles would be driven the final few inches of embedment with an impact hammer. Under Phase II (Figure 4; Table 2-1), the proposed project would:

- Construct and install the following pile-supported components:
  - 56-foot by 32-foot vehicle turnaround float.
  - 144-foot by 56-foot transient float to support 5 transient seaplane berths.
- Install and remove 6 temporary 16-inch-diameter steel piles as templates to guide proper installation of permanent piles (these temporary piles would be removed prior to project completion) (Table 3-1).
- Install 6 permanent 24-inch-diameter galvanized steel piles to support the vehicle turnaround float and transient float (Table 3-1).
- Install other SPB float components such as bull rail, floating fenders, mooring cleats, electricity connections, waterlines, lighting, passenger walkway, handrail, and mast lights.
- Add an additional 1.2 acres of supporting infrastructure with the addition of a 183-foot by 34-foot seaplane haul-out ramp, seaplane staging areas, expanded parking, curb, security fencing, landscape buffer, and a covered shelter (Figure 5).
- Discharge of 0.5 acres of fill between MHW (+9.16 feet) and HTL (+13 feet) and 0.8 acres below MHW.
- Side slopes of fill would have ratio of 2 horizontal to 1 vertical (2H:1V) slopes with heavy open graded armor rock and interstitial spaces.



**Figure 4. Sitka SPB project area and proposed activities for Phase II of construction. Items completed in Phase I are noted in grey text (Solstice AK 2023).**

### 2.1.1.3 Pile Installation and Removal Methods

#### *Installation and Removal of Temporary (Template) Piles*

A maximum of 12 temporary 16-inch-diameter piles would be installed using a vibratory hammer and impacting hammer to construct the approach dock, bridge abutment, and floats during Phase I. These piles would be removed using the vibratory hammer.

A maximum of six temporary 16-inch-diameter piles would be installed using a vibratory hammer and impacting hammer in constructing the project floats during Phase II. These piles would be removed using the vibratory hammer.

#### *Installation of Permanent Piles*

All permanent 16-inch-diameter and 24-inch-diameter piles would be initially installed with a vibratory hammer. After vibratory driving, piles would be socketed into the bedrock with down-the-hole (DTH) drilling equipment. Finally, piles would be driven the final few inches of embedment with an impact hammer.

Piles at the end of the seaplane ramp float and the corners of the drive-down float would be installed as a steel pipe pile frame for added stability and reinforcement.

See Table 2-1 for a summary of the numbers and types of piles to be installed and removed during Phase I and Phase II, as well as the estimated durations of each activity.

**Table 2-1. Phase I and II Summary of Piles to be Installed and Removed (Solstice AK 2023).**

Project Component	Temp Install	Temp Remove	Perm Install	Perm Install	Total		Temp Install	Temp Remove	Perm Install	Total	Total
	Phase I						Phase II				I & II
Diameter of Steel Pipe Piles (inches)	16	16	16	24			16	16	24		
Total # of Piles	12	12	10	16	50		6	6	6	18	68
<b>Vibratory Pile Driving<sup>1</sup></b>											
Total Quantity	12	12	10	16	50		6	6	6	18	68
Max # Piles Vibrated Per Day	6	6	6	6			6	6	6		
Vibratory Time Per Pile (minutes)	10	10	10	10			10	10	10		
Vibratory Time Per Day (minutes)	60	60	60	60			60	60	60		
Number of Days	2.0	2.0	1.7	2.7	<b>8.4</b>		1.0	1.0	1.0	<b>3.0</b>	<b>11.4</b>
Vibratory Time Total (hours)	2.0	2.0	1.7	2.7	<b>8.4</b>		1.0	1.0	1.0	<b>3.0</b>	<b>11.4</b>
<b>Down-The-Hole Pile Drilling</b>											
Total Quantity			10	16	26				6	6	32
Max # of Piles Installed per Day			2	2	4				2	2	
# of Strikes Per Pile			36,000	54,000					54,000		
# of Strikes Per Second			10	10					10		
Actual Drilling Time Per Pile (minutes)			60	90					90		
Time per Day (minutes)			120	180					180		
Number of Days			5.0	8.0	<b>13.0</b>				3.0	<b>3.0</b>	<b>16.0</b>

Project Component	Temp Install	Temp Remove	Perm Install	Perm Install	Total		Temp Install	Temp Remove	Perm Install	Total	Total
	Phase I						Phase II				I & II
DTH Drilling Time Total (hours)			10.0	24.0	<b>34.0</b>				9.0	<b>9.0</b>	<b>43.0</b>
<b>Impact Pile Driving</b>											
Total Quantity	12		10	16			6		6		
Max # Piles Impacted Per Day	4		4	4			4		4		
# of Strikes Per Pile	175		175	175			175		175		
Impact Time Per Pile (minutes)	5		5	5			5		5		
Impact Time Per Day (minutes)	20		20	20			20		20		
Number of Days	3.0		2.5	4.0	<b>9.5</b>		1.5		1.5	<b>3.0</b>	<b>12.5</b>
Impact Time Total (hours)	1.0		0.8	1.3	<b>3.1</b>		0.5		0.5	<b>1.0</b>	<b>4.1</b>

<sup>1</sup> The total number of days and total time in hours are the same for vibratory pile driving because the applicant has assumed a maximum of 60 minutes (1 hour) of vibratory pile driving per day.

#### **2.1.1.4 Other In-water Construction and Heavy Machinery Activities**

In addition to the activities described above, the proposed action would involve other in-water construction and heavy machinery activities. Examples of other types of activities include using standard barges, tugboats, or other equipment to place and position piles on the substrate via a crane (i.e., “stabbing the pile”).

The seaplane floats (constructed elsewhere) would consist of treated timber and galvanized steel fasteners. The submerged timber structural elements of the floats will be pressure treated with creosote. All other timber components that will not be fully submerged will be pressure treated with ammoniacal copper zinc arsenate. All preservative treatment will be in accordance with best management practices (BMPs) as set forth by the *Western Wood Preservers Institute*. Floatation includes closed cell expanded polystyrene billets covered with 100 percent solid polyurethane and/or polyethylene floatation tubs to protect from physical damage, water absorption, colonization by encrusting organisms, and other factors.

#### **2.1.1.5 Blasting, Excavating, and Filling Methods**

To develop the SPB uplands, the project would require rock blasting and excavating 9,500 CY above HTL (+13 feet) and excavating an additional 5,925 CY of common material above HTL in Phase I. Drilling and blasting would be expected to occur for 564 hours over 47 days (12 hours per day) during Phase I. Material would be excavated from the supratidal shoreline (+16 to +60 feet above MLLW). Excavated soils would be stored at an upland location to dry before being used as fill within the proposed uplands. There would be no blasting or excavating during Phase II.

Following blasting and excavating, excavated materials, armor rock, and underlayment would be placed above and below HTL to develop the SPB uplands such as bridge abutment, approach, vehicle turnaround, parking, basic amenities, curb, and vehicle driveway totaling 34,650 CY during Phase I and 56,650 CY during Phase II. The fill would be placed using an excavator and dozer and then compacted using a vibratory soil compactor.

#### **2.1.2 Construction Vessels and Movements**

The Contractor is expected to mobilize two barges: one with a crane mounted on it and a staging/work barge that will be moved into place with a tugboat. Additional barges and tugs will be used to deliver equipment as needed. Construction materials will arrive from Seattle, Washington, and coastal Alaska, following well-established, frequently used navigation lanes throughout Southeast Alaska. A small support skiff will be used during construction activities to move workers and materials from shore to active construction. Within the action area, project-related vessels will not exceed 10 knots.

### **2.1.3 Construction Sequence and Duration**

Construction of the project is expected to occur over approximately two years with Phase I beginning as early as July 2024 and Phase II being completed by the end of July 2026. Pile installation and removal will be intermittent during this period, depending on weather, construction and mechanical delays, protected species shutdowns, and other potential delays and logistical constraints.

During Phase I, in-water pile driving activities are expected to occur for a total of approximately 45 hours over 31 days (not necessarily consecutive). Most of the in-water pile-driving time would be spent DTH pile driving (34 hours). Additionally, placement of fill below HTL would occur over an estimated 652 hours of 55 days.

Construction of Phase II would follow a similar sequence with in-water work (pile driving) occurring for approximately 13 hours over 9 days (not necessarily consecutive). Most of the in-water pile-driving time would be spent DTH pile driving (9 hours). Additionally, placement of fill below HTL would occur over an estimated 285 hours or 24 days.

Uplands work would be completed independently of pile supported structures. Uplands project construction would begin with clearing the uplands area, blasting, and excavating. Excavated materials would be placed on uplands to be used as fill. Placement of fill would create 2.6 acres for Phase I (includes 1.3 acres of fill below HTL) and an additional 1.2 acres during Phase II (includes 1.3 acres of fill below HTL). Please see Table 5-1 for a conservative estimate of quantities involved in blasting, excavating, and placement of fill.

The total construction duration accounts for the time required to construct both phases of the project, accounting for potential delays in material deliveries, equipment maintenance, inclement weather, and shutdowns that may occur to prevent impacts to marine mammals.

### **2.1.4 Mitigation Measures**

For all reporting that results from implementation of these mitigation measures, NMFS will be contacted using the contact information specified in Table 2-2. In all cases, notification will reference the NMFS consultation tracking number AKRO-2023-02513.

#### **2.1.4.1 General Mitigation Measures**

1. CBS will inform NMFS of impending in-water activities a minimum of one week prior to the onset of those activities.
2. If construction activities will occur outside of the time window specified in these measures, the applicant will notify NMFS of the situation at least 60 days prior to the end of the specified time window to allow for reinitiation of consultation.
3. Project-associated staff will cut all materials that form closed loops (e.g., plastic packing bands, rubber bands, and all other loops) prior to proper disposal in a closed and secured

trash bin. Trash bins will be properly secured with locked or secured lids that cannot blow open, preventing trash from entering into the environment, thus reducing the risk of marine mammal entanglement should waste enter marine waters.

4. Project-associated staff will properly secure all ropes, nets, and other marine mammal entanglement hazards to ensure they do not blow or wash overboard.

#### **2.1.4.2 Protected Species Observer (PSO) Measures**

5. A minimum of two (depending on in-water activity) NMFS-approved PSOs, able to accurately identify and distinguish species of Alaska marine mammals, will be present before and during all in-water construction and demolition activities. For each in-water activity, PSOs will monitor all marine waters within the indicated shutdown and/or monitoring zone radius for that activity. See Figure 3, 4, and 5 in Section 2.2 for specific shutdown and monitoring zones.
6. PSOs will be positioned such that they will collectively be able to monitor the entirety of each activity's shutdown zone. The action agency will coordinate with NMFS on the placement of PSOs prior to commencing in-water work.
7. Prior to commencing any in-water work, PSOs will scan waters within the appropriate shutdown zone and confirm no listed marine mammal species are within the shutdown zone for at least 30 minutes immediately prior to initiation of in-water activity. If one or more listed marine mammal species are observed within the shutdown zone, the in-water activity will not begin until the listed marine mammal species exit the shutdown zone of their own accord. Alternately, if the PSO has continuously scanned these waters and has not observed listed marine mammals within the zone for 30 minutes, then the in-water work may commence.
8. The pre-construction-activity-observation-period described in the above measure will take place at the start of each day of in-water activities, each time in-water activities have been shut down or delayed due the presence of a listed marine mammal species, and following cessation of in-water activities for a period of 30 minutes or longer.
9. The on-duty PSOs will continuously monitor the shutdown zone and adjacent waters during all in-water operations for the presence of listed species.
10. In-water activities will take place only:
  - a. between local sunrise and sunset;
  - b. during conditions with a Beaufort Sea State of 4 or less; and
  - c. when the entire shutdown zone and adjacent waters are visible (e.g., monitoring effectiveness is not reduced due to rain, fog, snow, haze or other environmental or atmospheric conditions).
11. If visibility degrades such that a PSO can no longer ensure that the shutdown zone remains devoid of listed marine mammal species during in-water work, the crew will

- cease in-water work until the entire shutdown zone is visible and the PSO has indicated that the zone has remained devoid of listed marine mammal species for 30 minutes.
12. The PSO will order in-water activities to immediately cease if one or more listed marine mammal species has entered, or appears likely to enter, the associated shutdown zone.
  13. If in-water activities are shut down for less than 30 minutes due to the presence of listed marine mammal species in the shutdown zone, in-water work may commence when the PSO provides assurance that listed marine mammal species were observed exiting the shutdown zone. Otherwise, the activities may only re-commence after the PSO provides assurance that listed species have not been seen in the shutdown zone for 30 minutes (for cetaceans) or 15 minutes (for pinnipeds).
  14. Following a lapse of in-water activities of more than 30 minutes, the PSO will authorize resumption of activities (using soft-start procedures for impact pile driving activities) only after the PSO provides assurance that listed marine mammal species have not been present in the shutdown zone for at least 30 minutes immediately prior to resumption of operations.
  15. If a listed marine mammal species is observed within a shutdown zone or is otherwise harassed, harmed, injured, or disturbed, PSOs will immediately report that occurrence to NMFS using the contact information specified in Table 2-2.
  16. PSOs will have no other primary duties besides watching for, acting on, and reporting events related to listed species.
  17. The action agency or its designated non-federal representative will provide resumes or qualifications of PSO candidates to the NMFS consultation biologist or section 7 coordinator for approval at least one week prior to in-water work. NMFS will provide a brief explanation of disapproval in instances where an individual is not approved.
  18. At least one PSO will have prior experience performing the duties of a PSO during construction activity.
  19. At least one PSO on the project will complete PSO training prior to deployment (contact NMFS AKR PRD for a list of trained and experienced PSOs). The training will include:
    - a. field identification of marine mammals and marine mammal behavior;
    - b. ecological information on marine mammals and specifics on the ecology and management concerns of those marine mammals;
    - c. ESA and MMPA regulations;
    - d. proper equipment use;
    - e. methodologies in marine mammal observation and data recording and proper reporting protocols; and
    - f. an overview of PSO roles and responsibilities.

20. When a team of three or more PSOs are required, a lead observer or monitoring coordinator will be designated.
21. PSOs will:
  - a. have vision that allows for adequate monitoring of the entire shutdown zone;
  - b. have the ability to effectively communicate orally, by radio and in person, with project personnel;
  - c. be able to collect field observations and record field data accurately and in accordance with project protocols;
  - d. be able to identify to species all marine mammals that occur in the action area; and
  - e. have writing skills sufficient to create understandable records of observations.
22. PSOs will work in shifts lasting no longer than 4 hours with at least a 1-hour break from monitoring duties between shifts. PSOs will not perform PSO duties for more than 12 hours in a 24-hour period.
23. PSOs will have the ability and authority to order appropriate mitigation responses, including shutdowns, to avoid takes of all listed species.
24. The PSOs will have the following equipment to address their duties:
  - a. tools which enable them to accurately determine the position of a marine mammal in relationship to the shutdown zone;
  - b. two-way radio communication, or equivalent, with onsite project manager;
  - c. tide tables for the project area;
  - d. watch or chronometer;
  - e. binoculars (7x50 or higher magnification) with built-in rangefinder or reticles (rangefinder may be provided separately);
  - f. instruments that allow observer to determine geographic coordinates of observed marine mammals;
  - g. a legible copy of this opinion and all appendices; and
  - h. legible and fillable observation record form allowing for required PSO data entry.
25. Prior to commencing in-water work or at changes in watch, PSOs will establish a point of contact with the construction crew. The PSO will brief the point of contact as to the shutdown procedures if listed species are observed likely to enter or within the shutdown zone and will request that the point of contact instruct the crew to notify the PSO when a marine mammal is observed. If the point of contact goes "off shift" and delegates his duties, the PSO must be informed and brief the new point of contact.

### **2.1.4.3 Impact Pile driving**

26. If no listed species are observed within the impact pile driving shutdown zone for 30 minutes immediately prior to pile driving, soft-start procedures will be implemented immediately prior to activities. Soft start requires contractors to provide an initial set of strikes at no more than half the operational power, followed by a 30 second waiting period, then two subsequent reduced power strike sets. A soft start must be implemented at the start of each day's impact pile driving, any time pile driving has been shutdown or delayed due the presence of a listed species, and following cessation of pile driving for a period of 30 minutes or longer.
27. Following this soft-start procedure, operational impact pile driving may commence and continue provided listed species remain absent from the shutdown zone.

### **2.1.4.4 Down the Hole (DTH) drilling**

28. If no listed species are observed within the DTH pile driving shutdown zone for 30 minutes immediately prior to pile driving, soft-start procedures will be implemented immediately prior to activities. Soft start requires contractors to activate the drilling equipment at no more than half the operational power for several seconds, followed by a 30 second waiting period, then two subsequent reduced power start-ups. A soft start must be implemented at the start of each day's DTH pile driving, any time pile driving has been shutdown or delayed due the presence of a listed species, and following cessation of pile driving for a period of 30 minutes or longer.
29. Following this soft-start procedure, operational pile driving may commence and continue provided listed species remain absent from the shutdown zone.
30. Following a lapse of pile driving activities of more than 30 minutes, the PSO will authorize resumption of pile driving only after the PSO provides assurance that listed species have not been present in the shutdown zone for at least 30 minutes immediately prior to resumption of operations.

### **2.1.4.5 Use of Creosote Treated Wood Products**

31. Composition and treatment of creosote-treated wood will conform to the most current version of the *Production Guide-Best Management Practices for the Use of Preserved Wood in Aquatic and Sensitive Environments* issued by Western Wood Preservers Institute, Southern Pressure Treaters' Association, Southern Forest Products Association, Wood Preservation Canada and the Creosote Council.
32. Construction debris must be salvaged and disposed of properly and will not be allowed to enter aquatic or marine environments.
33. Prefabrication of overwater structures made with creosote-treated wood products will occur before the structure is placed to minimize treated debris entry into aquatic or marine environments.
34. Temporary structures designed to facilitate construction of permanent structures will be

composed of untreated materials.

35. Treated wood products located in areas with current velocities less than 1.0 cm/sec will be coated or wrapped with non-toxic protective barriers that are maintained throughout the life of the structure.
36. 0.5 inch-thick high density polyethylene wear strips will be installed down the length of each treated wooden pile (or component) to prevent abrasion by other components and by vessels.

#### **2.1.4.6 Vessels**

37. Vessel operators will:
  - a. maintain a watch for marine mammals at all times while underway;
  - b. stay at least 91 m (100 yards) away from listed marine mammals;
  - c. travel at less than 5 knots (9 km/hour) when within 274 m (300 yards) of a whale;
  - d. avoid changes in direction and speed when within 274 m (300 yards) of a whale, unless doing so is necessary for maritime safety;
  - e. not position vessel(s) in the path of a whale, and will not cut in front of a whale in a way or at a distance that causes the whale to change direction of travel or behavior (including breathing/surfacing pattern);
  - f. check the waters immediately adjacent to the vessel(s) to ensure that no whales will be injured when the vessel gets underway; and
  - g. reduce vessel speed to 10 knots or less when weather conditions reduce visibility to 1.6 km (1 mi) or less.
38. Adhere to the Alaska Humpback Whale Approach Regulations when vessels are transiting to and from the project site: (see 50 CFR §§ 216.18, 223.214, and 224.103(b)) (note: these regulations apply to all humpback whales). Specifically, pilot and crew will not:
  - a. approach, by any means, including by interception (i.e., placing a vessel in the path of an oncoming humpback whale), within 100 yards of any humpback whale;
  - b. cause a vessel or other object to approach within 100 yards of a humpback whale; or
  - c. disrupt the normal behavior or prior activity of a whale by any other act or omission.
39. If a whale's course and speed are such that it will likely cross in front of a vessel that is underway, or approach within 91 m (100 yards) of the vessel, and if maritime conditions safely allow, the engine will be put in neutral and the whale will be allowed to pass

beyond the vessel.

40. Vessels will take reasonable steps to alert other vessels in the vicinity of whale(s).
41. Vessels will not allow lines to remain in the water unless both ends are under tension and affixed to vessels or gear. No materials capable of becoming entangled around marine mammals will be discarded into marine waters.

*Vessel Transit, Western DPS Steller Sea Lions, and their Critical Habitat.*

42. Vessels will not approach within 5.5 km (3 nm) of rookery sites listed in 50 CFR § 224.103(d).
43. Vessels will not approach within 914 m (3,000 ft) of any Steller sea lion haulout or rookery which is not listed in 50 CFR § 224.103(d).

**2.1.4.7 Sunflower Sea Stars**

44. To prevent direct placement of a pile on a sunflower sea star, a pre-construction survey and biweekly survey of the pilings and seafloor near the project area will take place.
  - a. To prevent direct placement of a pile on an ESA-listed sunflower sea star, a pre-construction survey and biweekly (every other week) surveys of the seafloor near the project area will take place.
  - b. If a sunflower sea star is identified during the pre-construction or biweekly surveys, more frequent surveys prior to piling may be required.
  - c. The contractor, at their own discretion, may monitor the seafloor during the placement of every pile in lieu of a pre-construction or bi-weekly surveys.
  - d. If a sunflower sea star is attached to a pile being removed from the water, the sunflower sea star will be gently removed from the pile by the Lead PSO, or a crew delegate due to possible safety concerns, and immediately released into an intertidal location outside of the disturbed area where harm or injury cannot occur.

**2.1.4.8 General Data Collection and Reporting**

*Data Collection*

45. PSOs will record observations on data forms or into electronic data sheets.
46. The action agency will ensure that PSO data will be submitted electronically in a format that can be queried such as a spreadsheet or database (i.e. digital images of data sheets are not sufficient).
47. PSOs will record the following:
  - a. the date, shift start time, shift stop time, and PSO identifier;
  - b. date and time of each reportable event (e.g., a marine mammal observation,

- operation shutdown, reason for operation shutdown, change in weather);
- c. weather parameters (e.g., percent cloud cover, percent glare, visibility) and sea state where the Beaufort Wind Force Scale will be used to determine sea-state (<https://www.weather.gov/mfl/beaufort>);
- d. species, numbers, and, if possible, sex and age class of observed marine mammals, and observation date, time, and location;
- e. the predominant anthropogenic sound-producing activities occurring during each marine mammal observation;
- f. observations of marine mammal behaviors and reactions to anthropogenic sounds and human presence;
- g. initial, closest, and last known location of marine mammals, including distance from observer to the marine mammal, and minimum distance from the predominant sound-producing activity or activities to marine mammals;
- h. whether the presence of marine mammals necessitated the implementation of mitigation measures to avoid acoustic impact, and the duration of time that normal operations were affected by the presence of marine mammals; and
- i. geographic coordinates for the observed animals, (or location noted on a chart) with the position recorded using the most precise coordinates practicable (coordinates will be recorded in decimal degrees, or similar standard and defined coordinate system).

#### *Data Reporting*

- 48. Observations of humpback whales will be transmitted to [Akr.prd.records@noaa.gov](mailto:Akr.prd.records@noaa.gov) by the end of the calendar year, including information specified in General Data Collection and Reporting (above) and photographs and videos obtained of humpback whales, most notably those of the whale's flukes.

#### *Unauthorized Take*

- 49. If a listed marine mammal is determined by the PSO to have been disturbed, harassed, harmed, injured, or killed (e.g., a listed marine mammal(s) is observed entering a shutdown zone before operations can be shut down, or is injured or killed as a direct or indirect result of this action), the PSO will report the incident to NMFS within one business day, with information submitted to [AKR.prd.records@noaa.gov](mailto:AKR.prd.records@noaa.gov). These PSO records will include:
  - a. all information to be provided in the final report (see Mitigation Measures under the *Final Report* heading below);
  - b. number of animals of each threatened and endangered species affected;
  - c. the date, time, and location of each event (provide geographic coordinates);

- d. description of the event;
- e. the time the animal(s) was first observed or entered the shutdown zone, and, if known, the time the animal was last seen or exited the zone, and the fate of the animal;
- f. mitigation measures implemented prior to and after the animal was taken;
- g. if a vessel struck a marine mammal, the contact information for the PSO on duty, or the contact information for the individual piloting the vessel if there was no PSO on duty; and
- h. photographs or video footage of the animal(s) (if available).

*Stranded, Injured, Sick or Dead Marine Mammal (not associated with the project)*

50. If PSOs observe an injured, sick, or dead marine mammal (i.e., stranded marine mammal), they will notify the Alaska Marine Mammal Stranding Hotline at 877-925-7773. The PSOs will submit photos and available data to aid NMFS in determining how to respond to the stranded animal. If possible, data submitted to NMFS in response to stranded marine mammals will include date/time, location of stranded marine mammal, species and number of stranded marine mammals, description of the stranded marine mammal's condition, event type (e.g., entanglement, dead, floating), and behavior of live-stranded marine mammals.

*Illegal Activities*

51. If PSOs observe marine mammals being disturbed, harassed, harmed, injured, or killed (e.g., feeding or unauthorized harassment), these activities will be reported to NMFS Alaska Region Office of Law Enforcement at (Table 2-2; 1-800-853-1964).
52. Data submitted to NMFS will include date/time, location, description of the event, and any photos or videos taken.

*Monthly Report*

53. Submit interim monthly PSO monitoring reports, including data sheets. These reports will include a summary of marine mammal species and behavioral observations, shutdowns or delays, and work completed.
54. Monthly reports will be submitted to [Akr.prd.records@noaa.gov](mailto:Akr.prd.records@noaa.gov) by the 15<sup>th</sup> day of the month following the reporting period. For example, the report for activities conducted in June 2023 will be submitted by July 15<sup>th</sup>, 2023.

*Final Report*

55. A draft of the final report will be submitted to NMFS within 90 calendar days of the completion of the project summarizing the data recorded and submitted to

[Akr.prd.records@noaa.gov](mailto:Akr.prd.records@noaa.gov). A final report must be prepared and submitted within 30 calendar days following receipt of any NMFS comments on the draft report. If no comments are received from NMFS within 30 calendar days of receipt of the draft report, the report may be considered final. The report will summarize all in-water activities associated with the proposed action, and results of PSO monitoring conducted during the in-water project activities.

56. The final report will include:

- a. summaries of monitoring efforts, including dates and times of construction, dates and times of monitoring, dates and times and duration of shutdowns due to marine mammal presence;
- b. date and time of marine mammal observations, geographic coordinates of marine mammals at their closest approach to the project site, marine mammal species, numbers, age/size/sex categories (if determinable), and group sizes;
- c. number of marine mammals observed (by species) during periods with and without project activities (and other variables that could affect detectability);
- d. observed marine mammal behaviors and movement types versus project activity at time of observation;
- e. numbers of marine mammal observations/individuals seen versus project activity at time of observation;
- f. distribution of marine mammals around the action area versus project activity at time of observation; and
- g. digital, queryable documents containing PSO observations and records, and digital, queryable reports.

#### 2.1.4.9 Summary of Agency Contact Information

Table 2-2. Summary of Agency Contact Information

Reason for Contact	Contact Information
Consultation Questions & Unauthorized Take	<a href="mailto:AKR.prd.section7@noaa.gov">AKR.prd.section7@noaa.gov</a> and Leanne Roulson ( <a href="mailto:leanne.roulson@noaa.gov">leanne.roulson@noaa.gov</a> )
Reports & Data Submittal	<a href="mailto:Akr.prd.records@noaa.gov">Akr.prd.records@noaa.gov</a> (please include NMFS tracking number AKRO-2022-03506 in subject line)

Reason for Contact	Contact Information
Stranded, Injured, or Dead Marine Mammal <i>(not related to project activities)</i>	Stranding Hotline (24/7 coverage) 877-925-7773
Oil Spill & Hazardous Materials Response	U.S. Coast Guard National Response Center: 1-800-424-8802 & <a href="mailto:AKRNMFSspillResponse@noaa.gov">AKRNMFSspillResponse@noaa.gov</a>
Illegal Activities <i>(not related to project activities; e.g., feeding, unauthorized harassment, or disturbance to marine mammals)</i>	NMFS Office of Law Enforcement (AK Hotline): 1-800-853-1964
In the event that this contact information becomes obsolete	NMFS Anchorage Main Office: 907-271-5006 Or NMFS Juneau Main Office: 907-586-7236

## 2.2 Action Area

“Action area” means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR § 402.02). For this reason, the action area is typically larger than the project area and extends out to a point where no measurable effects from the proposed action occur.

The proposed project would be located within the Channel Rock Breakwaters in the Sitka Channel spanning between Japonski Island and Baranof Island (Figure 2). The Channel Rock Breakwaters provide protection for the harbor and other facilities and structures located throughout the channel. Sitka Channel is about 150 feet wide and about 22 feet deep at its narrowest. The mean tide range is 7.7 feet, the diurnal tide range is 9.94 feet, and the extreme range is 18.98 feet (NOAA Station 9451600). Sitka Channel connects to the larger Sitka Sound, an active fishery and transportation corridor.

NMFS defines the ensonified portion of the action area for this consultation to include the area within which project-related noise levels exceed 120 dB re 1 µPa root mean square (rms) and are expected to approach ambient noise levels (i.e., the point where no measurable effect from the project would occur). As shown in Figure 5, the project action area extends 13.6 kilometers (8.5

miles) from the construction site during Phase I and Phase II.

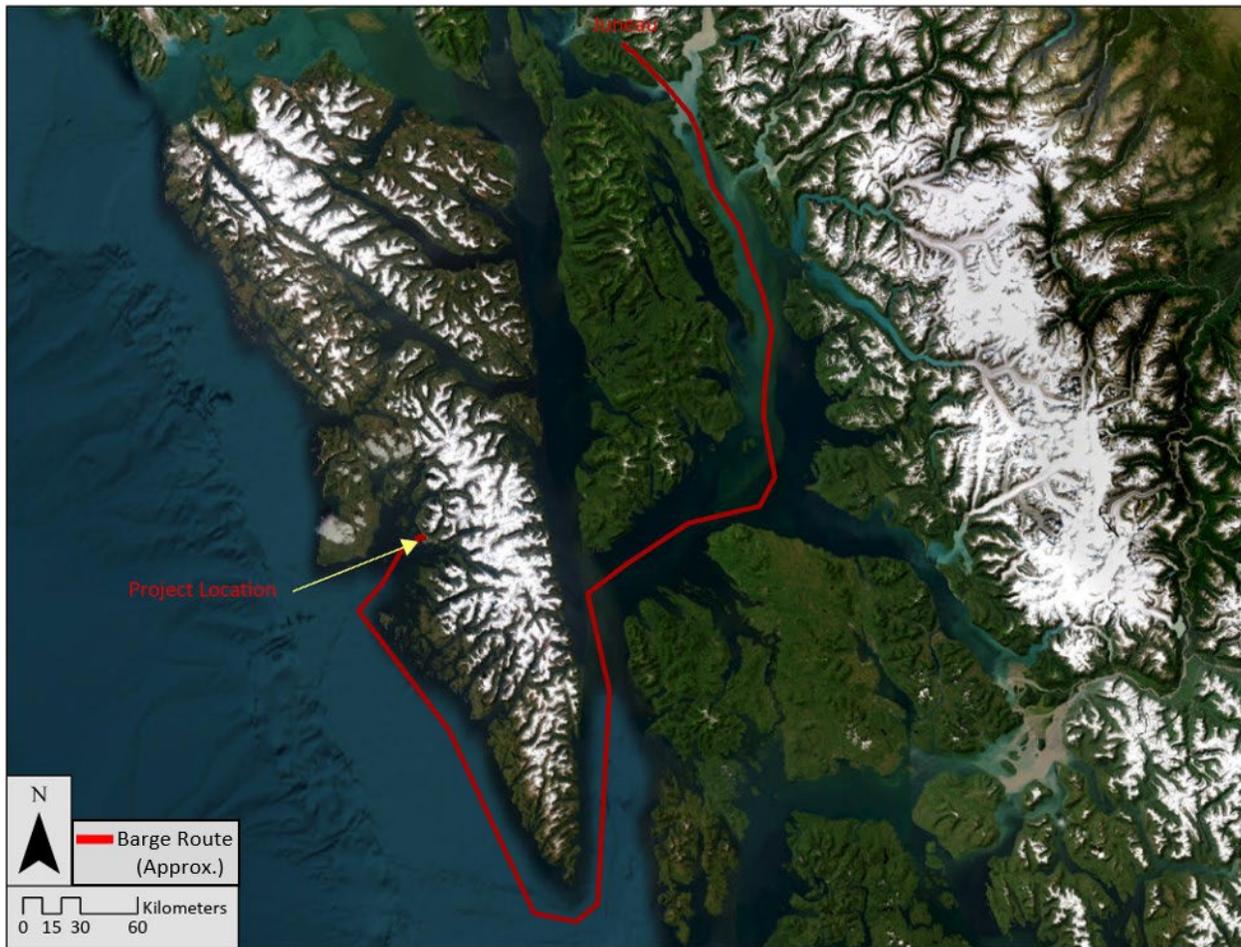
The ensonified area (action area) is truncated where land masses obstruct underwater sound transmission. The breakwaters on the north side of Japonski Island protect the harbor entrance and would largely block sound transmission from project activities. Therefore, the action area is largely confined to marine waters within the northern half of Sitka Channel, although there are a few narrow areas where sound extends north past the breakwaters and south past the end of Sitka channel. Sound would extend approximately 6.0 kilometers (3.7 miles) from the western opening in the Channel Rock Breakwaters, 7.0 kilometers (4.3 miles) from the eastern opening in the Channel Rock Breakwaters, and 13.6 kilometers (8.5 miles) from the south end of Sitka Channel (Figure 5). The transit routes to be taken by the material and construction barges are also considered a part of the action area due to the potential impacts of large vessels on the marine environment (Figure 6 and Figure 7).



**Figure 5. Sitka SPB Action Area based on expected ensonified area extent (HDR 2022).**

Since hauled-out marine mammals such as Steller sea lions can also be adversely affected by in-air noise, an estimate of the in-air ensonified area was included in the analysis of impacts. Pile

driving and removal associated with this project would generate in-air noise above ambient levels within the action area but would not extend more than 22 meters and 30 meters from any type of pile being impacted or vibrated, respectively<sup>1</sup> According to the blasting plan submitted by Solstice AK, uplands rock blasting would not exceed 90 dB for in-air noise at the center of the blast, which is below the in-air noise disturbance threshold for Steller sea lions (100 dB). Given that there are no documented Steller sea lion haulouts in the action area, no in-air disturbance to hauled-out individuals are anticipated as a result of the proposed project; thus, land area is not included in the action area.



**Figure 6. Sitka SPB project expected construction barge route from Juneau to the project site (Solstice AK 2023).**

<sup>1</sup> Predicted distances for in-air threshold distances. The Washington State Department of Transportation has documented un-weighted rms levels for a vibratory hammer (30-inch pile) to an average 96.5 dB and a maximum of 103.2 dB at 15 meters (Laughlin 2010). The sound source level is 106 dB rms at 15 m, the median value during impact installation of 24 to 48-inch-diameter steel piles at Naval Base Kitsap Bangor (Illingworth and Rodkin, Inc. 2012).



**Figure 7. Sitka SPB project expected materials barge route from Seattle, Washington to the project site in Sitka, Alaska (Solstice AK 2023).**

### **2.2.1 Shutdown Zones**

To minimize impacts to North Pacific right whales, fin whales, sperm whales, humpback whales, and Steller sea lions monitoring of shutdown and Level A and Level B harassment zones under the MMPA IHA would be implemented to protect and document listed marine mammals in the action area. The largest shutdown zones for Level A harassment of marine mammals for Phase I and II are displayed in Figure 8. Sound capable of producing injury to marine mammals from impact pile installation has the potential to extend up to 375 meters (0.23 miles) from the noise source for high frequency cetaceans (Figure 8). The shutdown zones for Level A harassment due to noise generated by vibratory pile installation are much smaller at 20 meters (65 feet). As shown in Figure 8, the Level A harassment shutdown zones for all project activities are predominately contained within the Channel Rocks breakwaters.

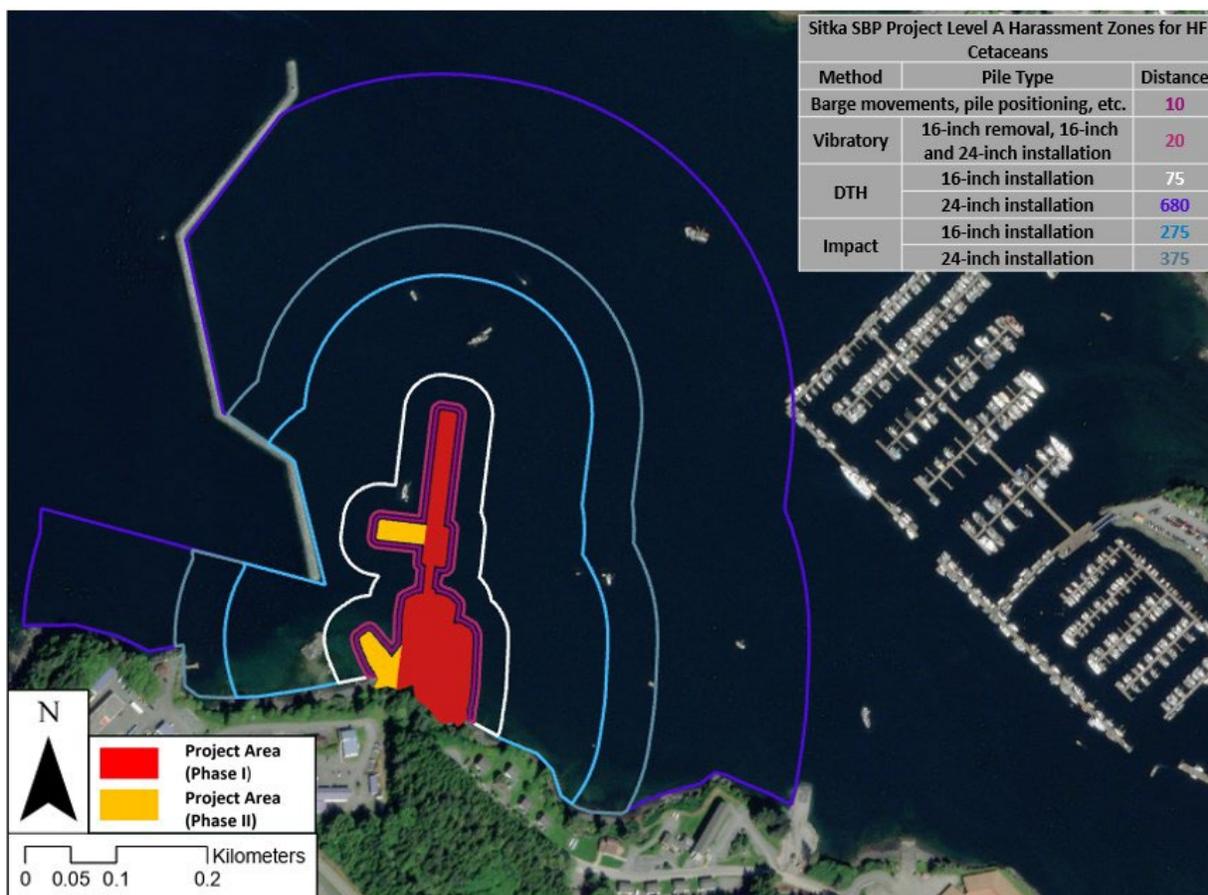


Figure 8. Shutdown zones for project activities exceeding the Level A isopleth (Solstice AK 2023).

The shutdown zones for Level B harassment of marine mammals for Phases I and II are displayed in Figure 9. NMFS assumes that any continuous in-water noise source above 120 dB could result in behavioral effects or harassment of marine mammals. Sound capable of behavioral impacts or harassment from vibratory pile installation has the potential to extend up to 5,412 meters (3.35 miles) from the noise source. DTH activity has the potential to affect the farthest distance. Sound levels from this project’s DTH activity approaching the 120 dB isopleth for continuous noise sources could extend approximately 8,500 meters (5.3 miles). However, potential noise effects outside of Sitka harbor would be along the narrow vectors exiting the Sitka Channel to the southeast, which is approximately 100 m wide at its widest point, and Sitka Sound to the west and northwest (Figure 9). The 120 dB isopleth was chosen because that is where we anticipate continuous noise from DTH and vibratory extraction/installation sound levels is unlikely to result in behavioral effects or harassment of marine mammals (i.e., the point where no measurable effect from the project would occur). While project sound may propagate beyond the 120 dB isopleth, we do not anticipate that marine mammals would respond in a biologically significant manner at these low levels and large distances from the sources.

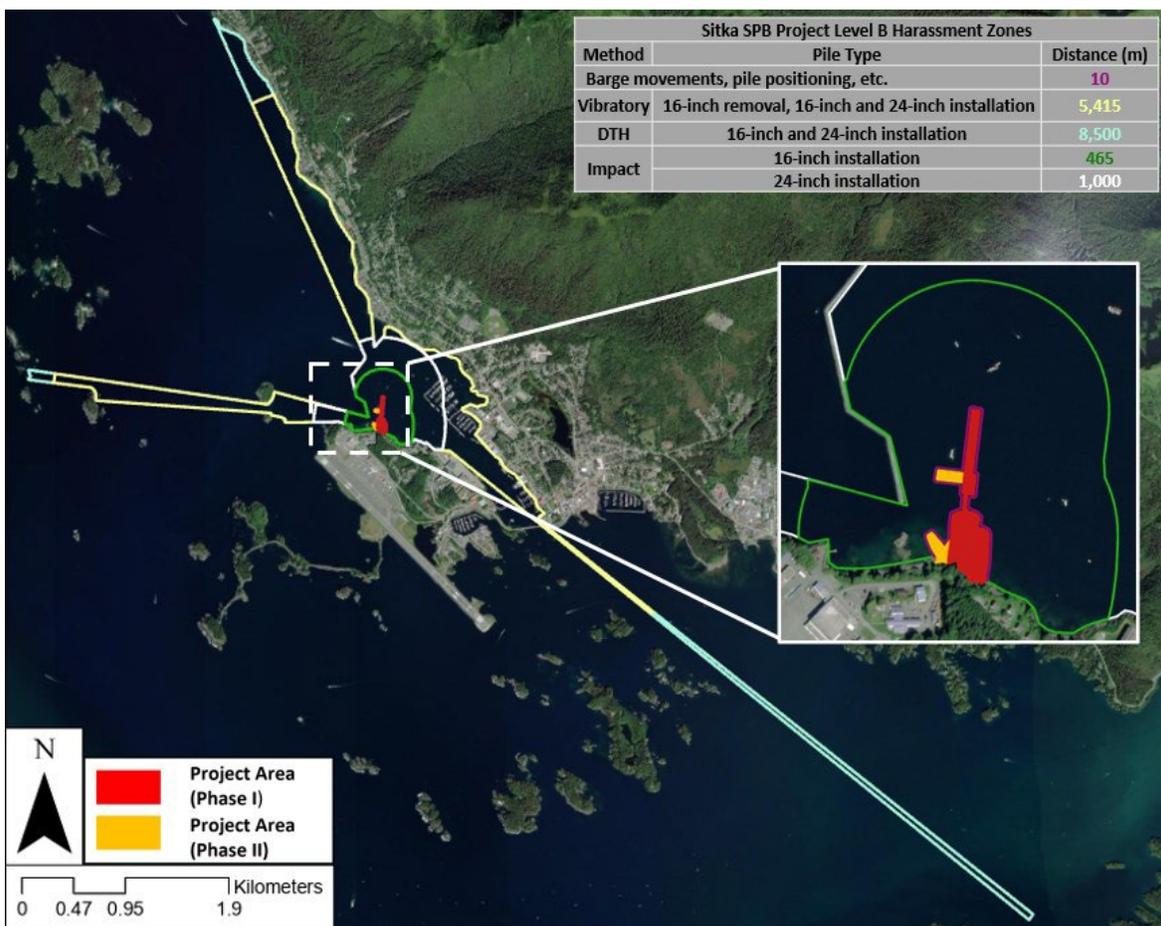


Figure 9. Shutdown zones for project activities exceeding the Level B isopleth (Solstice AK 2023).

### 3 EFFECTS DETERMINATIONS

Please note the following abbreviations are only used in Table 3-1 and are not, therefore, included in the list of acronyms: E = endangered; T = threatened; LAA = likely to adversely affect; NLAA = may affect, not likely to adversely affect.

#### 3.1 Effects Determinations for ESA-Listed Species

We have assessed the ESA-listed species that may be present in the action area, and our determination of the project’s potential effects is shown in Table 3-1 below.

### 3.1.1 Agency Effects Determinations

**Table 3-1. ESA-listed Species in the Action Area and Effect Determinations**

Species	Status	Listing	FAA Effect Determination	NMFS Effect Determination
North Pacific Right Whale ( <i>Eubalaena japonica</i> )	E	NMFS 2008, <a href="#">73 FR 12024</a>	NLAA	NLAA
Fin Whale ( <i>Balaenoptera physalus</i> )	E	NMFS 1970, <a href="#">35 FR 18319</a>	NLAA	NLAA
Sperm Whale ( <i>Physeter macrocephalus</i> )	E	NMFS 1970, <a href="#">35 FR 18319</a>	NLAA	NLAA
Humpback Whale, Mexico DPS ( <i>Megaptera novaeangliae</i> )	T	NMFS 2016, <a href="#">81 FR 62260</a>	LAA	LAA
WDPS Steller Sea Lion ( <i>Eumetopias jubatus</i> )	E	NMFS 1997, <a href="#">62 FR 24345</a>	LAA	LAA
Sunflower Sea Star ( <i>Pycnopodia helianthoides</i> )	Proposed	N/A	LAA	LAA

### 3.2 Effects Determinations for Critical Habitat

We have assessed the critical habitats and their overlap with the action area. There is no overlap with critical habitat for North Pacific right whale, Mexico DPS humpback whale, or Steller sea lion; therefore, we conclude there will be no effects to critical habitat due to the proposed action for any of these species. Critical habitat has not been designated for the fin whale, sperm whale, or sunflower sea star.

## 4 RANGEWIDE STATUS OF THE SPECIES AND CRITICAL HABITAT

This opinion considers the effects of the proposed action on the species specified in Table 4-1.

**Table 4-1. Listing status and critical habitat designation for species considered in this opinion.**

Species	Status	Listing	Critical Habitat
North Pacific Right Whale ( <i>Eubalaena japonica</i> )	Endangered	NMFS 2008, <a href="#">73 FR 12024</a>	NMFS 2008, <a href="#">73 FR 19000</a> None in the action area
Fin Whale ( <i>Balaenoptera physalus</i> )	Endangered	NMFS 1970, <a href="#">35 FR 18319</a>	Not designated
Sperm Whale ( <i>Physeter macrocephalus</i> )	Endangered	NMFS 1970, <a href="#">35 FR 18319</a>	Not designated
Humpback Whale, Mexico DPS ( <i>Megaptera novaeangliae</i> )	Threatened	NMFS 2016, <a href="#">81 FR 62260</a>	NMFS 2021 <a href="#">86 FR 21082</a> None in the action area
Western DPS Steller Sea Lion ( <i>Eumetopias jubatus</i> )	Endangered	NMFS 1997, <a href="#">62 FR 24345</a>	NMFS 1993, <a href="#">58 FR 45269</a> None in the action area
Sunflower Sea Star ( <i>Pycnopodia helianthoides</i> )	Proposed	N/A	N/A

#### 4.1 Species Not Likely to be Adversely Affected by the Action

NMFS uses two criteria to identify those endangered or threatened species that are likely to be adversely affected. The first criterion is exposure or some reasonable expectation of an occurrence between one or more potential stressors associated with the proposed activities and a listed species or designated critical habitat. The second criterion is the probability of a response given that exposure.

We applied these criteria to the species listed above and determined that the following species are not likely to be adversely affected by the proposed action: North Pacific right whales, fin whales, and sperm whales.

##### 4.1.1 North Pacific Right Whales

North Pacific right whales inhabit the Pacific Ocean, particularly between 20°N and 60°N. They primarily occur in coastal or shelf waters, although movements over deep waters are known. Few sightings of right whales occur in Alaska; those that do occur in Alaska are primarily in the central North Pacific and Bering Sea. Since 1996, right whales have been consistently observed in Bristol Bay (southeastern Bering Sea) during the summer months. According to NMFS, right whales are the rarest of all large whale species. Depleted by whaling and illegal harvesting, only an estimated 30 North Pacific right whales remain in the eastern stock (the population of whales

that summers in the southeastern Bering Sea and Gulf of Alaska) (NMFS 2015b).

North Pacific right whales are rare in the action area and have not been observed during various marine mammal monitoring efforts around Sitka Channel between 2017 and 2022 (Solstice AK 2023). North Pacific right whales are not expected in the project area because they are very rare, and they have not been documented feeding in or near Sitka Channel.

Though we do not expect North Pacific right whales to occur in the action area where pile driving activities will occur, it is possible these species may be encountered during transit from staging areas to the construction site in Sitka Channel. Therefore, it is possible the species will be at-risk for vessel strike. However, it is extremely unlikely that vessels will strike North Pacific right whales for the following reasons:

- Few, if any, right whales are likely to be encountered because they are generally found in deeper waters than those in which the transit route will occur.
- Although the project duration will encompass two years, material transport is expected to take 24 days or less.
- A limited number of vessels are associated with construction and material transport.
- NMFS's guidelines for approaching marine mammals discourage vessels approaching within 100 yards of marine mammals.

For these reasons, we conclude the majority of stressors associated with the proposed action would be extremely unlikely to have adverse effects on North Pacific right whales because they are not anticipated to overlap in time and space, and the effects of ship strike are discountable because they are extremely unlikely to occur. Therefore, North Pacific right whales are not likely to be adversely affected by this action.

#### **4.1.2 Fin Whales**

Fin whales are found in deep offshore waters. Panigada et al. (2005) found water depth to be the most significant variable in describing fin whale distribution, with more than 90 percent of sightings occurring in waters deeper than 2,000 meters (6,560 feet). Fin whales are rare in the inside waters of Southeast Alaska (Neilson et al. 2012). Fin whales are also rare in the action area and have not been observed during various marine mammal monitoring efforts around Sitka Channel between 2017 and 2022 (Solstice AK 2023). Fin whales are not expected in the project area because of its location in the shallow (<20 m [65 ft]) and narrow north entrance of Sitka Channel

Though we do not expect fin whales to occur in the action area where pile driving activities will occur, it is possible these species may be encountered during transit from staging areas to the construction site in Sitka Channel. Therefore, it is possible the species will be at-risk for vessel strike. However, it is extremely unlikely that vessels will strike fin whales for the following reasons:

- Few, if any, fin whales are likely to be encountered because they are generally found in deeper waters than those in which the transit route will occur.
- Although the project duration will encompass two years, material transport is expected to take 24 days or less.
- A limited number of vessels are associated with construction and material transport.
- NMFS's guidelines for approaching marine mammals discourage vessels approaching within 100 yards of marine mammals.

For these reasons, we conclude the majority of stressors associated with the proposed action would be extremely unlikely to have adverse effects on fin whales because they are not anticipated to overlap in time and space, and the effects of ship strike are discountable because they are extremely unlikely to occur. Therefore, fin whales are not likely to be adversely affected by this action.

#### **4.1.3 Sperm Whales**

Sperm whales are found typically far from land throughout the world's oceans in deep waters between about 60°N and 60°S. They tend to inhabit areas with a water depth of 600 meters (1,970 feet) or more and are uncommon in waters less than 300 meters (980 feet) deep (NMFS 2023d). Sperm whale calls have been detected year-round in the Gulf of Alaska (Mellinger et al. 2004). Sperm whales are rare in the action area and have not been observed during various marine mammal monitoring efforts around Sitka Channel between 2017 and 2022 (Solstice AK 2023). Sperm whales are not expected in the project area because of its location in the shallow (<20 m [65 ft]) and narrow north entrance of Sitka Channel.

Though we do not expect sperm whales to occur in the action area where pile driving activities will occur, it is possible these species may be encountered during transit from staging areas to the construction site in Sitka Channel. Therefore, it is possible the species will be at-risk for vessel strike. However, it is extremely unlikely that vessels will strike sperm whales for the following reasons:

- Few, if any, sperm whales are likely to be encountered because they are generally found in deeper waters than those in which the transit route will occur.
- Although the project duration will encompass two years, material transport is expected to take 24 days or less.
- A limited number of vessels are associated with construction and material transport.
- NMFS's guidelines for approaching marine mammals discourage vessels approaching within 100 yards of marine mammals.

For these reasons, we conclude the majority of stressors associated with the proposed action would be extremely unlikely to have adverse effects on sperm whales because they are not anticipated to overlap in time and space, and the effects of ship strike are discountable because they are extremely unlikely to occur. Therefore, sperm whales are not likely to be adversely affected by this action.

Critical habitat has not been designated for the sperm whale.

## **4.2 Status of Listed Species Likely to be Adversely Affected by the Action**

This opinion examines the status of each species and critical habitat that is likely to be adversely affected by the proposed action. Species status is determined by the level of extinction risk that the listed species face, based on parameters considered in documents such as recovery plans, status reviews, and listing decisions. This informs the description of the species' likelihood of both survival and recovery. The species status section also helps to inform the description of the species' current "reproduction, numbers, or distribution" as described in 50 CFR § 402.02. The opinion also examines the condition of critical habitat throughout the designated area and discusses the current function of the essential PBFs that help to form that conservation value.

For each species, we present a summary of information on the population structure and distribution of the species to provide a foundation for the exposure analyses that appear later in this opinion. Then we summarize information on the threats to the species and the species' status given those threats to provide points of reference for the jeopardy determinations we make later in this opinion. That is, we rely on a species' status and trend to determine whether an action's effects are likely to increase the species' probability of becoming extinct. For designated critical habitat, we present a summary of the critical habitat designation, the geographical area of the designation, and any physical or biological features essential to the conservation of the species, as well as any relevant threats and management considerations. That is, we rely on the status of critical habitat and its function to determine whether an action's effects are likely to diminish the value of critical habitat as a whole for the conservation of listed species.

### **4.2.1 Mexico DPS Humpback Whales**

Humpback whales are found in all oceans of the world with a broad geographical range from tropical to temperate waters in the Northern Hemisphere and from tropical to near-ice-edge waters in the Southern Hemisphere. Additional information on humpback whale biology and natural history is available at:

<https://www.fisheries.noaa.gov/species/humpback-whale>

<https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-species-stock>

#### **4.2.1.1 Status and Population Structure**

In 1970, the humpback whale was listed under the Endangered Species Conservation Act (ESCA) as endangered worldwide (35 FR 18319; December 2, 1970), primarily due to overharvest by commercial whalers. Congress replaced the ESCA with the ESA in 1973 and humpback whales continued to be listed as endangered. Humpback whales are also considered "depleted" under the MMPA.

Following the cessation of commercial whaling, humpback whale numbers increased. NMFS conducted a global status review (Bettridge et al. 2015) and published a final rule recognizing 14 DPSs on September 8, 2016 (81 FR 62259). Four of these DPSs were designated as endangered and one as threatened, with the remaining nine not warranting ESA listing status.

Based on an analysis of migration between winter mating/calving areas and summer feeding areas using photo-identification, Wade (2021) concluded that whales feeding in Alaskan waters belong primarily to the Hawaii DPS (recovered), with small numbers from the WNP DPS (endangered) and Mexico DPS (threatened). There are approximately 1,084 animals in the WNP DPS and 2,913 animals in the Mexico DPS (Wade 2021). The population trend is unknown for both DPSs. The Hawaii DPS is estimated at 11,540 animals, and the annual growth rate is between 5.5 and 6.0 percent. Humpback whales in the Southeast Alaska summer feeding area are comprised of approximately 98 percent Hawaii DPS individuals and 2 percent Mexico DPS individuals.

#### **4.2.1.2 Distribution**

Relatively high densities of humpback whales occur throughout much of Southeast Alaska and northern British Columbia, particularly during the summer months. The abundance estimate for humpback whales in Southeast Alaska is estimated to be 5,890 (CV= 0.08) animals, which includes whales from the unlisted Hawaii DPS (98 percent) and threatened Mexico DPS (2 percent; Wade 2021).

Humpback whales generally undertake seasonal migrations from their tropical calving and breeding grounds in winter to their high-latitude feeding grounds in summer, although some individuals may remain in Alaska waters year-round. Most humpbacks that summer in Alaska winter in temperate or tropical waters near Mexico, Hawaii, or in the western Pacific near Japan. In the spring, those animals migrate back to Alaska, where food is abundant. They tend to concentrate in several areas, including Southeast Alaska, Prince William Sound, Kodiak, the Bering Sea, and along the Aleutian Islands (Wild et al. 2023). Large numbers of humpbacks have also been reported in waters over the continental shelf, extending up to 100 nm offshore in the western Gulf of Alaska (Wade 2021).

Although migration timing varies among individuals, most whales depart for Hawaii or Mexico in fall or winter and begin returning to Southeast Alaska in spring, with continued returns through the summer and a peak occurrence in Southeast Alaska during late summer to early fall. However, there are significant overlaps in departures and returns (Baker et al. 1985; Straley 1990).

#### **4.2.1.3 Presence in the Action Area**

Relatively high densities of humpback whales occur throughout much of Southeast Alaska and northern British Columbia. Southeast Alaska was identified as a biologically important area (BIA) for seasonal feeding due to the high density of animals from March-November (Ferguson

et al. 2015). The second version of BIAs split the previous Southeast BIA with three seasonal occurrences into 10 BIAs and 2 Watch List areas, each with their own temporal delineation (Wild et al. 2023). Sitka Sound is within seasonal humpback whale feeding BIAs from March-May and September-December (Wild et al. 2023). Project vessels deployed from Juneau and/or Seattle are expected to transit through multiple Southeast BIAs.

Several surveys and project-related marine mammal monitoring efforts have documented humpback whale abundance near the Sitka Channel (Solstice AK 2023). In general, these surveys, spanning different seasons and locales, support the potential presence of humpback whales in the Sitka Channel area year-round, but that their presence is more likely during the summer months (June- August) (Solstice AK 2023). Anecdotal information from local residents suggests that humpback whales' utilization of the area is intermittent year-round. Their abundance, distribution, and occurrence are dependent on and fluctuate with fish prey.

#### **4.2.1.4 Foraging and Prey Selection**

Humpback whales exhibit flexible feeding strategies, sometimes foraging alone and sometimes cooperatively (Clapham 1993). Humpback whales are 'gulp' or 'lunge' feeders, capturing large mouthfuls of prey during feeding rather than continuously filtering food, as may be observed in some other large baleen whales (Goldbogen et al. 2008; Simon et al. 2012). When lunge feeding, whales advance on prey with their mouths wide open, then close their mouths around the prey and trap them by forcing engulfed water out past the baleen plates.

Compared to some other baleen whales, humpbacks are relatively generalized in their prey selection. In the Northern Hemisphere, known prey includes euphausiids (krill), copepods, juvenile salmonids, herring, Arctic cod, walleye pollock, pteropods, and cephalopods (Johnson and Wolman 1984; Perry et al. 1999; Straley et al. 2018). Pacific herring serve an important ecological role within Sitka Sound and are known to spawn on intertidal and subtidal substrates within the project area in spring (ADFG 2019).

In the North Pacific, humpback whales forage in the coastal and inland waters along California, north to the Gulf of Alaska and the Bering Sea, and west along the Aleutian Islands to the Kamchatka Peninsula and into the Sea of Okhotsk (Tomilin 1967; Johnson and Wolman 1984).

#### **4.2.1.5 Reproduction**

Humpbacks in the Northern Hemisphere give birth and presumably mate on low-latitude wintering grounds from January to March. Females attain sexual maturity at five years old in some populations and exhibit a mean calving interval of approximately two years (Clapham 1992; Barlow and Clapham 1997). Gestation is about 12 months, and calves are probably weaned by the end of their first year (Perry et al. 1999).

#### **4.2.1.6 Hearing, Vocalization, and Other Sensory Capabilities**

NMFS categorizes humpback whales in the low-frequency cetacean functional hearing group, with a generalized hearing range between 7 Hz and 35 kHz (NMFS 2018b). Baleen whales have inner ears that appear to be specialized for low-frequency hearing. In a study of the morphology of the mysticete auditory apparatus, Ketten (1997) hypothesized that large mysticetes have acute infrasonic hearing.

Humpback whales produce a wide variety of sounds ranging from 20 Hz to 10 kHz. During the breeding season males sing long, complex songs, with frequencies in the 20-5,000 Hz range and intensities as high as 181 dB (Payne 1970; Winn et al. 1970; Thompson et al. 1986). Source levels average 155 dB and range from 144 to 174 dB (Thompson et al. 1979). The songs appear to have an effective range of approximately 10 to 20 km. Animals in mating groups produce a variety of sounds (Tyack 1981; Silber 1986).

Social sounds associated with aggressive behavior by male humpback whales in breeding areas are very different than songs and extend from 50 Hz to 10 kHz (or higher), with most energy in components below 3 kHz (Tyack and Whitehead 1983; Silber 1986). These sounds appear to have an effective range of up to 9 km (Tyack and Whitehead 1983).

Humpback whales produce sounds less frequently in their summer feeding areas. Feeding groups produce distinctive sounds ranging from 20 Hz to 2 kHz, with median durations of 0.2-0.8 seconds and source levels of 175-192 dB (Thompson et al. 1986). These sounds are attractive and appear to rally animals to the feeding activity (D'Vincent et al. 1985; Sharpe and Dill 1997).

#### **4.2.1.7 Threats**

##### *Natural Threats*

There is limited information on natural sources of injury or mortality to humpback whales. Based upon prevalence of tooth marks, attacks by killer whales appear to be highest among humpback whales migrating between Mexico and California, although populations throughout the Pacific Ocean appear to be targeted to some degree (Steiger et al. 2008). Juveniles appear to be the primary age group targeted.

Thirteen marine mammal species in Alaska were examined for domoic acid; humpback whales indicated a 38 percent prevalence (Lefebvre et al. 2016). Saxitoxin was detected in 10 of the 13 species, with the highest prevalence in humpback whales at 50 percent. The occurrence of the nematode *Crassicauda boopis* appears to increase the potential for kidney failure in humpback whales and may be preventing some populations from recovering (Lambertsen 1992).

##### *Anthropogenic Threats*

Historically, commercial whaling represented the greatest threat to every population of humpback whale and was ultimately responsible for humpback whales being listed as an

endangered species. In 1965, the International Whaling Commission banned commercial hunting of humpback whales in the Pacific Ocean, and, as a result, this threat has largely been curtailed. No commercial whaling occurs within the range of Mexico DPS humpbacks, and Alaskan subsistence hunters are not authorized to take humpback whales.

Vessel strike is one of the main threats and sources of harmful anthropogenic impacts to humpback whales in Alaska. Neilson et al. (2012a) summarized 108 ship strike events in Alaska from 1978 to 2011; 86 percent involved humpback whales. Eighteen humpbacks were struck by vessels between 2016 and 2020 (Freed et al. 2022). Most ship strikes of humpback whales are reported in Southeast Alaska (Helker et al. 2019), where high vessel traffic overlaps with whale presence.

Commercial fisheries pose a threat to marine mammal stocks. Reductions in seasonal availability and distribution of fish can cause cumulative effects on many species that depend on reliable sources of prey for survival.

Fishing gear entanglement is a major threat. Entanglement may result in only minor injury or may potentially significantly affect individual health, reproduction, or survival. Every year humpback whales are reported entangled in fishing gear in Alaska, particularly pot gear and gill net gear. Bettridge et al. (2015) report that fishing gear entanglements may moderately reduce the population size or the growth rate of ESA-listed whales. Humpback whales have been killed and injured during interactions with commercial fishing gear; however, the frequency of these interactions does not appear to have a significant adverse consequence for humpback whale populations. Most entanglements occur between early June and early September, when humpbacks are foraging in nearshore Alaska waters. A photographic study of humpback whales in southeastern Alaska found at least 53 percent of individuals showed some kind of scarring from fishing gear entanglement (Neilson et al. 2005). Between 2016 and 2020, entanglement of humpback whales ( $n = 47$ ) was the most frequent human-caused source of mortality and injury of large whales (Freed et al. 2022).

Aquaculture operations may pose an entanglement risk to humpback whales (Price et al. 2017). Humpback whales in Southeast Alaska have been observed feeding around and near salmon aquaculture facilities (Chenoweth et al. 2017). In June 2018, NMFS received a report of a humpback whale damaging a floating salmon net pen near Ketchikan. The encounter did not result in entanglement, but it illustrates the potential for interactions. The aquaculture industry is growing in Alaska, increasing the potential for marine mammal entanglements.

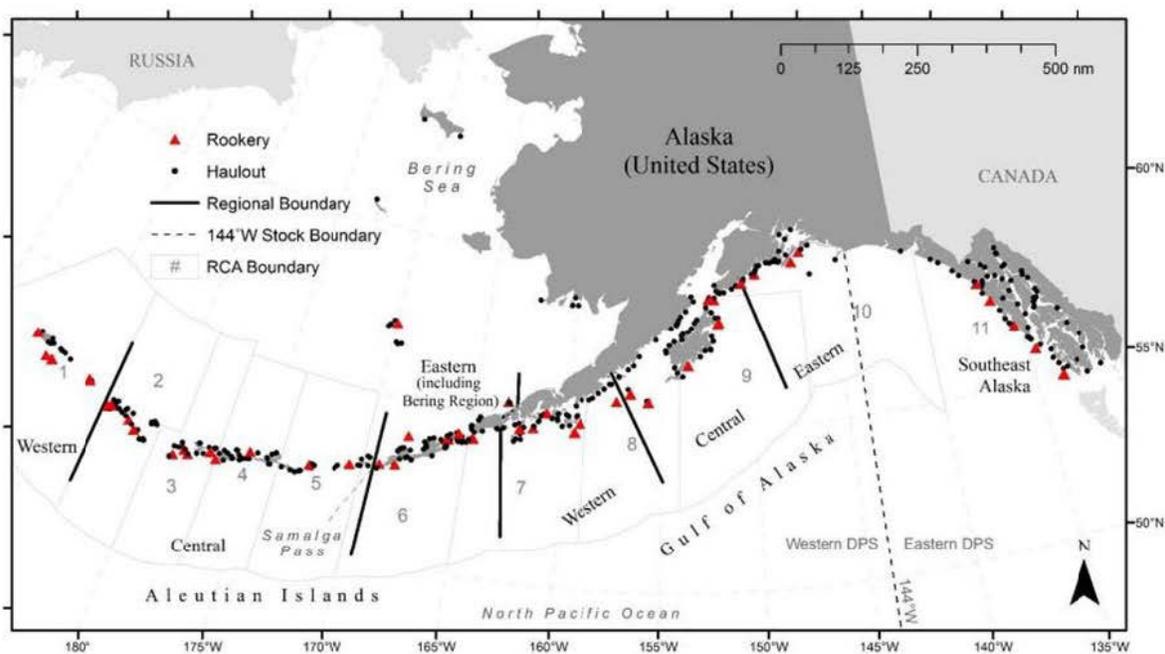
#### **4.2.2 Western DPS Steller Sea Lion**

More detailed background information on the status of WDPS Steller sea lions can be found in the latest stock assessment report (Muto et al. 2019) and the recovery plan for WDPS Steller sea lions (NMFS 2008). Information on Steller sea lion biology, threats, and habitat (including critical habitat) is available online at: <https://www.fisheries.noaa.gov/species/steller-sea-lion> .

#### 4.2.2.1 Status and Population Structure

On November 26, 1990, NMFS issued the final rule to list Steller sea lions as a threatened species under the ESA (55 FR 49204). In 1997, NMFS reclassified Steller sea lions as two DPSs based on genetic studies and other information (62 FR 24345; May 5, 1997; Figure 10). At that time, the eastern DPS was listed as threatened, and the western DPS was listed as endangered. On November 4, 2013, the eastern DPS was removed from the endangered species list (78 FR 66140).

Data from 1978-2017 suggest WDPS Steller sea lions were at their lowest levels in 2002 but have shown an increasing trend in abundance in much of their range since then, although strong regional differences exist. While most regions show positive trends, regions of the Aleutian Islands exhibit generally negative trends (Muto et al. 2019). Contrary to the general population increase since 2002, pup counts in the eastern (-33%) and central (-18%) Gulf of Alaska declined sharply between 2015 and 2017. The most recent surveys of WDPS Steller sea lions in Alaska suggest a minimum population estimate of 54,267 individuals; estimates for WDPS in Russia suggest there may be approximately 23,000 animals, which is less than the 1960 levels but more than the low in 2005 (Muto et al. 2019). Overall, the WDPS Steller sea lion population in Alaska (non-pups only) was estimated to be increasing at about 2.14 percent per year from 2002-2017 (Muto et al. 2019).



**Figure 10. NMFS Steller sea lion survey regions, rookeries, haulouts, and line at 144W depicting the separation of eastern and western distinct population segments. (Fritz et al, 2016).**

Estimated annual mortality is 0.22 for ages 0 to 2, dropping to 0.07 at age 3, then increasing

gradually to 0.15 by age 10 and 0.20 by age 20 (York 1994). Population modeling suggests decreased juvenile survival likely played a major role in the decline of sea lions in the central Gulf of Alaska during 1975-1985 (Pascual and Adkison 1994, York 1994, Holmes and York 2003).

#### **4.2.2.2 Distribution**

The WDPS of Steller sea lions includes animals west of Cape Suckling, Alaska (144° W; 62 FR 24345). However, individuals move between rookeries and haul out sites regularly, even over long distances between eastern and western DPS locations (Calkins and Pitcher 1982a, Raum-Suryan et al. 2002, Raum-Suryan et al. 2004). Most adult Steller sea lions occupy rookeries during the summer pupping and breeding season and exhibit a high level of site fidelity. During the breeding season, some juveniles and non-breeding adults occur at or near the rookeries, but most are on haulouts (sites that provide regular retreat from the water on exposed rocky shoreline, gravel beaches, and wave-cut platforms or ice; (Rice 1998a, Ban 2005, Call and Loughlin 2005). During fall and winter many sea lions disperse from rookeries and increase use of haulouts, particularly on terrestrial sites but also on sea ice in the Bering Sea.

Critical habitat has been defined in Southeast Alaska at major haulouts and major rookeries (50 CFR 226.202), but the project action area does not overlap with Steller sea lion critical habitat. The Biorka Island haulout is the closest designated critical habitat and is approximately 25 km southwest of the project area.

#### **4.2.2.3 Presence in the Action Area**

Within the action area, Steller sea lions are anticipated to be predominantly from the EDPS, but a small number of WDPS Steller sea lions may occur. Based on surveys and genetic analysis conducted by (Hastings et al. 2020), an estimated 2.2 percent of Steller sea lions in the vicinity of the project are WDPS Steller sea lions. Therefore, for the purposes of this opinion, NMFS considers that 2.2 percent of the total Steller sea lions in the action area are from the endangered WDPS and the remaining 97.8 percent are from the delisted EDPS.

Steller sea lions do not migrate, but they often disperse widely outside of the breeding season. An area of high occurrence extends from the shore to water depths of 273 fathoms (500 m). In the Gulf of Alaska, foraging habitat is primarily shallow, nearshore, and continental shelf waters 4.3 to 13 nm offshore with a secondary occurrence inshore of the 3,280 ft. (1,000 m) isobath, and a rare occurrence seaward of the 3,280 ft. (1,000 m) isobath.

Steller sea lions occur year-round in the action area. Several surveys and project-related marine mammal monitoring efforts have documented Steller sea lion abundance near the Sitka Channel (Solstice AK 2023). In general, these surveys, spanning different seasons and locales, support the potential presence of Steller sea lions in the Sitka Channel area year-round, but notes that they are most abundant during January and February (Solstice AK 2023). Surveys from 1994 through 2022 documented individuals and groups of Steller sea lions ranging from 2-3 (most common) to

100 (Solstice AK 2023). Steller sea lions are also attracted to the project area in summer because fishing charter operations often dump fish carcasses nearby. Steller sea lions are likely to be in the project area during all phases of construction.

#### **4.2.2.4 Foraging and Prey Selection**

Steller sea lions consume a variety of demersal, semi-demersal, and pelagic prey, indicating a potentially broad spectrum of foraging styles, probably based primarily on availability. Overall, the available data suggest two types of distribution at sea by Steller sea lions: 1) less than 20 km (12 mi) from rookeries and haulout sites for adult females with pups, pups, and juveniles, and 2) much larger areas (greater than 20 km [12 mi]) where these and other animals may range to find optimal foraging conditions once they are no longer tied to rookeries and haulout sites for nursing and reproduction. Loughlin (1993) observed large seasonal differences in foraging ranges that may have been associated with seasonal movements of prey, and Merrick (1995) concluded on the basis of available telemetry data that seasonal changes in home range were related to prey availability.

#### **4.2.2.5 Reproduction**

Female Steller sea lions reach sexual maturity and first breed between three and eight years of age and the average age of reproducing females (generation time) is about 10 years (Pitcher and Calkins 1981, Calkins and Pitcher 1982, York 1994). They give birth to a single pup from May through July and then breed about 11 days after giving birth. For more information see our website (<https://www.fisheries.noaa.gov/species/steller-sea-lion>), the Steller Sea Lion Recovery Plan (<https://www.fisheries.noaa.gov/resource/document/recovery-plan-steller-sea-lion-revision-eastern-and-western-distinct-population>), and the most recent stock assessment report (<https://repository.library.noaa.gov/view/noaa/20606>).

#### **4.2.2.6 Hearing, Vocalization, and Other Sensory Capabilities**

The ability to detect sound and communicate underwater is important for a variety of Steller sea lion life functions, including reproduction and predator avoidance. Steller sea lions have similar hearing thresholds in-air and underwater to other otariids. In-air hearing ranges from 0.250-30 kHz, with their best hearing sensitivity at 5-14.1 kHz (Muslow and Reichmuth 2010). An underwater audiogram shows the typical mammalian U-shape. Higher hearing thresholds, indicating poorer sensitivity, were observed for signals below 16 kHz and above 25 kHz (Kastelein et al. 2005).

#### **4.2.2.7 Threats**

Brief descriptions of threats to Steller sea lions follow. More detailed information can be found in the Steller sea lion Recovery Plan (available at: <http://alaskafisheries.noaa.gov/protectedresources/stellers/recovery/sslrpfinalrev030408.pdf>), the Stock Assessment Reports (available at: <http://www.nmfs.noaa.gov/pr/sars/species.htm>), and the

most recent Alaska Groundfish Biological Opinion (NMFS 2014a).

### *Natural Threats*

#### *Killer Whale Predation*

The Steller Sea Lion Recovery Plan (NMFS 2008b) ranked predation by killer whales as a potentially high threat to the recovery of the WDPS. Steller sea lions in both the eastern and western stocks are eaten by killer whales (Dahlheim and White 2010).

Relative to other WDPS sub-regions, transient killer whale abundance and predation on Steller sea lions has been well studied in the Prince William Sound and Kenai Fjords portion of the eastern GOA. Steller sea lions represented 33% and 5% of the remains found in deceased killer whale stomachs in the GOA, depending on the specific study results (Heise et al. 2003). The abundance of transient killer whales in the eastern GOA was estimated to be 18 (Matkin et al. 2012). Nineteen transient killer whales were identified in Kenai Fjords from 2000 through 2005 and killer whale predation on six pup and three juvenile Steller sea lions was observed. It has been estimated that 11% of the Steller sea lion pups born at the Chiswell Island rookery (in the Kenai Fjords area) were preyed upon by killer whales from 2000 through 2005. GOA transient killer whales were concluded to have a minor impact on the recovery of the sea lions in the area (Maniscalco et al. 2007). Steller sea lion pup mortality was studied using remote video at Chiswell Island. Pup mortality up to 2.5 months postpartum averaged 15.4%, with causes varying greatly across years (2001–2007). They noted that high surf conditions and killer whale predation accounted for over half the mortalities. Even at this level of pup mortality, the Chiswell Island Steller sea lion population has increased (Maniscalco et al. 2008).

#### *Environmental Variability and Drivers in the Bering Sea and Gulf of Alaska/North Pacific*

The Steller Sea Lion Recovery Plan ranks environmental variability as a potentially high threat to recovery of the WDPS (NMFS 2008b). The Bering Sea and Gulf of Alaska are subjected to large-scale forcing mechanisms that can lead to basin-wide shifts in the marine ecosystem resulting in significant changes to physical and biological characteristics, including sea surface temperature, salinity, and sea ice extent and amount. Physical forcing affects food availability and can change the structure of trophic relationships by impacting climate conditions that influence reproduction, survival, distribution, and predator-prey relationships at all trophic levels (Wiese et al. 2012). Populations of Steller sea lions in the GOA and Bering Sea have experienced large fluctuations due to environmental and anthropogenic forcing (Mueter et al. 2009). As we work to understand how these mechanisms affect various trophic levels in the marine ecosystem, we must consider the additional effects of global warming, which are expected to be most significant at northern latitudes (IPCC 2013).

Other natural threats that were ranked as low by the Steller Sea Lion Recovery Plan (NMFS 2008) include disease and parasites and shark predation.

## *Anthropogenic Threats*

### *Competition between Commercial Fishing and Steller Sea Lions for Prey Species*

Commercial fisheries pose a threat to marine mammal stocks. Reductions in seasonal availability and distribution of fish can cause cumulative effects on many species that depend on reliable sources of prey for survival. Competition between commercial fishers and sea lions for prey was ranked as a potentially high threat to the recovery of WDPS. Substantial scientific debate surrounds the question about the impact of potential competition between fisheries and Steller sea lions. It is generally well accepted that commercial fisheries target several important Steller sea lion prey species (NRC 2003) including salmon species, Pacific cod, Atka mackerel, pollock, and others. These fisheries could be reducing sea lion prey biomass and quality at regional and/or local spatial and temporal scales such that sea lion survival and reproduction are reduced. NMFS (2014) analyzes this threat in detail.

### *Fishing Gear and Marine Debris Entanglement*

The Steller Sea Lion Recovery Plan (NMFS 2008) ranked interactions or entanglement with fishing gear and marine debris as a low threat to the recovery of the WDPS. Helker *et al.* (2015) report 352 cases of serious injuries to EDPS Steller sea lions from interactions with fishing gear between 2009 and 2013, mostly from troll gear and other marine debris. Raum-Suryan *et al.* (2009) found 386 animals either entangled in marine debris or having ingested fishing gear over the period 2000-2007 in Southeast Alaska and northern British Columbia.

The estimated mean annual mortality and serious injury rate in U.S. commercial fisheries in 2011-2015 is 31 Steller sea lions from the WDPS (31 from observer data + 0.2 from stranding data). No observers have been assigned to several fisheries that are known to interact with WDPS Steller sea lions; thus, the estimated mortality and serious injury is likely an underestimate of the actual level (Muto *et al.* 2018).

Aquaculture operations may pose an entanglement risk to Steller sea lions. The aquaculture industry is growing in Alaska, increasing the potential for marine mammal entanglements.

### *Vessel Traffic and Strike*

Vessel traffic, sea lion research, and tourism may disrupt sea lion feeding, breeding, or aspects of sea lion behavior. The Steller Sea Lion Recovery Plan (NMFS 2008) ranked disturbance from these sources as a low threat to the recovery of the WDPS. Disturbances from these sources are not likely affecting population dynamics in the WDPS.

NMFS Alaska Region Stranding Program has records of four occurrences of Steller sea lions being struck by vessels in Southeast Alaska; three were near Sitka. Vessel strike is not considered a major threat to Steller sea lions.

Other anthropogenic threats that were ranked as low by the Steller Sea Lion Recovery Plan

(NMFS 2008) include illegal shooting, mortality and disturbance from research activities, and subsistence and Native harvest.

### **4.2.3 Sunflower Sea Stars**

#### **4.2.3.1 Population Structure and Status**

On August 18, 2021, the Center for Biological Diversity petitioned NMFS to list the sunflower sea star (*Pycnopodia helianthoides*) under the ESA. NMFS determined that the proposed action may be warranted (86 FR 73230, December 27, 2021) and began a full status review to evaluate overall extinction risk for the species. NMFS issued a proposed rule to list the species as threatened on March 16, 2023, (88 FR 16212). NMFS has not proposed to designate critical habitat at this time.

Prior to 2013, the global abundance of sunflower sea star was estimated at several billion animals, but from 2013–2017 sea star wasting syndrome (SSWS) reached pandemic levels, killing an estimated 90 percent or more of the population (Lowry 2022). Sunflower sea stars are currently estimated to number approximately 600 million (Lowry 2022). Declines in the northern portion of its range (i.e., Alaska and British Columbia) were less pronounced than in the southern portion, but still exceeded 60 percent. Species-level impacts from SSWS, both during the pandemic and on an ongoing basis, have been identified as the major threat affecting the long-term persistence of the sunflower sea star (Lowry 2022).

Recent counts in areas of Alaska near Cook Inlet, Prince William Sounds, and the Kenai Fjords showed large increases in sunflower sea star abundance in 2022 compared to previous years (Heather Coletti et al. 2023).

#### **4.2.3.2 Distribution and Habitat Use**

The sunflower sea star is a large (up to 1 m in diameter), fast-moving (up to 160 cm/minute), many-armed (up to 24) echinoderm native to the west coast of North America (Lowry et al. 2022). Sunflower sea stars occur in a wide range of intertidal and subtidal habitats from northern Baja California, Mexico, to the central Aleutian Islands, Alaska (Jewett et al. 2015; Gravem et al. 2021; Lowry 2022). They occupy waters from the intertidal to at least 435 m deep, but is most common at depths less than 25 m and rare in waters deeper than 120 m (Lambert 2000; Hemery et al. 2016; Gravem et al. 2021). Sunflower sea stars occur over a broad array of soft-, mixed-, and hard-bottom habitats, and are most abundant in Alaska and British Columbia (Gravem et al. 2021).

They are found along the outer coasts and inside waters, which have complex geophysical features including glacial fjords, sounds, embayments, and tidewater glaciers. Preferring temperate waters, they inhabit kelp forests and rocky intertidal shoals (Shivji et al. 1983; Lowry 2022), and are regularly found in eelgrass meadows as well (Dean and Jewett 2001; Gravem et al. 2021).

#### 4.2.3.3 Presence in the Action Area

No sunflower sea stars were observed in the project footprint during an intertidal survey conducted in 2020 (Solstice AK 2020a), but the depths and substrate could potentially support their presence. Alaska Department of Fish and Game (ADFG) completed surveys in and around the Sitka Channel (Sites 113-40, 41, 42, and 43) and found average densities of 0.002 sunflower sea stars/m<sup>2</sup> (Lowry 2023). The iNaturalist website catalogs sunflower sea star observations and has several records from recent years (2018-2023) in areas south of the Sitka Channel, including a few near the O’Connell Bridge

([https://www.inaturalist.org/observations?place\\_id=any&subview=map&taxon\\_id=47673](https://www.inaturalist.org/observations?place_id=any&subview=map&taxon_id=47673))

Therefore, it is reasonable to assume that sunflower sea stars may be found in the project area, albeit in low densities.

#### 4.2.3.4 Reproduction and Growth

The species has separate sexes and is a broadcast spawner with a planktonic larval stage (Lundquist and Botsford 2011). Females can release a million eggs or more (Strathmann 1987; Chia and Walker 1991; Byrne 2013). Reproduction also occurs via larval cloning, enhancing potential reproductive output beyond female fecundity (Bosch et al. 1989; Balser 2004). Sea stars also have the ability to regenerate lost rays/arms and parts of the central disc (Chia and Walker 1991). Rays may detach when a sea star is injured or as a defense reaction when attacked by a predator. The longevity of *P. helianthoides* in the wild is unknown, as is the age at first reproduction and the period over which a mature individual is capable of reproducing (Lowry et al. 2022).

#### 4.2.3.5 Feeding and Prey Selection

The sunflower sea star hunts a range of bivalves, gastropods, crustaceans, and other invertebrates using chemosensory stimuli and will dig for preferred prey in soft sediment (Mauzey et al. 1968; Paul and Feder 1975; Herrlinger 1983). It preys on sea urchins and plays an important role in controlling sea urchin numbers in kelp forests (Lowry et al. 2022). While generally solitary, they are also known to seasonally aggregate, perhaps for spawning purposes.

#### 4.2.3.6 Threats to the Species

Brief descriptions of threats to sunflower sea stars follow. More detailed information can be found in the draft ESA Status Review report for the species (Lowry et al. 2022).

Prior to 2013, the global abundance of sunflower sea star was estimated at several billion animals, but from 2013–2017 sea star wasting syndrome (SSWS) reached pandemic levels, killing an estimated 90 percent or more of the population (Lowry et al. 2022). Declines in the northern portion of its range were less pronounced than in the southern portion, but still exceeded 60 percent. Species-level impacts from SSWS, both during the pandemic and on an ongoing

basis, have been identified as the major threat affecting the long-term persistence of the sunflower sea star (Lowry et al. 2022).

The causative agent of SSWS is currently unknown and various hypotheses regarding transmission dynamics and the lethality of SSWS under diverse physiochemical conditions exist. A number of factors ranging from environmental stressors to the microbiome in sea stars may play a role (Lloyd and Pespeni 2018; Konar et al. 2019; Aquino et al. 2021). Ocean warming has also been linked to SSWS outbreaks, hastening disease progression and severity (Harvell et al. 2019; Aalto et al. 2020).

## **5 ENVIRONMENTAL BASELINE**

The “environmental baseline” refers to the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present impacts of all Federal, state, or private actions and other human activities in the action area, the expected impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of state or private actions which are contemporaneous with the consultation process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency’s discretion to modify are part of the environmental baseline (50 CFR § 402.02).

This section discusses the environmental baseline, focusing on existing anthropogenic and natural activities within and near the action area and their influences on listed species may be adversely affected by the proposed action. Species that may be affected by the proposed action include Mexico DPS humpback whales, WDPS Steller sea lion, and sunflower sea star. Although some of the activities discussed below are outside the action area, they may still have an influence on listed species or their habitat in the action area.

### **5.1 Climate Change**

Global climate change is a threat that affects all species. Because it is a shared threat, we present this narrative here rather than in each of the species-specific effect analyses that follow. A vast amount of literature is available on climate change and for more detailed information we refer the reader to these websites which provide the latest data and links to the current state of knowledge on the topic:

<https://www.ipcc.ch/reports/>

<https://climate.nasa.gov/evidence/>

<http://nsidc.org/arcticseaicenews/>

<https://arctic.noaa.gov/Report-Card>

The listed and proposed species we consider in this opinion live in the ocean and depend on the ocean for nearly every aspect of their life history. Factors which affect the ocean, like temperature

and pH, can have direct and indirect impacts on listed and proposed species and the resources they depend upon. Global climate change may affect all the species we consider in this opinion, but it is expected to affect them differently. First, we provide background on the physical effects climate change has caused on a broad scale; then we focus on changes that have occurred in Alaska. Finally, we provide an overview of how these physical changes translate to biological effects.

## 5.1.1 Physical Effects

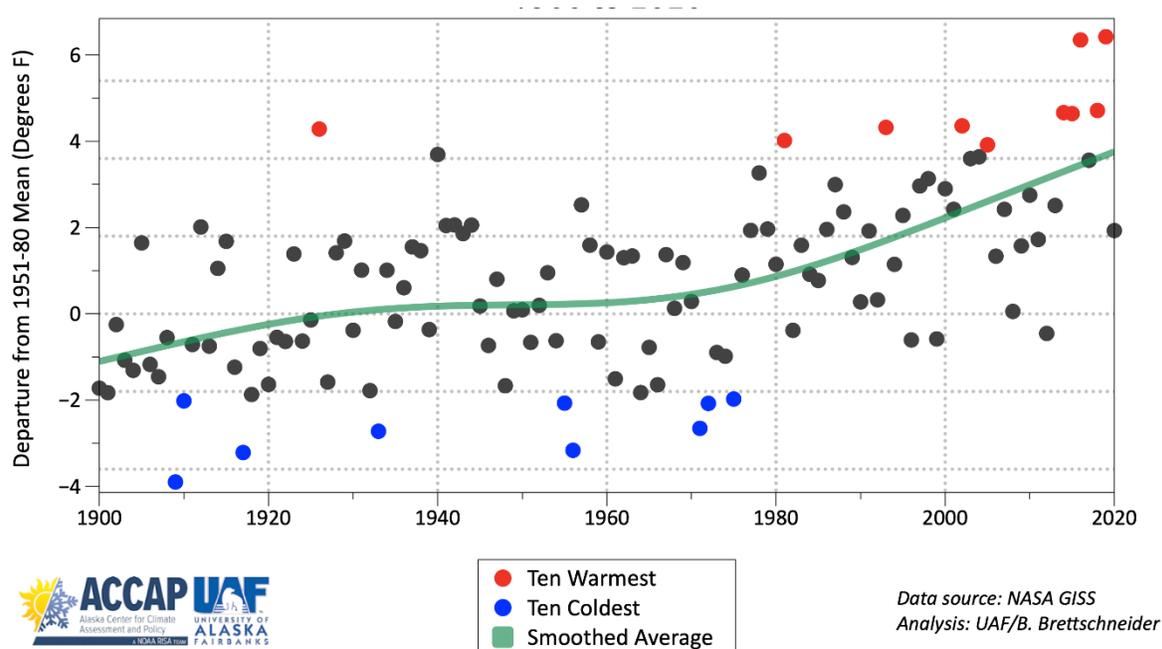
### 5.1.1.1 Air Temperature

Recording of global temperatures began in 1850, and the last ten years (2014–2023) have ranked as the ten warmest years on record<sup>2</sup>, with 2023 being the warmest recorded since 1850. The yearly temperature for North America has increased at an average rate of 0.23°F since 1910; however, the average rate of increase has doubled since 1981 (0.49°F)<sup>2</sup>.

The Arctic (latitudes between 60°N and 90°N) has been warming at more than two times the rate of lower latitudes since 2000. This is due to “Arctic amplification”, a characteristic of the global climate system influenced by changes in sea ice extent, albedo, atmospheric and oceanic heat transports, cloud cover, black carbon, and many other factors (Serreze and Barry 2011; Richter-Menge et al. 2017; Richter-Menge 2019). The average annual temperature is now 3-4°F warmer than during the early and mid-century (Figure 6; Thoman and Walsh 2019). The average annual temperature for Alaska in 2023 was 28.4°F, 2.4°F above the long-term average, ranking as the 17<sup>th</sup> warmest in the 98-year record for the state<sup>2</sup>. Some of the most pronounced effects of climate change in Alaska include disappearing sea ice, shrinking glaciers, thawing permafrost, and changing ocean temperatures and chemistry (Chapin et al. 2014).

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<sup>2</sup> <https://www.ncei.noaa.gov/access/monitoring/monthly-report/global/202213> viewed 3/11/2024.



**Figure 11. Alaska Annual Temperature 1900 to 2020.**

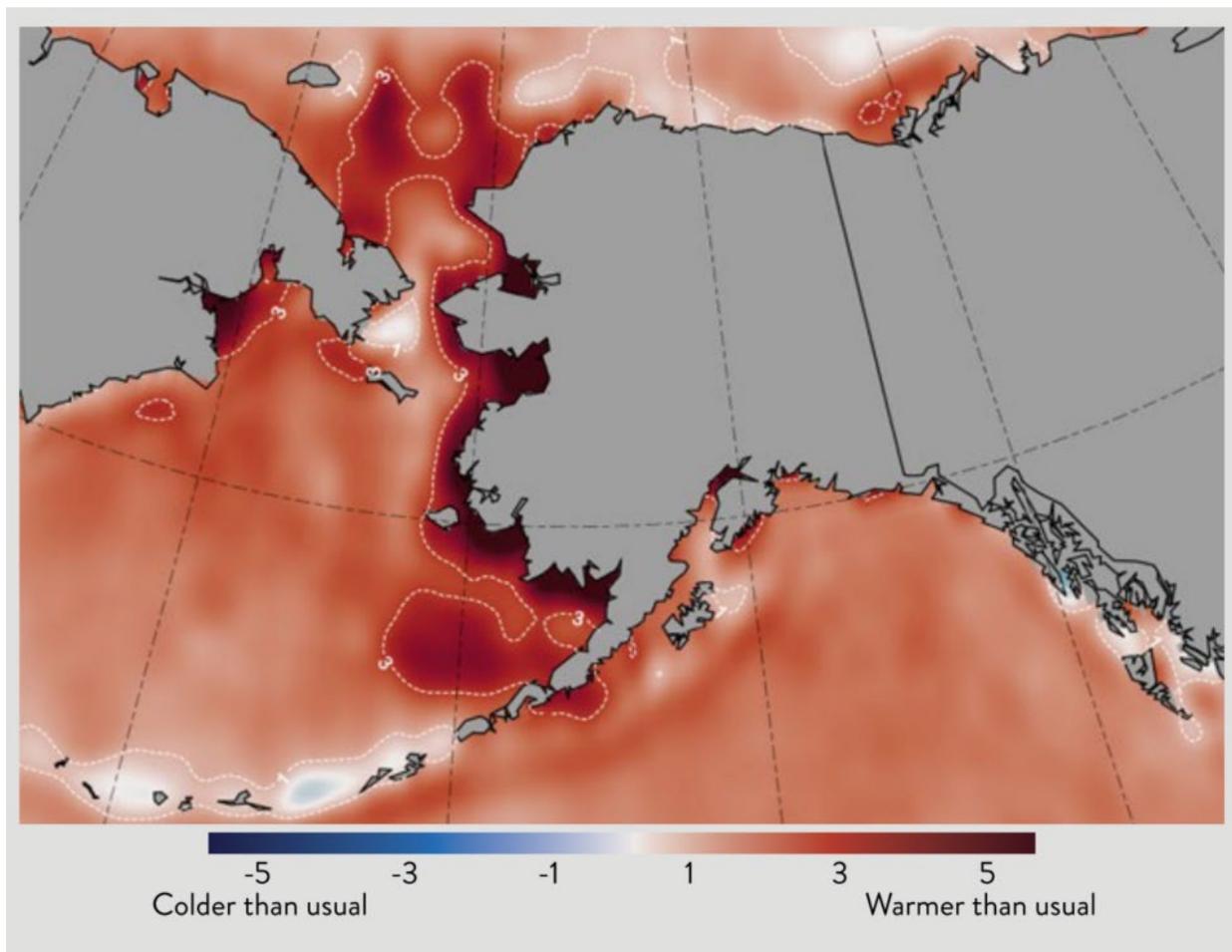
### 5.1.1.2 Marine water temperature

Higher air temperatures have led to higher ocean temperatures. More than 90 percent of the excess heat created by global climate change is stored in the world’s oceans, causing increases in ocean temperature (IPCC 2019; Cheng et al. 2020). The upper ocean heat content, which measures the amount of heat stored in the upper 2000 m (6,561 ft) of the ocean, was the highest on record in 2019 by a wide margin and is the warmest in recorded human history (Cheng et al. 2020).

The seas surrounding Alaska have been unusually warm in recent years, with unprecedented warmth in some cases (Thoman and Walsh 2019). This effect can be seen throughout the Alaska region, including the Bering, Chukchi, and Beaufort seas (Figure 7). Along the west coast, the surface waters were 4–11°F warmer than average in the summer of 2019 (Thoman and Walsh 2019).

Warmer ocean water affects sea ice formation and melt. In the first decade of the 21<sup>st</sup> century, Arctic sea ice thickness and annual minimum sea ice extent (i.e., September sea ice extent) began declining at an accelerated rate and continues to decline at a rate of approximately minus 2.7 percent per decade (Stroeve et al. 2007; Stroeve and Notz 2018). None of the species we are considering in this biological opinion are directly dependent on or greatly affected by sea ice or changes to sea ice. Humpback and fin whales have been sighted in the Bering Sea in recent years, but this is primarily during summer months when the sea ice has retreated (Clarke et al. 2020). WDPS Steller sea lions can be found on St Lawrence Island and even farther north but are not dependent seasonal on sea ice movement.

In the Pacific Arctic, with the reduction in the cold-water pool in the northern Bering Sea, large scale northward movements of commercial stocks are underway as previously cold-dominated ecosystems warm and fish move northward to higher latitudes (Grebmeier et al. 2006; Eisner et al. 2020). Not only fish, but plankton, crabs and ultimately, sessile invertebrates like clams are affected by these changes in water temperature (Grebmeier et al. 2006; Fedewa et al. 2020).



**Figure 12. Shades of red indicate summer sea surface temperatures that were warmer than average during 2014-2018, especially along the west coast.**

Another ocean water anomaly is described as a marine heat wave. Marine heat waves are described as a coherent area of extreme warm temperature at the sea surface that persists (Frölicher et al. 2018). Marine heatwaves are a key ecosystem driver and there has been an increase from 30 percent in 2012 to nearly 70 percent of global oceans in 2016 experiencing strong or severe heatwaves (Suryan et al. 2021). The largest recorded marine heat wave occurred in the northeast Pacific Ocean from 2013-2015 (Frölicher et al. 2018). Initially called “the blob” the northeast Pacific marine heatwave (PMH) first appeared off the coast of Alaska in the winter of 2013-2014 and by the end of 2015 it stretched from Alaska to Baja California. In mid-2016,

the PMH began to dissipate, based on sea surface temperature data but warming re-intensified in late-2018 and persisted into fall 2019 (Suryan et al. 2021). Consequences of this event included an unprecedented harmful algal bloom that extended from the Aleutian Islands to southern California, mass strandings of marine mammals, shifts in the distribution of invertebrates and fish, and shifts in abundance of several fish species (Cavole et al. 2016). Cetaceans, forage fish (capelin and herring), Steller sea lions, adult cod, chinook and sockeye salmon in the Gulf of Alaska were all impacted by the PMH (Bond et al. 2015; Peterson et al. 2016; Sweeney et al. 2018).

The 2018 Pacific cod stock assessment<sup>3</sup> estimated that the female spawning biomass of Pacific cod (an important prey species for Steller sea lions) was at its lowest point in the 41-year time series, following three years of poor recruitment and increased natural mortality as a result of the PMH. In 2020 the spawning stock biomass dropped below 20 percent of the unfished spawning biomass and the federal Pacific cod fishery in the Gulf of Alaska was closed by regulation to directed Pacific cod fishing (Barbeaux et al. 2020). Twenty percent is a minimum spawning stock size threshold instituted to help ensure adequate forage for the endangered WDPS Steller sea lions.

Events from warming, such as the toxic algal bloom caused by the PMH, can produce biotoxins like domoic acid and saxitoxin that may pose a risk to marine mammals in Alaska. In addition, increased temperatures can increase *Brucella* infections. In the Lefebvre et al. (2016) study of marine mammal tissues across Alaska, 905 individuals from 13 species were sampled including humpback whales, bowhead whales, beluga whales, harbor porpoises, northern fur seals, Steller sea lions, harbor seals, ringed seals, bearded seals, spotted seals, ribbon seals, Pacific walruses, and northern sea otters (Figure 13). Domoic acid was detected in all 13 species examined and had a 38 percent prevalence in humpback whales, and a 27 percent prevalence in Steller sea lions. Additionally, fetuses from a beluga whale, a harbor porpoise, and a Steller sea lion contained detectable concentrations of domoic acid documenting maternal toxin transfer in these species. Saxitoxin was detected in 10 of the 13 species, with the highest prevalence in humpback whales (50 percent) and a 10 percent prevalence in Steller sea lions (Lefebvre et al. 2016).

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<sup>3</sup>NOAA Fisheries, Alaska Fisheries Science Center website. Available at [https://apps-afsc.fisheries.noaa.gov/REFM/stocks/Historic\\_Assess.htm](https://apps-afsc.fisheries.noaa.gov/REFM/stocks/Historic_Assess.htm), accessed 2/17/24.



Figure 13. Algal toxins detected in 13 species of marine mammals from Southeast Alaska to the Arctic from 2004 to 2013 (Lefebvre et al. 2016).

### 5.1.1.3 Ocean Acidification

For 650,000 years or more, the average global atmospheric carbon dioxide (CO<sub>2</sub>) concentration varied between 180 and 300 parts per million (ppm), but since the beginning of the industrial revolution in the late 1700s, atmospheric CO<sub>2</sub> concentrations have been increasing rapidly, primarily due to anthropogenic inputs (Fabry et al. 2008; Lüthi et al. 2008). The world’s oceans have absorbed approximately one-third of the anthropogenic CO<sub>2</sub> released, which has buffered the increase in atmospheric CO<sub>2</sub> concentrations (Feely et al. 2004; Feely et al. 2009). Despite the oceans’ role as large carbon sinks, the CO<sub>2</sub> level continues to rise and is currently at 424.5 ppm<sup>4</sup>.

As the oceans absorb CO<sub>2</sub>, the buffering capacity, and ultimately the pH of seawater is reduced. This process is referred to as ocean acidification. Ocean acidification reduces the saturation states of certain biologically important calcium carbonate minerals like aragonite and calcite that many organisms use to form and maintain shells (Bates et al. 2009; Reisdorph and Mathis 2014). When seawater is supersaturated with these minerals, calcification (growth) of shells is favored. Likewise, when the sea water becomes undersaturated, dissolution is favored (Feely et al. 2009).

<sup>4</sup> NOAA Global Monitoring Laboratory website. Trends in Atmospheric Carbon Dioxide. Available at <https://www.esrl.noaa.gov/gmd/ccgg/trends/>, accessed 3/11/ 2024.

High latitude oceans have naturally lower saturation states of calcium carbonate minerals than more temperate or tropical waters, making Alaska's oceans more susceptible to the effects of ocean acidification (Fabry et al. 2009; Jiang et al. 2015). Model projections indicated that aragonite undersaturation would start to occur by about 2020 in the Arctic Ocean and by 2050, all of the Arctic will be undersaturated with respect to aragonite (Feely et al. 2009; Qi et al. 2017). Large inputs of low-alkalinity freshwater from glacial runoff and melting sea ice contribute to the problem by reducing the buffering capacity of seawater to changes in pH (Reisdorph and Mathis 2014). As a result, seasonal undersaturation of aragonite was already detected in the Bering Sea at sampling stations near the outflows of the Yukon and Kuskokwim Rivers, and the Chukchi Sea (Fabry et al. 2009). Models and observations indicate that rapid sea ice loss will increase the uptake of CO<sub>2</sub> and exacerbate the problem of aragonite undersaturation in the Arctic (Yamamoto et al. 2012; DeGrandpre et al. 2020).

Undersaturated waters are potentially highly corrosive to any calcifying organism, such as corals, bivalves, crustaceans, echinoderms and many forms of zooplankton such as copepods and pteropods, and consequently may affect Arctic food webs (Fabry et al. 2008; Bates et al. 2009). Pteropods, which are often considered indicator species for ecosystem health, are prey for many species of carnivorous zooplankton, fishes including salmon, mackerel, herring, and cod, and baleen whales (Orr et al. 2005). Because of their thin shells and dependence on aragonite, under increasingly acidic conditions, pteropods may not be able to grow and maintain shells (Lischka and Riebesell 2012). It is uncertain if these species, which play a large role in supporting many levels of the Alaskan marine food web, will be able to adapt to changing ocean conditions (Fabry et al. 2008; Lischka and Riebesell 2012).

Climate change is projected to have substantial direct and indirect effects on individuals, populations, species, and the structure and function of marine, coastal, and terrestrial ecosystems in the foreseeable future (Hinzman et al. 2005; Burek et al. 2008; Doney et al. 2012; Huntington et al. 2020). The physical effects on the environment described above have impacted, are impacting, and will continue to impact marine species in a variety of ways (IPCC 2014), including shifting abundances, changes in distribution, changes in timing of migration, changes in periodic life cycles of species. For example, cetaceans with restricted distributions linked to water temperature may be particularly susceptible to range restriction (Learmonth et al. 2006). Conversely, for species that undergo long migrations, if either prey availability or habitat suitability is disrupted by changing ocean temperature regimes or prey availability due to ocean acidification, the timing of migration can change or negatively impact population sustainability (Simmonds and Elliott. 2009). Macleod (2009) estimated that, based on expected shifts in water temperature, 88 percent of cetaceans will be affected by climate change, 47 percent will be negatively affected, and 21 percent will be put at risk of extinction.

### **5.1.2 Regional Effects**

Sitka is located in Sitka Sound on the southwest side of Baranof Island. Sitka Harbor and the Sitka Channel are approximately 27 km (16.5 mi) from the open Pacific Ocean; however, Sitka is protected by Japonski Island and several small islands that reduce its exposure to waves and weather somewhat. The Sitka Channel is generally characterized by semidiurnal tides with a

mean tide range of 2.34 m (7.7 feet), the diurnal tide range is 3.01 m (9.94 feet), and the extreme range is 5.73 m (18.98 feet) (data for Station 9451600, NOAA 2024). Freshwater inputs to Sitka Sound include many anadromous streams, but the Indian River is the closest tributary to the action area. The bathymetry of the sound is variable depending on location and proximity to shore, islands, or rocks. Depths approach approximately 176 meters (580 feet) within Sitka Sound but near the Sitka Channel depths range from 6.7 meters (22 feet) in the channel to 15.3 m (50 feet) near the Channel Rocks.

All areas of the action area are being affected by climate change. Although the species living in the Arctic successfully adapted to changes in the climate in the past, the current rate of change is accelerated (Simmonds and Elliott. 2009). As described above, effects to Arctic ecosystems are very pronounced, wide-spread, and well documented. While a changing climate may create opportunities for range expansion for some species, the life cycles and physiological requirements of many specialized polar species are closely linked to the annual cycles of sea ice and photoperiod and they may be less adaptable (Doney et al. 2009; Wassmann et al. 2011). Because the rate of change is occurring so quickly, the changes may exceed species' ability to adapt.

Indirect threats associated with climate change include increased human activity as a result of regional warming. Human fishing pressure could change the abundance, seasonality, or composition of prey species. Fisheries in Alaska are managed with the goal of sustainability; however, not all fish stocks are assessed, and it is unknown whether management of fisheries for optimal returns provides sufficient densities in feeding areas for efficient foraging by ESA-listed marine mammal species.

Physical forcing affects food availability and can change the structure of trophic relationships by impacting climate conditions that influence reproduction, survival, distribution, and predator-prey relationships at all trophic levels. Warmer waters could favor productivity of some species, but the impact on recruitment of important prey of humpback whales is unpredictable. Recruitment of large year-classes of gadids (e.g., pollock) and herring has occurred more often in warm than cool years, but the distribution and recruitment of other fish (e.g., osmerids) could be negatively affected (NMFS 2008a).

## **5.2 Natural Catastrophic Changes**

Coastal Alaska is a region of known seismic and volcanic activity and tsunami events. Earthquakes, volcanic eruptions, landslides, and tsunamis can alter the physical environment instantaneously. Catastrophic events are infrequent but have the potential to impact marine mammals by: decreasing prey abundance as a result of direct mortality; rendering habitat unsuitable (or more suitable) for marine mammals and prey species; directly removing (or creating) habitat; and, degrading habitat quality (e.g., volcanic ash outfall could affect siltation and water chemistry; NMFS 2016).

### **5.3 Vessel Traffic**

Sitka has the second-highest number of commercial vessel port calls (approximately 1,800 in 2018) following Ketchikan in Alaska. CBS Harbor Department operates and maintains the following five boat harbors in the Sitka area: Crescent Harbor, Sealing Cove Harbor, ANB Harbor, Thomsen Harbor, and Eliason Harbor as well as the existing sea plane base (A29). Thomsen and Eliason Harbors are directly across Sitka Channel from the proposed project. Sitka is part of the Alaska Marine Highway with sailings multiple days a week and provides transit to numerous communities in Southeast Alaska, Washington State, and Canada. Marine vessels that use the action area include passenger ferries, commercial freight vessels/barges, commercial tank barges, cruise ships, commercial fishing boats, charter vessels, recreational vessels, kayaks, and floatplanes.

Ongoing vessel activities in and around Sitka Channel, as well as land-based industrial and commercial activities, result in elevated in-air and underwater acoustic conditions in the action area. Background sound levels likely vary seasonally, with elevated levels during summer when the cruise ship, commercial, and fishing industries are at their peaks.

Many residents maintain a subsistence and commercial fishing lifestyle. The action area experiences moderate levels of commercial fishing vessels and recreational marine vessel traffic during the summer season.

#### **5.3.1 Vessel Strike Risk**

Ship strikes can cause major wounds or death to marine mammals. An animal at the surface could be struck directly by a vessel, a surfacing animal could hit the bottom of a vessel, or a vessel propeller could injure or kill an animal below the water surface. From 1978-2011, there were at least 108 recorded whale-vessel collisions in Alaska, with the majority occurring in Southeast Alaska between May and September (Neilson et al. 2012b). Small recreational vessels traveling at speeds over 13 knots (14.9 miles per hour) were most commonly involved in ship strike encounters; however, all types and sizes of vessels were reported (Neilson et al. 2012b).

The majority of vessel strikes involved humpback whales (86 percent) and the number of humpback strikes increased annually by 5.8 percent from 1978 to 2011. Seventeen humpback whales were reported struck by vessels between 2013 and 2015 (Delean et al. 2020), and 18 humpbacks were reported struck by vessels between 2016 and 2020 (Freed et al. 2022) in Alaskan waters. From 2007 to 2013, there were four documented cases of Steller sea lions killed or injured by vessel strikes in Alaska, none from seaplanes (NMFS 2020a).

The CBS travel and transportation website notes that inside Sitka Channel is a no wake zone requiring vessels to go 4.3 knots (5 miles per hour) or slower; however, outside the channel in Sitka Sound ships may be travelling much faster. The largest ships usually travel at speeds between 20-24 knots (23-27 miles per hour).

Vessel traffic in the action area and the surrounding area poses varying levels of threat to humpback whales and Steller sea lions, depending on the type and intensity of the vessel activity and its degree of spatial and temporal overlap with habitats.

#### **5.4 Fisheries**

Commercial, recreational, and subsistence fishing occurs in the Southeast Alaska region. Subsistence fisheries include salmon, halibut, herring spawn-on-kelp, shellfish, and groundfish. Eulachon, Dolly Varden, trout, and smelt are also taken for subsistence purposes. Sport fishers have year-round opportunities to catch all five species of Pacific salmon, halibut, lingcod, and rockfish. Salmon, herring, groundfish, and shellfish species are all commercially fished in the area.

The Sitka Sound Seafood Plant was built in 1981 to replace the Seafood Producer's Cooperative facility near Seward, which was destroyed in the 1964 earthquake. The Sitka facility provides seafood processing support services for Seafood Producer's Cooperative member fishermen.

The NMFS Alaska Marine Mammal Stranding Network database has records of 224 large whale entanglements between 2000 and 2020.<sup>5</sup> Of these, 64 percent were humpback whales from Southeast Alaska. Most of these whales were entangled with gear between the beginning of June and the beginning of September, when they were on their nearshore foraging grounds in Alaska waters. Between 2000 and 2020, 18 percent of humpback entanglements in Southeast Alaska were with pot gear, 33 percent with gillnet and other net-type gears, and less than 1 percent were associated with longline gear. Humpback whales have been reported as entangled in the action area or near the action area in recent years, including two near Ketchikan in 2011 and one near Gravina Island in 2019.

#### **5.5 Pollution**

A number of intentional and accidental discharges of contaminants pollute the marine waters of Alaska annually. Intentional sources of pollution, including domestic, municipal, and industrial wastewater discharges are managed by the Alaska Department of Environmental Conservation. Pollution may also occur from unintentional discharges and spills.

Marine water quality in the action area can be affected by discharges from permitted seafood processing, treated sewer system outflows, vessels operating in marine waters, and sediment runoff from paved surfaces and disturbed areas. Large fuel spills are also possible from large vessel groundings or barges transporting fuel.

#### **5.6 Coastal Zone Development**

Coastal zone development results in some loss and alteration of nearshore marine species habitat and changes in habitat quality. Increased development may prevent marine mammals from

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<sup>5</sup> NMFS Alaska Marine Mammal Stranding Network database, accessed November 5, 2020.

reaching or using important feeding, breeding, and resting areas. The shoreline in the immediate project area is primarily developed with impervious surfaces directly adjacent to the shoreline of the project footprint. Few areas of natural shoreline exist in the project site, mostly near the proposed upland parking area and haul out ramp. There is little opportunity for further development within Sitka Channel as the SPB is located between the US Coast Guard (USCG) Air Strip and Southeast Alaska Regional Health Consortium facilities, which are currently pursuing permits for expansion. Development actions will likely involve repairs, restructuring, or enlarging existing facilities in the Sitka Channel.

### 5.7 Prior Section 7 Consultations

Based on a search of the Environmental Consultation Organizer (ECO), there have been three formal and nine informal Section 7 consultations conducted for projects in the Sitka Channel area since 2017. Seven expedited informal Section 7 consultations have occurred in or near the SPB project area (Table 5-1), with one being a consultation for geotechnical survey activities at the proposed SPB site (AKRO-2021-03432). The most common stressor among these consultations was acoustic disturbance.

**Table 5-1. Recent Section 7 consultations within a three-mile radius of the Sitka Seaplane Base**

<b>Project ID</b>	<b>Project Title</b>	<b>Consultation Category</b>
AKRO-2017-00903	City and Borough of Sitka Gary Paxton Industrial Park Multipurpose Dock Project	Formal
AKRO-2017-00904	Biorka Island Dock Replacement Project Sitka, Alaska	Formal
AKRO-2018-00245	Crescent Bay, City & Borough of Sitka O'Connell Lightering Float Pile Replacement	Formal
AKRO-2016-00232	South Sitka Channel Fuel Float LOC	Informal
AKRO-2017-00909	Sitka Marine Service Center	Informal
AKRO-2018-01684	Sitka North Pacific Seafoods Dock Maintenance Project	Informal
AKRO-2019-00160	USCG Sitka Dock Moorage Short Term Repairs	Informal
AKRO-2019-00440	Sitka Sound Aldrich Dock Project	Informal
AKRO-2019-03001	Crescent Harbor, City and Borough of Sitka, Solstice Alaska Consulting Inc.	Informal
AKRO-2019-03283	Sitka Harbor, 1401-3 HPR Dock Association POA-2019-00536	Informal
AKRO-2019-03761	Sitka Romar Holdings Western Channel Dock	Informal
AKRO-2022-03511	Kelptastic Farms, Sitka POA-2020-00426	Informal
AKRO-2021-00398	Sitka, Breast Island Dock eLOC	Expedited
AKRO-2021-03432	Sitka Seaplane Base Geotechnical Project	Informal Expedited

<b>Project ID</b>	<b>Project Title</b>	<b>Consultation Category</b>
AKRO-2022-00871	Hernandez Dock Modification, Jamestown Bay Sitka	Informal Expedited
AKRO-2022-03086	Caldwell Steel Pile Install in Sitka Channel	Informal Expedited
AKRO-2023-00651	Sitka Channel fender replacement	Informal Expedited
AKRO-2023-01867	Sitka Geotechnical Boring	Informal Expedited
AKRO-2023-03140	Sitka Seawalk Phase II	Informal Expedited

The records are linked in the Environmental Consultation Organizer (ECO) at <https://appscloud.fisheries.noaa.gov/suite/sites/eco/page/home>

## 5.8 Environmental Baseline Summary

Several of the activities described in the Environmental Baseline have adversely affected listed species that occur in the action area:

- There are insufficient data to make reliable estimations of the impact of climate change on marine mammals considered in this opinion. Although the effects of climate change and other large-scale environmental phenomena on humpback whales cannot be predicted with certainty, impacts to their prey from oceanic regime shifts, or changes in freshwater habitat (hydrologic changes, increased water temperature) are projected to occur.
- Vessel traffic in the action area poses varying levels of threat to listed marine mammals, depending on the type and intensity of the activity and its degree of spatial and temporal overlap with marine mammals. The presence, movements, and sound of ships in the vicinity of some species may cause them to abandon foraging areas.
- Commercial fisheries may have reduced prey availability for humpback whales.
- Humpback whales have been impacted by entanglement.
- The proposed project is in an area of high human use and some existing habitat alteration for both the sunflower sea star and prey species for the humpback whale.
- Climate change is thought to have exacerbated SSWS, which was the cause of a range wide die-off of sunflower sea stars.

## 6 EFFECTS OF THE ACTION

“Effects of the action” are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the

proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (50 CFR § 402.02).

This biological opinion relies on the best scientific and commercial information available. We try to note areas of uncertainty, or situations where data is not available. In analyzing the effects of the action, NMFS gives the benefit of the doubt to the listed species by minimizing the likelihood of false negative conclusions (concluding that adverse effects are not likely when such effects are, in fact, likely to occur).

We organize our effects analysis for each species beginning with stressor identification, then assessing the potential for exposure, likely response, and concluding with a risk assessment for the proposed activities.

NMFS identified and addressed potential stressors; and considered consequences of the proposed action, individually and cumulatively, in developing the analysis and conclusions in this opinion regarding the effects of the proposed action on ESA-listed species and designated critical habitat.

## **6.1 Project Stressors**

Stressors are any physical, chemical or biological phenomena that can induce an adverse response. The effects section starts with identification of the stressors produced by the constituent parts of the proposed action.

Based on our review of the Biological Assessment; the IHA application; the proposed notice for issuing the IHA; personal communications with PR1, the non-federal designee, and others; and other available literature as referenced in this opinion, our analysis recognizes that the SPB project may cause these primary stressors:

1. in-water sound fields produced by impulsive and non-impulsive noise sources related to pile driving activities including vibratory pile driving, impact pile driving, and down-the-hole drilling;
2. vessel strike and disturbance;
3. disturbance to prey and/or habitat including seafloor disturbance from pile driving activities and placement of fill, equipment or anchors, and turbidity and sedimentation; and
4. pollution from unauthorized spills.

### **6.1.1 Minor Stressors on ESA-Listed or Proposed Species and Critical Habitat**

Based on a review of available information, we determined the following stressors are either unlikely to occur or likely to have minimal impacts on Mexico DPS humpback whales, WDPS

Steller sea lions, and sunflower sea stars.

#### **6.1.1.1 Vessel strike**

As discussed in the Environmental Baseline section, Sitka Channel and the surrounding area experiences high levels of vessel traffic year-round, with a seasonal summer increase. Marine vessels that use the action area include passenger ferries, commercial freight vessels/barges, commercial tank barges, cruise ships, commercial fishing boats, charter vessels, recreational vessels, kayaks, and floatplanes.

Vessels associated with the project would follow well-established, frequently utilized navigation lanes as they cross Sitka Sound and enter Eastern, Middle, and Sitka Channels, and they would be traveling at slow speeds. Within the action area, project-related vessels will not exceed 10 knots and will typically be travelling at less than five knots as they navigate the constrained area of Sitka Channel and the areas near Sitka. Mexico DPS humpback whales and WDPS Steller sea lions in the action area are exposed to ship traffic in this area daily and are unlikely to change their behavior in response to vessel traffic associated with this project. There is the potential for some increase in seaplane traffic with improved and updated base facilities, but an increase in large vessels (e.g. fish processors, and research vessels) is not expected as a result of this project.

The possibility of vessel strike associated with the proposed action is extremely unlikely. Between 2014 and 2018 the minimum mean annual mortality and serious injury rate due to ship strikes reported in Alaska for humpback whales was 2.6 whales (Muto et al. 2021). These incidents account for a very small fraction of the total humpback whale population (Laist et al. 2001).

Vessel operations for construction occur at relatively low speed limits (5 knots). Once vessels get to the construction site, they will be moving very slowly for very short distances. Due to the common presence of commercial and recreational vessels in the action area and the relatively small number of vessel transits during the duration of the project, the use of slow-moving tugboats and barges and skiff transits associated with construction of the project is not expected to measurably affect Mexico DPS humpback whales, WDPS Steller sea lions, and sunflower sea stars.

#### *Vessel strike conclusion*

Vessel disturbance or strikes of Mexico DPS humpback whales or WDPS Steller sea lions are not expected as a result of the proposed action because: 1) vessel traffic associated with the project is minimal; 2) relatively few humpback whales use Sitka Sound near the Sitka Channel; 3) only two percent of humpback whales that occur in the area are from the listed Mexico DPS; 4) all vessels, including vessels used in construction of the Sitka SPB, are limited to a speed of 10 knots or less; 5) vessels must adhere to the Alaska Humpback Whale Approach Regulations when transiting to and from the project site (see 50 CFR §§ 216.18, 223.214 and 224.103(b)) that prohibit approaching within 100 yards of humpback whales; and 6) the new SPB location would

potentially reduce conflicts with marine mammals and overall vessel congestion in Sitka Channel, because the landing and transit areas would be farther away from seafood processing facilities. All of these factors limit the risk of strike; therefore, we conclude that a strike between a project vessel and a listed humpback whale or Steller sea lion is extremely unlikely to occur.

#### **6.1.1.2 Vessel noise**

Project vessels are likely to generate underwater sound levels exceeding the non-impulsive threshold of 120 dB, and disturbance to listed species could occur from project vessel noise. The source levels for project vessels (barge movements) are estimated at between 171-176 dB rms, and will drop to a received level of 120 dB within 2,154 meters (or less) of the source (Richardson et al. 1995; Blackwell and Greene 2003; Ireland and Bisson 2016).

Although some marine mammals could receive sound levels exceeding the acoustic threshold of 120 dB from the project vessels, disturbances rising to the level of harassment are extremely unlikely to occur. The nature of the exposure will be low-frequency, with much of the acoustic energy emitted by project vessels at frequencies below the best hearing ranges of humpback whales. In addition, because vessels will be in transit, the duration of the exposure to ship noise will be brief. The project vessels will emit continuous sound while in transit, which will provide a gradual and prolonged onset of vessel sound before the received sound level exceeds 120 dB. Furthermore, vessel noise associated with construction will be minimal because most work will be conducted from anchored barges and work platforms. Propeller cavitation, the predominant contributor to vessel underwater sound, is unlikely to occur when vessels are anchored.

A startle response to vessels that are underway is not expected. Rather, slight deflection and avoidance are expected to be common responses in those instances where there is any response at all. Free-ranging marine mammals may engage in avoidance behavior when surface vessels move toward them, similar to their behavioral responses to predators. Animals have been observed reducing their visibility at the water surface and moving horizontally away from the source of disturbance or adopting erratic swimming strategies (Williams et al. 2002; Lusseau 2003; Lusseau 2006). Studies indicate that dive times and swimming speeds increase, vocalizations and jumping usually decrease, and individuals in groups move closer together (Kruse 1991; Evans et al. 1994). Most animals in confined spaces, such as shallow bays, moved towards more open, deeper waters when vessels approached (Kruse 1991).

Some baleen whales have adjusted their communication frequencies, intensity, and call rate to limit masking effects from anthropogenic sounds such as shipping traffic. Baleen whales may also exhibit behavioral changes in response to vessel noise. Marine mammals that have been disturbed by anthropogenic noise and vessel approaches are commonly reported to shift from resting behavioral states to active behavioral states, suggesting an energetic cost to the affected animal. Responding to vessels is likely stressful to humpback whales, but the biological significance of that stress is unknown (Bauer and Herman 1986).

Humpback cow-calf pairs significantly reduced the amount of time spent resting and milling

when vessels approached, as compared to undisturbed whales (Morete et al. 2007).

Marine mammals including listed whales and sea lions that frequent the project area are very likely habituated to vessel disturbance due to the common presence of ferries, cruise ships, fishing vessels, barges, tugboats, and other commercial and recreational vessels that use the harbor. If animals do respond to project vessel noise, they may exhibit slight deflection from the source, engage in low-level avoidance behavior, or short-term vigilance behavior; however, these behaviors are not likely to result in adverse consequences for the animals. The nature and duration of response is not expected to disrupt to a measurable degree important behavioral patterns such as feeding or resting. The best available information indicates that sunflower sea stars are not sensitive to underwater sounds, and we therefore do not expect this stressor to affect them.

#### *Vessel Noise Conclusion*

In summary, some marine mammals could be exposed to vessel noise as a result of this action. If exposure occurs, it will be temporary and localized, and likely cause responses that are at a low energy cost to individuals. The proposed mitigation measures are expected to further reduce the number of times marine mammals react to transiting vessels. NMFS concludes that any disturbance of marine mammals from vessel noise will be temporary and the effects to Mexico DPS humpback whales, WDPS Steller sea lions, and sunflower sea stars from vessel noise will be extremely small.

#### **6.1.1.3 Airborne Acoustic Effects**

Although pinnipeds are known to haul out regularly on man-made objects, we believe that adverse effects resulting solely from airborne sound are unlikely due to the sheltered proximity between the proposed project area and haulout sites (outside of Sitka Channel). There is a possibility that an animal could surface in-water, but with head out, within the area in which airborne sound exceeds relevant thresholds and thereby be exposed to levels of airborne sound that we associate with harassment, but any such occurrence would likely be accounted for in our estimation of exposures and adverse effects due to underwater sound. Therefore, a separate assessment of stressor effects due to airborne sound for pinnipeds is not warranted, and airborne sound is not discussed further here. Similarly, cetaceans, including humpback whales are not expected to be exposed to airborne sounds that would result in adverse effects.

#### **6.1.1.4 Disturbance to Seafloor, Habitat and/or Prey Resources Related to Marine Mammals and Sunflower Sea Stars**

The proposed action will have temporary impacts on water quality (increases in turbidity levels) and on prey species distribution. Pile driving may cause temporary and localized turbidity through sediment disturbance. Turbidity plumes during pile installation and removal will be localized around the pile. Due to temporary, localized, and low levels of turbidity increases, it is not expected that turbidity would result in immediate or long-term effects to the Mexico DPS

humpback whale, WDPS Steller sea lions, sunflower sea stars, or their prey.

Construction activities will produce non-impulsive (i.e., vibratory pile removal and DTH) and impulsive (i.e., impact driving and DTH) sounds. Fish react to sounds that are especially strong and/or intermittent low-frequency sounds. Short duration, sharp sounds can cause overt or subtle changes in fish behavior and local distribution. Hastings and Popper (2005) identified several studies that suggest fish may relocate to avoid certain areas of sound energy. Additional studies have documented effects of pile driving on fish, although several are based on studies related to large, multiyear bridge construction projects (e.g., Scholik and Yan 2001; Scholik and Yan 2002; Popper and Hastings 2009). Impulsive sounds at received levels of 160 dB may cause subtle changes in fish behavior. SPLs of 180 dB may cause noticeable changes in behavior (Pearson et al. 1992; Skalski et al. 1992). SPLs of sufficient strength have been known to cause injury to fish and fish mortality, typically due to near-field particle motion rather than sound waves.

The most likely impact to fish from pile driving and drilling activities at the project area would be temporary behavioral avoidance of the area. The duration of fish avoidance of this area after pile driving ceases is unknown, but a rapid return to normal recruitment, distribution and behavior is expected. In general, impacts to marine mammal prey species are expected to be minor and temporary given the small area of pile driving within the action area relative to known feeding areas for humpback whales. In general, we expect fish will be capable of moving away from project activities to avoid exposure to noise. We expect the area in which stress, injury, TTS, or changes in balance of prey species may occur will be limited by the Channel Rocks breakwaters which will block much of the sound generated by the pile driving and drilling operations. We consider potential adverse impacts to prey resources from pile-driving and drilling in the action area to be immeasurably small.

Studies on euphausiids and copepods, two of the more abundant and biologically important groups of zooplankton, have documented some sensitivity of zooplankton to sound (Chu et al. 1996; Wiese 1996); however, any effects of pile driving and fill activities on zooplankton would be expected to be restricted to the area within a few feet or meters of the project and would likely be sub-lethal. While previous studies concluded that crustaceans (such as zooplankton) are not particularly sensitive to sound produced by even louder impulsive sounds such as seismic operations (Wiese 1996), a recent study provides evidence that seismic surveys may cause significant mortality (McCauley et al. 2017). However, seismic surveys are significantly louder and lower frequency than the sound sources associated with this project and are not directly comparable.

No appreciable adverse impact on zooplankton populations will occur due in part to large reproductive capacities and naturally high levels of predation and mortality of these populations. Any mortality or impacts on zooplankton as a result of construction operations is immaterial as compared to the naturally occurring reproductive and mortality rates of these species.

Construction activities will temporarily increase in-water noise and may adversely affect prey in the action area. Adverse effects on prey species populations during project construction will be short-

term, based on the short duration of the project. After pile driving activities are completed, habitat use and function are expected to return to similar pre-construction levels and fish are expected to reoccupy the area.

An Erosion and Sediment Control Plan, and other best management practices will be implemented during construction to prevent contaminants from entering the marine environment. Construction will be conducted in accordance with Clean Water Act Sections 404 and 401 regulations to minimize potential construction-related impacts on water quality. As stated in Section 4.2.2.2, sunflower sea stars occur in a wide range of intertidal and subtidal habitats from northern Baja California, Mexico, to the central Aleutian Islands, Alaska. Any impacts to sunflower sea star habitat are expected to be limited and temporary.

Given the numbers of fish and other prey species in the vicinity, the short-term nature of effects on fish species, and the mitigation measures to protect fish and marine mammals during construction, the proposed action is not expected to have measurable effects on the distribution or abundance of potential marine mammal prey species. Any behavioral avoidance by fish of the disturbed area would still leave sufficiently large areas of fish and marine mammal foraging habitat outside the Sitka Channel.

The surrounding area is not a significant foraging ground for humpback whales. There are no known aggregations of forage fish important to humpback whales in the project vicinity that will be impacted by the action. Implementation of the mitigation measures described in Section 2.1.4 of this opinion will avoid or minimize effects to prey resources. In summary, the effects of disturbance to the seafloor, habitat, and prey resources resulting from the Sitka SPB project activities are expected to have a negligible impact on Mexico DPS humpback whales, WDPS Steller sea lions, and sunflower sea stars.

#### **6.1.1.5 Pollution**

While there is potential for an oil or pollutant spill from activities associated with the project, the risk of spills and pollutants related to the project will be mitigated by implementing best management practices and policies to prevent accidental spills. Plans will be in place and materials will be available for cleanup activities if a spill were to occur.

Construction will be conducted in accordance with Clean Water Act Section 404 and 401 regulations to minimize potential construction-related impacts on water quality, and any effects to Mexico DPS humpback whales will be immeasurably small. Therefore, we conclude that the effects from this stressor on humpback whales and sunflower sea stars are immeasurably small.

Pollution into the marine environment from runoff, spills, or outfall pipes may compromise the microbiome of sunflower sea stars leading to death, or making them vulnerable to other stressors (Aquino et al. 2021; McCracken et al. 2023). Relative to SSWS, this is minor threat that is limited in spatial and temporal scope. There is no direct evidence that this stressor is directly impacting sunflower sea stars in the action area.

## 6.1.2 Major Stressors on ESA-Listed Species

Underwater noise from pile driving activities is likely to adversely affect Mexico DPS humpback whales and WDPS Steller sea lions. This stressor will be analyzed further in the *Exposure Analysis* and *Response Analysis*.

### 6.1.2.1 Description of Sound Sources

The marine soundscape is comprised of both ambient (naturally-produced) and anthropogenic sounds. The sound level of an area is defined by the total acoustical energy being generated by known and unknown sources. These sources may include physical (e.g., waves, wind, precipitation, earthquakes, ice, atmospheric sound), biological (e.g., sounds produced by marine mammals, fish, and invertebrates), and anthropogenic sound (e.g., vessels, dredging, aircraft, construction).

Natural sound sources at any given location and time comprise “ambient” sound, while the sum of ambient sounds and typical anthropogenic sound comprises the “background” sound. Received levels of ambient and background sound depend not only on the source levels (as determined by current weather conditions and levels of biological and shipping activity) but also on the ability of sound to propagate through the environment. In turn, sound propagation is dependent on the spatially and temporally varying properties of the water column and sea floor and is frequency-dependent. As a result of the dependence on a large number of varying factors, ambient sound levels can be expected to vary widely over both coarse and fine spatial and temporal scales. Ambient sound levels at a given frequency and location can vary by 10-20 dB (over three-fold) from day to day (Richardson et al. 1995). The result is that, depending on the source type and its intensity, sound from the specified activity may be a negligible addition to the local environment or could adversely affect marine mammals.

In-water construction activities associated with the project include vibratory pile removal and installation, impact pile driving, and DTH pile installation. The sounds produced by these activities fall into one of two general sound types: impulsive and non-impulsive. Impulsive sounds (e.g., explosions, gunshots, sonic booms, impact pile driving) are typically transient, brief (less than one second), broadband, and consist of high peak sound pressure with rapid rise time and rapid decay (ANSI (American National Standards Institute) 1986; NIOSH (National Institute for Occupational Safety and Health) 1998; ANSI (American National Standards Institute) 2005; NMFS 2018b). Non-impulsive sounds (e.g., aircraft, machinery operations such as drilling or dredging, vibratory pile driving, and active sonar systems) can be broadband, narrowband or tonal, brief or prolonged (non-impulsive or intermittent), and typically do not have the high peak sound pressure with rapid rise/decay time that impulsive sounds do (ANSI 1995; NIOSH (National Institute for Occupational Safety and Health) 1998; NMFS 2018b). The distinction between these two sound types is important because they have differing potential to cause physical effects, particularly with regard to hearing (e.g., Ward 1997 in Southall et al. 2007).

Impact hammers operate by repeatedly dropping a heavy piston onto a pile to drive the pile into the substrate. Sound generated by impact hammers is characterized by rapid rise times and high peak levels, a potentially injurious combination (Hastings and Popper 2005). Vibratory hammers install piles by vibrating them and allowing the weight of the hammer to push them into the sediment. Vibratory hammers produce significantly less sound than impact hammers. Peak sound pressure levels (SPLs) may be 180 dB or greater, but are generally 10 to 20 dB lower than SPLs generated during impact pile driving of the same-sized pile (Oestman et al. 2009). Rise time is slower, reducing the probability and severity of injury, and sound energy is distributed over a greater amount of time (Nedwell and Edwards 2002; Carlson et al. 2005). To summarize, impact pile driving has more intense effects over a smaller area, while vibratory pile driving has lower intensity effects over a much larger area.

A DTH hammer drill is used to place hollow steel piles or casings by drilling. A DTH hammer drill is a drill bit that drills through the bedrock using a pulse mechanism that functions at the bottom of the hole. This pulsing bit breaks up rock to allow removal of debris and insertion of the pile. The head extends so that the drilling takes place below the pile. The pulsing sounds produced by DTH hammer drills were previously thought to be non-impulsive. However, recent sound source verification (SSV) monitoring has shown that DTH hammer drill can create sound that can be considered impulsive (Denes et al. 2019). Therefore, NMFS characterizes sound from DTH pile installation as being impulsive when evaluating potential Level A harassment (i.e., injury) impacts and as being non-impulsive when assessing potential Level B harassment (i.e., behavior) effects.

### 6.1.2.2 Acoustic Thresholds

Since 1997, NMFS has used generic sound exposure thresholds to determine whether an activity produces underwater and in-air sounds that might result in impacts to marine mammals (70 FR 1871, 1872; January 11, 2005). NMFS has developed comprehensive guidance on sound levels likely to cause injury to marine mammals through onset of permanent and temporary thresholds shifts (PTS and TTS) (83 FR 28824; June 21, 2018; 81 FR 51693; August 4, 2016). NMFS is in the process of developing guidance for behavioral disruption (Level B harassment). However, until such guidance is available, NMFS uses the following conservative thresholds of underwater sound pressure levels,<sup>6</sup> expressed in root mean square<sup>7</sup> (rms), from broadband sounds that cause behavioral disturbance, and referred to as Level B harassment under section 3(18)(A)(ii) of the Marine Mammal Protection Act (MMPA) (16 U.S.C § 1362(18)(A)(ii)):

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<sup>6</sup> Sound pressure is the sound force per unit micropascals ( $\mu\text{Pa}$ ), where 1 pascal (Pa) is the pressure resulting from a force of one newton exerted over an area of one square meter. Sound pressure level is expressed as the ratio of a measured sound pressure and a reference level. The commonly used reference pressure level in acoustics is 1  $\mu\text{Pa}$ , and the units for underwater sound pressure levels are decibels (dB) re 1  $\mu\text{Pa}$ .

<sup>7</sup> Root mean square (rms) is the square root of the arithmetic average of the squared instantaneous pressure values.

- impulsive sound: 160 dB<sub>rms</sub> re 1 μPa
- non-impulsive sound: 120 dB<sub>rms</sub> re 1μPa

Under the PTS/TTS Technical Guidance, NMFS uses the following thresholds (Table 6-1) for underwater sounds that have the potential to cause auditory injuries, referred to as Level A harassment under section 3(18)(A)(i) of the MMPA (16 U.S.C § 1362(18)(A)(i)) (NMFS 2018). Different thresholds and auditory weighting functions are provided for different marine mammal hearing groups, which are defined in the Technical Guidance (NMFS 2018). The generalized hearing range for each hearing group is in Table 6-2.

CBS's proposed activity includes the use of continuous (vibratory hammer and DTH drilling) and impulsive (DTH drilling and impact pile driving) sources, and therefore the RMS SPL thresholds of 120 and 160 dB re 1 μPa are applicable.

**Table 6-1. PTS Onset Acoustic Thresholds for Level A Harassment.**

Hearing Group	PTS Onset Acoustic Thresholds <sup>1</sup> (Received Level)	
	Impulsive	Non-impulsive
Low-Frequency (LF) Cetaceans	$L_{pk,flat}$ : 219 dB $L_{E,LF,24h}$ : 183 dB	$L_{E,LF,24h}$ : 199 dB
Mid-Frequency (MF) Cetaceans	$L_{pk,flat}$ : 230 dB $L_{E,MF,24h}$ : 185 dB	$L_{E,MF,24h}$ : 198 dB
High-Frequency (HF) Cetaceans	$L_{pk,flat}$ : 202 dB $L_{E,HF,24h}$ : 155 dB	$L_{E,HF,24h}$ : 173 dB
Phocid Pinnipeds (PW) (Underwater)	$L_{pk,flat}$ : 218 dB $L_{E,PW,24h}$ : 185 dB	$L_{E,PW,24h}$ : 201 dB
Otariid Pinnipeds (OW) (Underwater)	$L_{pk,flat}$ : 232 dB $L_{E,OW,24h}$ : 203 dB	$L_{E,OW,24h}$ : 219 dB

<sup>1</sup> Dual metric acoustic thresholds for impulsive sounds: Use whichever results in the largest isopleth for calculating PTS onset. If a non-impulsive sound has the potential of exceeding the peak sound pressure level thresholds associated with impulsive sounds, these thresholds should also be considered.

Note: Peak sound pressure ( $L_{pk}$ ) has a reference value of 1  $\mu$ Pa, and cumulative sound exposure level ( $L_E$ ) has a reference value of 1  $\mu$ Pa<sup>2</sup>s. The subscript “flat” is being included to indicate peak sound pressure should be flat weighted or unweighted within the generalized hearing range. The subscript associated with cumulative sound exposure level thresholds indicates the designated marine mammal auditory weighting function (LF, MF, and HF cetaceans, and PW and OW pinnipeds) and that the recommended accumulation period is 24 hours. The cumulative sound exposure level thresholds could be exceeded in a multitude of ways (i.e., varying exposure levels and durations, duty cycle). When possible, it is valuable for action proponents to indicate the conditions under which these acoustic thresholds will be exceeded.

**Table 6-2. Underwater marine mammal hearing groups.**

Hearing Group	ESA-listed Marine Mammals in the Project Area	Generalized Hearing Range <sup>1</sup>
Low-frequency (LF) cetaceans ( <i>Baleen whales</i> )	Humpback whales (Mexico and Western DPS)	7 Hz to 35 kHz
Mid-frequency (MF) cetaceans ( <i>dolphins, toothed whales, beaked whales</i> )	None	150 Hz to 160 kHz
High-frequency (HF) cetaceans ( <i>true porpoises</i> )	None	275 Hz to 160 kHz
Phocid pinnipeds (PW) ( <i>true seals</i> )	None	50 Hz to 86 kHz
Otariid pinnipeds (OW) ( <i>sea lions and fur seals</i> )	Steller sea lions (Western DPS)	60 Hz to 39 kHz

<sup>1</sup>Represents the generalized hearing range for the entire group as a composite (i.e., all species within the group), where individual species’ hearing ranges are typically not as broad. Generalized hearing range chosen based on ~65 db threshold from normalized composite audiogram, with the exception for lower limits for LF cetaceans (Southall et al. 2007) and PW pinniped (approximation).

These acoustic thresholds are presented using dual metrics of cumulative sound exposure level (L<sub>E</sub>) and peak sound level (PK) for impulsive sounds and L<sub>E</sub> for non-impulsive sounds.

Level A harassment radii can be calculated using the optional user spreadsheet<sup>8</sup> associated with NMFS Acoustic Guidance, or through modeling.

The MMPA defines “harassment” as: any act of pursuit, torment, or annoyance which: (i) has the potential to injure a marine mammal or marine mammal stock in the wild [Level A harassment]; or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [Level B harassment]” (16 U.S.C. § 1362(18)(A)).

While the ESA does not define “harass,” NMFS issued guidance interpreting the term “harass” under the ESA as to: “create the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering” (Wieting 2016). For purposes of this consultation, any exposure to Level A or Level B disturbance sound thresholds under the MMPA constitutes an incidental “take” under the ESA and must be authorized by the ITS (Section 10 of this opinion) (except that

<sup>8</sup> The Optional User Spreadsheet can be downloaded from the following website:  
<http://www.nmfs.noaa.gov/pr/acoustics/guidelines.htm>

take is not prohibited for species proposed for listing under the ESA, or for threatened species that do not have ESA section 4(d) regulations).

As described below in Section 5.2, we expect that Mexico DPS humpback whales and WDPS Steller sea lion exposures to noise associated with the proposed action may result in disturbance (Level B harassment). No auditory injury, serious injury, or mortalities are expected as a result of this project.

### 6.1.3 Major Stressors on Sunflower Sea Stars

New permanent and temporary pilings will come in contact with the benthic environment prior to being driven. In addition, marine invertebrates such as mussels and barnacles, have likely settled and grown on the pilings that will be removed as part of the action description. These are prey items for sunflower sea stars, and it is possible that a few individual sea stars will be attracted onto the pilings prior to the pilings' removal.

Activities impacting the benthic environment due to pile driving and removal may interact with sunflower sea stars on the sea floor or on the pilings that will be removed. Pilings could potentially come in contact with sea stars, or sunflower sea stars could be brought to the surface on pilings when they are removed from the water.

These activities have the potential to directly impact (e.g., harm, wound, kill, collect) sunflower sea stars, as well as impacting sunflower sea star habitat. The potential for an individual sunflower sea star to be hit by a pile during installation or removal is possible. The proposed project would install sets of piles in each phase. In Phase I, twelve temporary, 16-inch diameter piles will be installed and removed. Phase I will also install ten, 16-in and sixteen, 24-in permanent piles. In Phase II, six temporary, 16-inch diameter piles will be installed and removed. Phase II will also install six, 24-in permanent piles. The area covered per pile and the total area covered by each pile type are summarized in Table 6-3.

**Table 6-3. Summary of piles to be installed for the Sitka seaplane base and the total seafloor area to be impacted for each pile type and phase. Temporary piles are listed in italics.**

Number of Piles	Diameter (in)	Area/Pile (ft <sup>2</sup> )	Area/pile (m <sup>2</sup> )	Total Area (ft <sup>2</sup> )	Total area (m <sup>2</sup> )
<b>Phase I</b>					
12	16	1.40	<i>0.13</i>	16.76	1.56
<i>12</i>	<i>16</i>	<i>1.40</i>	<i>0.13</i>	<i>16.76</i>	<i>1.56</i>
10	16	1.40	<i>0.13</i>	13.96	1.30
16	24	3.14	<i>0.29</i>	50.27	4.67
				<b>Subtotal Phase I</b>	<b>9.09</b>
<b>Phase II</b>					
6	16	1.40	<i>0.13</i>	8.38	0.78
<i>6</i>	<i>16</i>	<i>1.40</i>	<i>0.13</i>	<i>8.38</i>	<i>0.78</i>
6	24	3.14	<i>0.29</i>	18.85	1.75

Number of Piles	Diameter (in)	Area/Pile (ft <sup>2</sup> )	Area/pile (m <sup>2</sup> )	Total Area (ft <sup>2</sup> )	Total area (m <sup>2</sup> )
				<b>Subtotal Phase II</b>	<b>3.31</b>
				<b>Total</b>	<b>11.40</b>

Based on surveys conducted in 2022 (Lowry 2023), the estimated density of sunflower sea stars present pre-pandemic, and the estimated decline in the population, the expected density in the action area would be 0.002-sunflower sea star per m<sup>2</sup>, and less than 0.018 sea star would be likely to be impacted in the 9.09 m<sup>2</sup> affected by the Phase I pile driving and removal. Similarly, less than 0.01 sea star would be likely to be impacted in the 3.31 m<sup>2</sup> affected by the Phase II pile driving and removal. Therefore, NMFS concurs with the CBS conclusion that it would be highly unlikely for there to be any adverse effects to sunflower sea stars within the action area where benthic disturbance due to pile driving would occur (See Lowry et al. 2022).

Although it is unlikely that sea stars will be adversely affected by the pile driving, the project will also fill areas below the HTL. Excavated materials from above the HTL would be placed below the HTL to develop the seaplane base uplands. The fill will be placed using an excavator and dozer and then compacted using a vibratory soil compactor. The total area of placement of fill below the HTL in Phase I will be 1.6 acres (6,475 m<sup>2</sup>) and in Phase II will be 1.3 acres (5,261 m<sup>2</sup>). Based on surveys conducted in 2022 (Lowry 2023), the estimated density of sunflower sea stars present pre-pandemic and the estimated decline in the population, the expected density in the action area is 0.002-sunflower sea star per m<sup>2</sup>, and approximately 12.95 sea star would be likely to be impacted in the 6,475-m<sup>2</sup> affected by the fill placement in Phase I and 10.5 sea stars would be likely to be impacted in the 5,261-m<sup>2</sup> affected by the fill placement in Phase II. Therefore, NMFS expects a total of 23.47 sea stars to be adversely affected by the fill placement.

### 6.1.3.1 Sea Star Wasting Syndrome

SSWS is the primary threat and stressor to sunflower sea stars across their range. SSWS is thought to be exacerbated by warming ocean temperatures and other climate change related characteristics. A SSWS pandemic occurred across the range of the sunflower sea star from 2013-2017. SSWS is known to occur in sunflower sea stars and other species at smaller geographic and temporal scales and is expected to occur in the future. But the magnitude of future outbreaks is unknown. The pathogen that caused the 2013-2017 SSWS is unknown. As stated above, the draft 2022 Status Review Report for this species identified SSWS as the factor of greatest concern for the species throughout its range, including in the action area.

## **6.2 Exposure Analysis for ESA Listed Species**

Exposure analyses are designed to identify the listed species that are likely to co-occur with these effects in space and time and the nature of that co-occurrence. In this step of our analysis, we estimate the number of individuals that are likely to be exposed to an action's effects and the populations or subpopulations those individuals represent.

While North Pacific right whale, sperm whale, and fin whale have been documented in or near Sitka Sound and Sitka Channel, the temporal and/or spatial occurrence of these species is such that take is not expected to occur, and they are not discussed further beyond the explanation provided here. These species are all considered to be rare (no sightings in recent years) or very rare (no local knowledge of sightings within the project vicinity) within Sitka Sound or near the action area. The take of these species has not been requested nor is proposed to be authorized and these species are not considered further in this document.

As discussed in Section 2.1.4 above, CBS proposed mitigation measures that should avoid or minimize exposure of listed species to one or more stressors from the proposed action.

### **6.2.1 Exposure to Noise from Pile Driving Activities**

NMFS expects that humpback whales, Steller sea lions, and the sunflower sea star, will be exposed to underwater noise from pile driving activities (including vibratory pile removal, impact and vibratory pile driving, and DTH). However, as stated above we don't expect any response from the sunflower sea star from the exposure. Possible responses by Mexico DPS humpback whales and WDPS Steller sea lions to the sound produced by pile driving activities include:

- Physical Responses
  - Temporary or permanent hearing impairment (threshold shifts)
  - Non-auditory physiological effects
- Behavioral responses

For this analysis we estimated exposure by considering: 1) acoustic thresholds above which the best available science indicates listed marine mammals will be behaviorally harassed or incur some degree of hearing impairment; 2) the area that will be ensonified above these levels in a day; 3) the expected density or occurrence of listed marine mammals within these ensonified areas; and 4) the number of days of activities.

#### **6.2.1.1 Distances to Level A and Level B sound thresholds**

Here, we describe operational and environmental parameters of the activity that are used in estimating the area ensonified above the acoustic thresholds, including source levels and the transmission loss coefficient.

The sound field in the project area is the existing background noise plus additional construction noise from the proposed project. Marine mammals are expected to be affected via sound generated by the primary components of the project (*i.e.*, impact pile driving, vibratory pile driving and removal, and DTH).

The intensity of pile driving sounds is greatly influenced by factors such as the type of piles (material and diameter), hammer type, and the physical environment (*e.g.*, sediment type) in which the activity takes place.

**Table 6-4. Summary of In-Water Pile Driving and Removal Proxy Levels (10 m)**

Pile Type	Installation Method	Peak SPL (dB re 1 $\mu$ Pa)	RMS SPL (dB re 1 $\mu$ Pa)	SEL <sub>ss</sub> (dB re 1 $\mu$ Pa <sup>2</sup> sec)	Reference levels
16-inch steel piles	Vibratory hammer	NA	161	NA	CALTRANS (2020), Navy (2015)
24-inch steel piles	Vibratory hammer	NA	161	NA	Navy (2015)
16-inch steel piles	Impact hammer	200	185	175	CALTRANS (2020)
24-inch steel piles	Impact hammer	203	190	177	CALTRANS (2015, 2020)
16-inch rock sockets	DTH system	172	167	146	Heyvaert and Reyff (2021), Guan and Miner 2020.
24-inch rock sockets	DTH system	184	167	159	Heyvaert and Reyff (2021)
Notes: NMFS conservatively assumes that noise levels during vibratory pile removal are the same as those during installation for the same type and size pile; all SPLs are unattenuated and represent the SPL referenced at a distance of 10 m from the source; NA = Not applicable; dB re 1 $\mu$ Pa = decibels (dB) referenced to a pressure of 1 micropascal					

All Level B harassment isopleths are reported in Table 6-5 considering RMS SPLs and the

default TL coefficient for practical spreading loss (*i.e.*,  $15 * \text{Log}_{10}(\text{range})$ ). Landforms (including causeways, breakwaters, islands, and other land masses) impede the transmission of underwater sound and create shadows behind them where sound from construction is not audible. At Sitka Channel, Level B harassment isopleths from the project will be blocked by the Channel Rock breakwaters, small islands to the northwest and southeast, and the coastline along Baranof Island northwest of the project site. The maximum distance that a harassment isopleth can extend due to these land masses is 8,500 m.

The ensonified area associated with Level A harassment is technically challenging to predict due to the need to account for a duration component. Therefore, NMFS developed an optional User Spreadsheet tool to accompany the Technical Guidance (NMFS 2018a) that can be used to relatively simply predict an isopleth distance for use in conjunction with marine mammal density or occurrence to help predict potential exposure. We note that because of some of the assumptions included in the methods underlying this optional tool, we expect that the resulting isopleth estimates are typically going to be overestimates of some degree, which may result in an overestimate of potential take by Level A harassment under the MMPA. However, this optional tool offers the best way to estimate isopleth distances when more sophisticated modeling methods are not available or practical. For stationary sources (such as from impact pile driving, vibratory pile driving, and DTH), the optional User Spreadsheet tool predicts the distance at which, if a marine mammal remained at that distance for the duration of the activity, it would be expected to incur PTS. The resulting estimated isopleths are reported in Table 6-5.

**Table 6-5. Distances to Level A Harassment and Level B Harassment Thresholds Per Pile Type and Installation Method for Phase I and Phase II.**

Activity	Pile Size	Minutes (min) or strikes per pile	Piles per day	Level A harassment distance (m) <sup>1</sup>					Level B harassment distance (m) all hearing groups
				LF	MF	HF	Phocid	Otariids	
Vibratory Installation	16- inch	10 min	6	6.8	0.6	10.1	4.2	0.3	5,412
	24-inch	10 <sup>2</sup> min	6 <sup>1</sup>	6.8	0.6	10.1	4.2	0.3	
Vibratory Removal	16-inch	10 min	6	6.8	0.6	10.1	4.2	0.3	5,412
Impact Installation	16-inch	175 strikes	4	231	8.2	275	123	9	464.2
	24-inch	175 strikes	4	313	11.1	373	168	12.2	1,000
DTH (Rock Socket) <sup>2</sup>	16-inch	36,000 strikes	2	59	2.1	70.3	31.6	2.3	8,500 <sup>3</sup>
	24-inch	54,000 strikes	2	568.9	20.2	677.6	304.4	22.2	

<sup>1</sup> Cetaceans: LF= low frequency, MF=Mid-frequency, HF= High frequency; Pinnipeds (underwater): Phocids, Otariids  
<sup>2</sup> A maximum scenario was calculated for this activity.  
<sup>3</sup> The calculated Level B harassment zone is 13,594 m. However, the farthest distance that sound will transmit from the source is 8,500 m before transmission is stopped by landmasses.

## 6.2.2 Marine Mammal Occurrence and Exposure Estimates

In this section we provide information about the occurrence of marine mammals, including density or other relevant information that will inform the exposure calculations. We also describe how this information is synthesized to produce a quantitative estimate of exposure that is reasonably likely to occur. Although construction is currently planned to begin in summer 2024 and extend for two years, unexpected delays associated with construction can occur. To account for this uncertainty, the following exposure estimates assume that construction will occur during the periods of peak abundance for those species for which abundance varies seasonally.

Daily occurrence probability of each marine mammal species in the action area is based on consultation with previous monitoring reports, local researchers and marine professionals. Occurrence probability estimates are based on conservative density approximations for each species and factor in historic data of occurrence, seasonality, and group size in Sitka Sound and Sitka Channel. A summary of proposed occurrence is shown in Table 6-6. To accurately describe species occurrence near the action area, marine mammals were described as either common (species sighted consistently during all monitoring efforts in the project vicinity, assume one to two groups per day), frequent (species sighted with some consistency during most monitoring efforts in the project vicinity, assume one group per week), or infrequent (species sighted occasionally during a few monitoring efforts in the project vicinity, assume one group per 2 weeks).

**Table 6-6. Estimated Occurrence of Group Sightings of Listed Marine Mammal Species in and around the Sitka Channel and Sitka Sound.**

Species	Frequency	Average Group Size	Expected Occurrence	Avg. Individuals/ Week
Humpback whale	Frequent	3.4	1 group/ week	3.4
Steller sea lion <sup>2</sup>	Common	2.0	1-2 groups/ day	14-28

<sup>1</sup>Likelihood of one group/ day in the Level A harassment zone and likelihood of two groups/day in the level B harassment zone.

While Steller sea lions do not have large Level A harassment zones, they are frequently sighted in the project area and therefore have some potential for auditory injury. Expected take of Steller sea lion by Level A harassment would likely occur only incidental to DTH drilling, due to the larger Level A harassment zones for these activities. See Table 6-5.

Additionally, for listed species that are large and/or infrequent (gray whale and humpback whale) in Sitka Sound and are unlikely to be within the breakwaters where the proposed action will take place, take by Level B harassment is only anticipated to occur incidental to vibratory and DTH

methods, given the larger Level B harassment zones which will extend beyond the breakwaters.

Table 6-7 provides more detail on our estimate of the total number of listed species individuals likely to be exposed to the sound levels capable of Level A or B harassment.

In summary, based on the observed occurrence of Steller sea lions in the Sitka Channel area, we expect that 22 individuals are likely to be exposed to sound levels capable of Level A harassment and 160 individuals are likely to be exposed to Level B harassment during the two phases of the project.

Based on the observed occurrence of humpback whales in the Sitka Channel area, we expect that no individuals are likely to be exposed to sound levels capable of Level A harassment and 14 individuals are likely to be exposed to Level B harassment during the two phases of the project.

**Table 6-7. Listed Species Occurrence and Estimated Exposure to Level A and B Harassment due to Sound for the Sitka Sea Plane Base Project, Phases I and II.**

Species	Frequency	Group Size Range	Average Group Size	Expected occurrence	Activities Leading to Exposure	Total Days of Construction	Estimated Individuals Exposed
<b>Phase I- 2024</b>							
<b>Level A Harassment Exposure</b>							
Steller sea lion	Common	1-8	2.0	2 groups/ day	DTH	8	16
<b>Level B Harassment Exposure</b>							
Humpback whale	Frequent	1-10	3.4	1 group/ week	Vibratory pile/ DTH	21.4	11
Steller sea lion	Common	1-8	2.0	2 groups/ day	All	30.9	123.6
<b>Phase II-2025</b>							
<b>Level A Harassment Exposure</b>							
Steller sea lion	Common	1-8	2.0	1 group/ day	DTH	3	6
<b>Level B Harassment Exposure</b>							
Humpback whale	Frequent	1-10	3.4	1 group/ week	Vibratory pile/ DTH	6	3
Steller sea lion	Common	1-8	2.0	2 groups/ day	All	9	36

### 6.3 Response Analysis to Sound

Response analyses determine how listed species / critical habitats are likely to respond after being exposed to an action's effects on the environment or directly on listed species themselves. Our assessments try to detect the probability of lethal responses, physical damage, physiological responses (particular stress responses), behavioral responses, and social responses that might result in reducing the fitness of listed individuals. Ideally, our response analyses consider and weigh evidence of adverse consequences, beneficial consequences, or the absence of such consequences.

Loud underwater noise can result in physical effects on the marine environment that can affect marine organisms. Possible responses by Mexico DPS humpback whales and WDPS Steller sea lions to the impulsive and non-impulsive sound produced by pile installation and removal and vessel noise include:

- Physical Response
  - Temporary or permanent hearing impairment (threshold shifts)
  - Non-auditory physiological effects
- Behavioral responses
  - Auditory interference (masking)
  - Tolerance or habituation
  - Change in dive, respiration, or feeding behavior
  - Change in vocalizations
  - Avoidance or displacement
  - Vigilance
  - Startle or fleeing/flight

As described in the *Exposure Analysis*, the Mexico DPS of humpback whales and WDPS of Steller sea lions are expected to occur in the action area and are expected to overlap with noise associated with pile installation and removal activities. We assume that some individuals are likely to be exposed and respond to these impulsive and non-impulsive noise sources.

To calculate expected take of listed species, the exposure estimates are weighted based on calculated percentages of population for each distinct population segment (DPS), assuming that animals present would follow the probability of presence in the project area. Based on surveys and analysis conducted by Hastings et al. (2020), an estimated 2.2 percent of Steller sea lions in the vicinity of the project are Western DPS Steller sea lions and the remaining 97.8 percent are Eastern DPS Steller sea lions. Therefore, we expect no Western DPS Steller sea lions to be included in the estimated Steller sea lions exposed to Level A harassment and three Western DPS Steller sea lions to be included in the estimated Steller sea lions exposed to Level B harassment.

Similarly, the exposure estimates for humpback whales are weighted based on calculated percentages of population for each DPS, assuming that animals present would follow the probability of presence in the project area. For humpback whales, the probability by stock is 98 percent Hawaii DPS and 2 percent Mexico DPS based on Southeast Alaska estimates from NMFS 2021. Therefore, based on the results of our modeling, we expect less than one Mexico DPS humpback whale to be included in the estimated humpback whales exposed to Level B harassment<sup>9</sup> (Table 6-8).

**Table 6-8. Estimated Individuals Exposed during Construction Activities for the Sitka Sea Plane Base and Calculated Take Estimates for Listed Species**

Species	Activities Leading to Exposure	Total Days of Construction	Estimated Individuals Exposed	Percentage of Listed DPS <sup>1</sup>	Estimated Take of Listed DPS
<b>Phase I- 2024</b>					
<b>Level A Harassment Take Estimate</b>					
Steller sea lion	DTH	8	<b>16</b>	2.2	<b>0</b>
<b>Level B Harassment Take Estimate</b>					
Humpback whale <sup>2</sup>	Vibratory pile/ DTH	21.4	<b>11</b>	2.0	<b>&lt;1</b>
Steller sea lion	All	30.9	<b>123.6</b>	2.2	<b>2.72</b>
<b>Phase II-2025</b>					
<b>Level A Harassment Take Estimate</b>					
Steller sea lion	DTH	3	<b>6</b>	2.2	<b>0</b>
<b>Level B Harassment Take Estimate</b>					
Humpback whale <sup>2</sup>	Vibratory pile/ DTH	6	<b>3</b>	2.0	<b>&lt;1</b>

<sup>9</sup> ESA listed Mexico DPS humpback whales take calculation resulted in less than 0.5 takes; therefore, no takes are expected or are proposed for authorization.

Species	Activities Leading to Exposure	Total Days of Construction	Estimated Individuals Exposed	Percentage of Listed DPS <sup>1</sup>	Estimated Take of Listed DPS
Steller sea lion	All	9	36	2.2	<1

<sup>1</sup>Take estimates are weighted based on calculated percentages of population for each DPS, assuming animals present would follow same probability of presence in project area. Humpback whale probability by DPS is based on Southeast Alaska estimates from NMFS 2021 (98 percent Hawaii DPS; 2 percent Mexico DPS). Take estimates are weighted based on calculated percentages of population for each DPS, assuming animals present would follow same probability of presence in project area. Steller sea lion probability by DPS is based on Hastings et al (2020) (97.8 percent Eastern DPS; 2.2 percent Western DPS).

<sup>2</sup>ESA listed Mexico DPS humpback whales take calculation resulted in less than 0.5 takes; therefore, no takes are expected or are proposed for authorization.

The introduction of anthropogenic noise into the aquatic environment from pile driving activities is the primary means by which marine mammals may be harassed from CBS’s specified activity. In general, animals exposed to natural or anthropogenic sound may experience physical and physiological effects, ranging in magnitude from none to severe (Southall et al. 2007). In general, exposure to pile driving and removal noise has the potential to result in auditory threshold shifts and behavioral reactions (e.g., avoidance, temporary cessation of foraging and vocalizing, changes in dive behavior). Exposure to anthropogenic noise can also lead to non-observable physiological responses such as an increase in stress hormones. Additional noise in a marine mammal's habitat can mask acoustic cues used by marine mammals to carry out daily functions such as communication and predator and prey detection. The effects of pile driving and removal noise on marine mammals are dependent on several factors, including, but not limited to, sound type (e.g., impulsive vs. non-impulsive), the species, age and sex class (e.g., adult male vs. mom with calf), duration of exposure, the distance between the pile and the animal, received levels, behavior at time of exposure, and previous history with exposure (Wartzok et al. 2003; Southall et al. 2007). Here we discuss physical auditory effects (threshold shifts) followed by behavioral effects.

### 6.3.1 Threshold Shifts

NMFS defines a noise-induced threshold shift (TS) as a change, usually an increase, in the threshold of audibility at a specified frequency or portion of an individual's hearing range above a previously established reference level (NMFS 2018b). In other words, a threshold shift is a hearing impairment and may be temporary (such as ringing in your ears after a loud rock concert), or permanent (such as the loss of the ability to hear certain frequencies or partial or complete deafness). The amount of threshold shift is customarily expressed in dB. As described in NMFS (2018b), there are numerous factors to consider when examining the consequence of TS, including, but not limited to: 1) the signal temporal pattern (e.g., impulsive or non-

impulsive), 2) likelihood an individual would be exposed for a long enough duration or to a high enough level to induce a TS, 3) the magnitude of the TS, 4) time to recovery (seconds to minutes or hours to days), 5) the frequency range of the exposure (i.e., spectral content), 6) the hearing and vocalization frequency range of the exposed species relative to the signal's frequency spectrum (i.e., how and animal uses sound within the frequency band of the signal; e.g., Kastelein et al. 2014), and 7) the overlap between the animal and the sound source (e.g., spatial, temporal, and spectral).

### **6.3.1.1 Temporary Threshold Shift (TTS)**

TTS is the mildest form of hearing impairment that can occur during exposure to a strong sound (Kryter 1970). While experiencing TTS, the hearing threshold rises, and a sound must be stronger in order to be heard. In terrestrial mammals, TTS can last from minutes or hours to days (in cases of strong TTS). For sound exposures at or somewhat above the TTS threshold, hearing sensitivity in both terrestrial and marine mammals recovers rapidly after exposure to the sound ends. Few data exist on the sound levels and durations necessary to elicit mild TTS in marine mammals, and none of the published data describe TTS elicited by exposure to multiple pulses of sound. Available data on TTS in marine mammals are summarized in (Southall et al. 2007).

For low-frequency cetaceans, no behavioral or auditory evoked potential threshold data exist. Therefore, hearing thresholds were estimated by synthesizing information from anatomical measurements, mathematical models of hearing, and animal vocalization frequencies (NMFS 2018b).

Although some Level B exposures may occur during the course of the proposed action, not all instances of Level B take will result in TTS because the estimated noise thresholds for the onset of TTS are conservative. If TTS does occur, it is expected to be mild and temporary and not likely to affect the long-term fitness of the affected individuals.

### **6.3.1.2 Permanent Threshold Shift (PTS)**

When PTS occurs, there is physical damage to the sound receptors in the ear. In severe cases, there can be total or partial deafness, while in other cases the animal has an impaired ability to hear sounds in specific frequency ranges (Kryter 1985). There is no specific evidence that exposure to pulses of sound can cause PTS in any marine mammal. However, given the possibility that mammals close to a sound source can incur TTS, it is possible that some individuals will incur PTS. Single or occasional occurrences of mild TTS are not indicative of permanent auditory damage, but repeated or (in some cases) single exposures to a level well above that causing the onset of TTS might elicit PTS.

Relationships between TTS and PTS thresholds have not been studied in marine mammals but are assumed to be similar to those in humans and other terrestrial mammals, based on anatomical

similarities. PTS might occur at a received sound level at least several decibels above that which induces mild TTS if the animal were exposed to strong sound pulses with rapid rise time. For non-impulsive exposures (i.e., vibratory pile driving), a variety of terrestrial and marine mammal data sources indicate that threshold shift up to 40 to 50 dB may be induced without PTS, and that 40 dB is a conservative upper limit for threshold shift to prevent PTS. An exposure causing 40 dB of TTS is therefore considered equivalent to PTS onset (NMFS 2018b).

For the proposed actions, no exposures are expected at levels resulting in PTS due to estimates of Level A isopleths and mitigation measures to shut down pile driving activities if a humpback whale or Steller sea lion approaches a Level A zone.

### **6.3.2 Non-Auditory Physiological Effects**

Non-auditory physiological effects or injuries that theoretically might occur in marine mammals exposed to strong underwater sound include stress, neurological effects, internal bubble formation, resonance effects, and other types of organ or tissue damage (Cox et al. 2006; Southall et al. 2007). Studies examining such effects are limited. In general, little is known about the potential for pile driving activities to cause auditory impairment or other physical effects in marine mammals. Available data suggest that such effects, if they occur at all, would presumably be limited to short distances from the sound source and to activities that extend over a prolonged period. The available data do not allow identification of a specific exposure level above which non-auditory effects can be expected (Southall et al. 2007) or any meaningful quantitative predictions of the numbers (if any) of marine mammals that might be affected in those ways. Marine mammals that show behavioral avoidance of pile driving, including some odontocetes and some pinnipeds, are especially unlikely to incur auditory impairment or non-auditory physical effects.

An animal's perception of a threat may be sufficient to trigger stress responses consisting of some combination of behavioral responses, autonomic nervous system responses, neuroendocrine responses, or immune responses (Moberg 2000). In many cases, an animal's first and sometimes most economical (in terms of energetic costs) response is behavioral avoidance of the potential stressor. Autonomic nervous system responses to stress typically involve changes in heart rate, blood pressure, and gastrointestinal activity. These responses have a relatively short duration and may or may not have a significant long-term effect on an animal's fitness.

The primary distinction between stress (which is adaptive and does not normally place an animal at risk) and "distress" is the cost of the response. During a stress response, an animal uses glycogen stores that can be quickly replenished once the stress is alleviated. In such circumstances, the cost of the stress response would not pose serious fitness consequences. However, when an animal does not have sufficient energy reserves to satisfy the energetic costs of a stress response, energy resources must be diverted from other functions. This state of

distress will last until the animal replenishes its energetic reserves sufficiently to restore normal function.

Relationships between these physiological mechanisms, animal behavior, and the costs of stress responses are well-studied through controlled experiments and for both laboratory and free-ranging animals (Jessop et al. 2003; Lankford et al. 2005; Crespi et al. 2013). Stress responses due to exposure to anthropogenic sounds or other stressors and their effects on marine mammals have also been reviewed (Fair and Becker 2000; Romano et al. 2002) and, more rarely, studied in wild populations (Romano et al. 2002). For example, Rolland et al. (2012) found that noise reduction from reduced ship traffic in the Bay of Fundy was associated with decreased stress in North Atlantic right whales. During the time following September 11, 2001, shipping traffic and associated ocean noise decreased along the northeastern U.S. This decrease in ocean noise was associated with a significant decline in fecal stress hormones in North Atlantic right whales, suggesting that chronic exposure to increased noise levels, although not acutely injurious, can produce stress (Rolland et al. 2012). These stress hormones returned to their previous level within 24 hours after the resumption of shipping traffic. Exposure to loud noise can also adversely affect reproductive and metabolic physiology (Kight and Swaddle 2011). In a variety of factors, including behavioral and physiological responses, females appear to be more sensitive or respond more strongly than males (Kight and Swaddle 2011).

These and other studies lead to a reasonable expectation that some marine mammals will experience physiological stress responses upon exposure to acoustic stressors and that it is possible that some of these would be classified as “distress.” In addition, any animal experiencing TTS would likely also experience stress responses (NRC 2003)

We expect a small number of humpback whales (no more than 14 individuals) may experience TTS and may experience non-auditory physiological effects from project activities. Of the affected whales, we expect that no more than one humpback whale from the ESA-listed Mexico DPS may experience mild stress responses in reaction to project activities within the Level B zone. However, we expect most humpback whales would leave the ensonified areas to avoid excessive noise and avoid stress. If humpbacks are not displaced and remain in a stressful environment (i.e., within the harassment zone of pile driving activities), we expect the stress response will dissipate shortly after the cessation of pile driving activities. However, in any of the above scenarios, we do not expect significant or long-term harm to individuals from a stress response because of this action.

We expect a larger number of Steller sea lions to be exposed and have the potential to experience TTS and may experience non-auditory physiological effects from project activities due to the higher incidence of them in the project area. We estimate that 160 Steller sea lions are likely to be in the project area during activities capable of producing TTS. Of the affected Steller sea lions, we expect that no more than three Steller sea lions from the ESA-listed Western DPS may

experience mild stress responses in reaction to project activities within the Level B zone. However, we expect most sea lions would leave the ensonified areas to avoid excessive noise and avoid stress. If sea lions are not displaced and remain in a stressful environment (i.e., within the harassment zone of pile driving activities), we expect the stress response will dissipate shortly after the cessation of pile driving activities. However, in any of the above scenarios, we do not expect significant or long-term harm to individuals from a stress response because of this action.

### **6.3.3 Behavioral Responses**

Behavioral responses are influenced by an animal's assessment of whether a potential stressor poses a threat or risk. Behavioral responses may include: changing durations of surfacing and dives, number of blows per surfacing, or moving direction and/or speed; reduced/increased vocal activities; changing/cessation of certain behavioral activities (such as socializing or feeding); visible startle response or aggressive behavior (such as tail/fluke slapping or jaw clapping); avoidance of areas where sound sources are located; and/or flight responses.

Disturbance includes a variety of effects, including subtle changes in behavior, more conspicuous changes in activities, and displacement. Behavioral responses to sound are highly variable and context-specific, and reactions, if any, depend on species, state of maturity, experience, current activity, reproductive state, auditory sensitivity, time of day, and many other factors (Southall et al. 2007).

Habituation can occur when an animal's response to a stimulus wanes with repeated exposure, usually in the absence of unpleasant associated events (Wartzok et al. 2003). Animals are most likely to habituate to sounds that are predictable and unvarying. The opposite process is sensitization, when an unpleasant experience leads to subsequent responses, often in the form of avoidance, at a lower level of exposure. Behavioral state may affect the type of response as well. For example, animals that are resting may show greater behavioral change in response to disturbing sound levels than animals that are highly motivated to remain in an area for feeding (Richardson et al. 1995; NRC 2003; Wartzok et al. 2003).

Controlled experiments with captive marine mammals showed pronounced behavioral reactions, including avoidance of loud sound sources (Ridgway et al. 1997; Finneran et al. 2003). Observed responses of wild marine mammals to loud pulsed sound sources (typically seismic guns or acoustic harassment devices, but also including pile driving) have been varied but often consist of avoidance behavior or other behavioral changes suggesting discomfort (Morton and Symonds 2002; Wartzok et al. 2003; Thorson and Reyff 2006; Nowacek et al. 2007). Responses to non-impulsive sound, such as vibratory pile installation, have not been documented as fully as responses to pulsed sounds.

The biological significance of many of these behavioral disturbances is difficult to predict, especially if the detected disturbances appear minor. However, the consequences of behavioral modification could be biologically significant if the change affects growth, survival, or fitness. Significant behavioral modifications that could potentially lead to effects on growth, survival, or fitness include:

- Drastic changes in diving/surfacing patterns (such as those thought to cause beaked whale stranding due to exposure to military mid-frequency tactical sonar);
- Longer-term habitat abandonment due to loss of desirable acoustic environment;
- Longer-term cessation of feeding or social interaction; and
- Cow/calf separation.

The onset of behavioral disturbance from anthropogenic sound depends on both external factors (characteristics of sound sources and their paths) and the specific characteristics of the receiving animals (hearing, motivation, experience, demography), and is difficult to predict (Southall et al. 2007).

#### **6.3.4 Masking**

Natural and artificial sounds can disrupt behavior by masking, or interfering with, a marine mammal's ability to hear other sounds. Masking occurs when the receipt of a sound is interfered with by another coincident sound at similar frequencies and at similar or higher levels. Chronic exposure to excessive, though not high-intensity, sound could cause masking at particular frequencies for marine mammals that utilize sound for vital biological functions. Masking can interfere with detection of acoustic signals such as communication calls, echolocation sounds, and environmental sounds important to marine mammals. Therefore, under certain circumstances, marine mammals whose acoustical sensors or environment are being severely masked could also be impaired from maximizing their performance or fitness in survival and reproduction. If the coincident (masking) sound were anthropogenic, it could be potentially harassing if it disrupted hearing-related behavior. It is important to distinguish TTS and PTS, which persist after the sound exposure, from masking, which occurs only during the sound exposure. Because masking (without resulting in threshold shift) is not associated with abnormal physiological function, it is not considered a physiological effect, but rather a potential behavioral effect.

Masking occurs at the frequency band the animals utilize, so the frequency range of the potentially masking sound is important in determining any potential behavioral impacts. Lower frequency man-made sounds are more likely to affect detection of communication calls and other potentially important natural sounds such as surf and prey sound. Anthropogenic sounds may also affect communication signals when both occur in the same sound band and thus reduce the

communication space of animals (Clark et al. 2009) and cause increased stress levels (Foote et al. 2004; Holt et al. 2009).

Masking has the potential to affect species at the population or community levels as well as at individual levels. Masking affects both senders and receivers of the signals and can potentially have long-term chronic effects on marine mammal species and populations. Research suggests that low frequency ambient sound levels have increased by as much as 20 dB (more than a three-fold increase in terms of SPL) in the world's ocean from pre-industrial periods, and that most of these increases are from distant shipping (Hildebrand 2009). All anthropogenic sound sources, such as those from vessel traffic, pile driving, and dredging activities, contribute to the elevated ambient sound levels, thus intensifying masking.

Noise from pile driving activities is relatively short-term. It is possible that pile driving noise or vessel noise resulting from this proposed action may mask acoustic signals important to Mexico DPS humpback whales and WDPS Steller sea lions, but the limited affected area and infrequent occurrence of humpback whales in the action area would result in insignificant impacts from masking.

Masking is likely less of a concern for Steller sea lions, which vocalize both in air and water and do not echolocate or communicate with complex underwater “songs”. Any masking event that could possibly rise to MMPA Level B harassment of sea lions would occur concurrently within the zones of behavioral harassment already estimated for pile driving activities, which have already been taken into account in the Exposure Analysis

The Sitka SPB project will occur in a moderately busy area, where vessel sounds and dock activity already occur. Pile driving will increase the noise levels, but as explained in section 6.2.1, the pattern of pile driving will be episodic; there will be significant amounts of time when pile driving is not occurring.

### **6.3.5 Effect of Sound on Sunflower Sea Stars**

While there is a paucity of literature on the effects of loud underwater sounds on sunflower sea stars, there are a few studies that look at the effects of loud sounds on other echinoderms. We do not know whether sunflower sea stars possess underwater vibration receptors that could be affected by loud sounds. However, sea stars do not have gas bladders, as most fish do. With no gas bladder, the number of ways a sunflower sea star could be affected by pile removal/driving and DTH sound is limited. The consensus of the available studies is that continuous loud sound exposure (>140 dB) can cause echinoderms such as sea urchins to have increased levels of stress related hormones (Vazzana et al. 2020; Solé et al. 2023). However, there is no information about whether the increase in these hormones has any impact on the behavior or survival of echinoderms. Furthermore, there are currently no studies that suggest sea stars, or more

specifically sunflower sea stars, have this response. Therefore, we conclude that, based on the best scientific and commercial data available, adverse effects of acoustic disturbance from pile removal and installation activities on sunflower sea stars will be insignificant, if there are any effects at all.

### 6.3.6 Response Analysis Summary

Probable responses of humpback whales and Steller sea lions to pile removal, installation, and DTH include TTS, increased stress, and/or short-term behavioral disturbance reactions such as changes in activity and vocalizations, masking, avoidance or displacement, or tolerance. These reactions and behavioral changes are expected to be temporary and subside quickly when the exposure ceases. The primary mechanism by which these behavioral changes may affect the fitness of individual animals is through the animals' energy budget, time budget, or both (the two are related because foraging requires time).

Large whales such as humpbacks have the ability to store substantial amounts of energy, which allows them to survive for months on stored energy during migration and while in their wintering areas, and their feeding patterns allow them to acquire energy at high rates. Sitka Channel has not been identified as important foraging habitat for humpback whales, and the proposed activities are not expected to displace foraging whales. Because humpbacks are not expected to be feeding in the action area, there is little incentive for them to remain in the action area while the disturbance is occurring.

With proper implementation of the mitigation measures and shutdown procedures described in Section 2.2, we expect that no Mexico DPS humpback whales or WDPS Steller sea lions will be exposed to noise levels loud enough, long enough, or at distances close enough for the proposed action to cause Level A harassment. More detail on the calculations for exposure and take estimates is provided in the *Incidental Take Statement* (See Table 10-1). We expect no more than 1 exposure of Mexico DPS humpback whales and no more than 3 exposures of WDPS Steller sea lions to noise levels sufficient to cause Level B harassment, as described in Section 6.2.2. All Level B instances of take are expected to occur at received levels greater than 120 dB or 160 dB for non-impulsive and impulsive noise sources, respectively.

We expect most animals would leave the area during pile driving activities if they were disturbed. The individual and cumulative energy costs of the behavioral responses we have discussed are not likely to increase the energy budgets of humpback whales and Steller sea lions, and their probable exposure to sound sources are not likely to reduce their fitness.

## 7 CUMULATIVE EFFECTS

“Cumulative effects” are those effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area (50 CFR § 402.02). Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

We searched for information on non-Federal actions reasonably certain to occur in the action area. We did not find any information about non-Federal actions other than what has already been described in the Environmental Baseline (Section 5 of this Opinion). Some continuing non-Federal activities are reasonably certain to contribute to climate change within the action area. However, it is difficult if not impossible to distinguish between the action area’s future environmental conditions caused by global climate change that are properly part of the environmental baseline versus cumulative effects. Therefore, all relevant future climate-related environmental conditions in the action area are described in the Environmental Baseline (Section 5).

Reasonably foreseeable future state, local, or private actions are hard to predict, but the main actions include activities that relate to vessel traffic and commercial fishing.

The Sitka Sound Seafood Plant was built in 1981 to replace the Seafood Producer’s Cooperative facility near Seward, which was destroyed in the 1964 earthquake. The Sitka facility provides seafood processing support services for Seafood Producer’s Cooperative member fishermen. Depending on the volume of salmon that trollers offload at the facility, fish are either flown to Seattle from Sitka SPB, or get shipped on a freezer container by ferry to Ketchikan and from there to Seattle.

Vessel traffic is expected to continue in the area. It is unknown whether overall vessel traffic or shipping will increase in the future, as this depends largely on economics, tourism, and other factors, but it is unlikely to decrease significantly. As a result, there will be continued risk to marine mammals of ship strikes, exposure to vessel noise and presence, and small spills.

Fishing, a major industry in southeast Alaska, is expected to continue in the area. As a result, there will be continued risk to marine mammals of prey competition, ship strikes, harassment, and entanglement in fishing gear. NMFS assumes that ADFG will continue to manage fish stocks and monitor and regulate fishing under their jurisdiction to maintain sustainable stocks. It remains unknown whether, and to what extent, marine mammal prey may be less available due to commercial, subsistence, personal use, and sport fishing. In addition, we do not know the full extent of the effects of fishing vessel traffic on availability of prey to listed species.

## **8 INTEGRATION AND SYNTHESIS**

The Integration and Synthesis section is the final step of NMFS's assessment of the risk posed to species and critical habitat as a result of implementing the proposed action. In this section, we add the effects of the action (Section 5) to the environmental baseline (Section 4) and the cumulative effects (Section 6) to formulate the agency's biological opinion as to whether the proposed action is likely to: (1) result in appreciable reductions in the likelihood of both the survival or recovery of the species in the wild by reducing its numbers, reproduction, or distribution; or (2) result in the adverse modification or destruction of critical habitat as measured through direct or indirect alterations that appreciably diminish the value of designated critical habitat as a whole for the conservation of the species. These assessments are made in full consideration of the status of the species (Section 3).

We begin our risk analyses by asking whether the probable physical, physiological, behavioral, or social responses of endangered or threatened species are likely to reduce the fitness of endangered or threatened individuals or the growth, annual survival or reproductive success, or lifetime reproductive success of those individuals.

As part of our risk analyses, we identified and addressed all potential stressors and considered all consequences of exposing listed species to all the stressors associated with the proposed action, individually and cumulatively, given that the individuals in the action area for this consultation are also exposed to other stressors in the action area and elsewhere in their geographic range.

### **8.1 Mexico DPS Humpback Whale Risk Analysis**

Based on the results of the exposure and response analyses, we expect a maximum of 14 instances of Level B harassment of humpback whales by noise from pile driving activities (impact, vibratory, and DTH), and two percent (<1 individual) of those instances of harassment of humpback whales are expected to affect whales from the threatened Mexico DPS (See Table 6-8). Exposure to vessel noise from transit and potential for vessel strike may occur, but adverse effects from vessel disturbance and noise are likely to be negligible due to the small marginal increase in such activities relative to the environmental baseline and the transitory nature of vessels. Adverse effects from vessel strike are considered extremely unlikely because of the few additional vessels introduced by the action, slow speeds within Sitka Channel, and the unlikelihood of these type of interactions. Disturbance to seafloor, habitat, and prey resources are not expected to adversely affect humpback whales because these disturbances are temporary, and the action area is not important habitat to humpback whales for foraging, migrating, breeding, or other essential life functions. Mitigation measures and adherence to Clean Water Act regulations are expected to minimize the risk of exposure of humpback whales to the potential introduction of pollutants into the action area.

As discussed in the *Proposed Action* and *Status of the Species* sections, this action does not overlap in space or time with humpback whale breeding. Some Mexico DPS humpback whales feed in Southeast Alaska in the summer and fall months and migrate to Mexican waters for breeding and calving in the late winter months. As a result, the probable responses to pile driving and removal noise are not likely to reduce the current or expected future reproductive success of Mexico DPS humpback whales or reduce the rates at which they grow, mature, or become reproductively active.

Therefore, these exposures are not likely to reduce the abundance, reproduction rates, or growth rates (or increase variance in one or more of these rates) of the populations those individuals represent. The short duration of sound generation and the implementation of mitigation measures to reduce exposure to high levels of sound reduce the likelihood that exposure would cause a behavioral response that may affect vital functions, or cause TTS or PTS. Additionally, when considered in conjunction with the effects of the proposed action, cumulative effects of future state or private activities in the action area are likely to affect humpback whales at a level comparable to present. The current and recent population trends for humpback whales in Southeast Alaska indicate that these levels of activity are not hindering population growth.

We do not expect the effects of the proposed project activities combined with the existing activities described in the *Environmental Baseline* (Section 5) and the cumulative effects (Section 7) to hinder population growth of Mexico DPS humpback whales. As a result, this project is not likely to appreciably reduce Mexico DPS humpback whales' likelihood of surviving or recovering in the wild.

## **8.2 WDPS Steller Sea Lion Risk Analysis**

Based on the results of the exposure and response analyses, we expect a maximum of 22 instances of Level A harassment of Steller sea lions by noise from pile driving activities (impact, vibratory, and DTH), and 2.2 percent (<1 individual) of those instances of harassment of Steller sea lions are expected to affect individuals from the endangered Western DPS (See Table 6-8).

In addition, we expect a maximum of 160 instances of Level B harassment of Steller sea lions by noise from pile driving activities (impact, vibratory, and DTH), and 2.2 percent (<3 individuals) of those instances of harassment of Steller sea lions are expected to affect individuals from the endangered Western DPS (See Table 6-8). These estimates represent the maximum number of takes that may be expected to occur, but not necessarily the number of individuals taken, as a single individual may be taken multiple times over the course of the proposed action. Sound from pile removal and installation activities is likely to cause some individual Steller sea lions to experience changes in their behavioral states that might have adverse consequences (Frid and Dill 2002). However, these responses are not likely to alter the physiology, behavioral ecology, or social dynamics of individual Steller sea lions in ways or to a degree that would reduce their

fitness.

Commercial fishing likely affects prey availability throughout much of the WDPS's range and causes a small number of direct mortalities each year. Predation has been considered a threat to this DPS and may remain so in the future. Subsistence hunting occurs at fairly low levels for this DPS. Illegal shooting is also a continuing threat, but the number of illegally shot sea lions found in the region to date is relatively low and has not precluded or measurably delayed recovery of the species.

Exposure to non-biodegradable marine debris, specifically to debris that can cause entanglement, remains an unquantifiable risk, but associated effects from this project will be immeasurably small. Best practices regarding waste management (cutting loops prior to disposal) will further reduce the impact of debris on Steller sea lions. Any increases in turbidity or seafloor disturbance will be temporary and localized, and have an immeasurably small effect, if any, upon Steller sea lions. Based on the localized nature of small oil spills, the relatively rapid weathering expected, and the safeguards in place to avoid and minimize oil spills, we conclude that the probability of the proposed action causing a small oil spill and exposing WDPS Steller sea lions is extremely small, and thus the effects are considered highly unlikely to occur.

Exposure to vessel noise and presence, seafloor disturbance and turbidity, and small oil spills may occur, but such exposure will have a very small impact, and we conclude that these stressors will not result in take of Steller sea lions. The temporary increase in ship traffic due to the proposed action is unlikely to result in a vessel strike. Project vessels will be traveling at slow speeds, the increase in vessel traffic will be small, and vessel strike is not considered a significant concern for Steller sea lions (only four reports of potential vessel strikes involving Steller sea lions have been reported in Alaska).

It is difficult to estimate the behavioral responses, if any, that WDPS Steller sea lions may exhibit to underwater sounds generated by project activities. Though the sounds produced during project activities may not greatly exceed levels that Steller sea lions already experience in Sitka Channel, the sources proposed for use in this project are not among sounds to which they are commonly exposed. In response to project-related sounds, some Steller sea lions may move out of the area or change from one behavioral state to another, while other Steller sea lions may exhibit no apparent behavioral changes at all.

The primary mechanism by which behavioral changes may affect the fitness of individual animals is through the animal's energy budget, time budget, or both. Most adult Steller sea lions occupy rookeries during the pupping and breeding season, which extends from late May to early July (NMFS 2008a). There are no rookeries and the closest haulout is more than 20 km (12 mi) southwest of the proposed action area. The natural surrounding geography will make it highly unlikely that project-related sound will reach this haulout. The individual and cumulative energy

costs of the behavioral responses we have discussed are not likely to measurably reduce the energy budgets of Steller sea lions in the action area.

The probable responses (i.e., tolerance, avoidance, short-term masking, and short-term vigilance behavior) to close approaches by vessel operations and their probable exposure to sound from pile removal and installation activities are not likely to reduce the current or expected future reproductive success or reduce the rates at which Steller sea lions grow, mature, or become reproductively active. Therefore, these exposures are not likely to reduce the abundance, reproduction rates, or survival and growth rates of the population those individuals represent.

The implementation of mitigation measures (including shutdown zones) to reduce exposure to high levels of sound decreases the likelihood of a behavioral response that may affect vital functions, or cause TTS or PTS of Steller sea lions. Based on the best information currently available, we do not expect the effects of the proposed project activities combined with the existing activities described in the Environmental Baseline (Section 5) and the cumulative effects (Section 7) to hinder population growth of WDPS Steller sea lions. As a result, this project is not likely to appreciably reduce WDPS Steller sea lions' likelihood of surviving or recovering in the wild.

As mentioned in the Environmental Baseline section, and similar to what was discussed for humpback whales in the previous section, WDPS Steller sea lions may be impacted by a number of anthropogenic activities present in Sitka Channel. Human activity, especially within the harbor area, has produced a number of anthropogenic risk factors that marine mammals must contend with, including: coastal and marine development, oil and gas development, ship strikes, sound pollution, water pollution, prey reduction, fisheries, tourism, and research. These risk factors are in addition to those operating on a larger scale such as predation, disease, and climate change. WDPS Steller sea lions may be affected by multiple threats at any given time, compounding the impacts of the individual threats. All of these activities are expected to continue to occur into the foreseeable future.

### **8.3 Sunflower Sea Star Risk Analysis**

Our consideration of probable exposures and responses of proposed threatened sunflower sea stars to construction activities associated with the proposed action is designed to help us assess whether those activities are likely to increase the extinction risk or jeopardize the continued existence of the species.

Effects from exposure to in-air noise, in-water noise, and vessel use are likely negligible due to the lack of expected responses from sea stars to these potential stressors. Effects from disturbance to the benthic environment and pilings and fill where sunflower sea stars may be located are expected to occur at a minor level. The agreed upon mitigations including pre-work

surveys will reduce the likelihood of a sea star being impacted by fill or pile placement. We calculated that approximately 0.025 sea stars might be struck by direct pile contact.

Sea stars may also be impacted by direct human contact during pre-construction site inspections or crushed by fill placement. If a sea star is found in the vicinity of a pile that will be removed or installed, it will be moved out of the work area. If a sea star is found during surveys prior to fill placement (covering approximately 2.9 acres [11,736 m<sup>2</sup>]), it will be moved out of the work area. Assuming a density of 0.002 sea stars/ m<sup>2</sup> (Lowry 2023), we estimate that a maximum of ~24 sea stars could be impacted by direct human contact during the proposed activities.

The primary threat to sunflower sea stars identified in the draft Status Review Report (Lowry 2022) and proposed rule to list the sunflower sea star as threatened (88 FR 16212; March 16, 2023), is sea star wasting syndrome (SSWS). Based on our analysis, no aspect of the proposed action is expected to increase the prevalence of SSWS in sunflower sea stars.

The geographic scope of this project is small relative to the entire range of the species. Habitat and prey impacts for the sunflower sea star are extremely small. Due to the limited geographic and temporal scope of the project, we do not expect significant increases in vulnerability to a SSWS pandemic as a result of the proposed action. The number of individuals that will be affected is very small relative to the estimated population of sunflower sea stars (over 600 million) (Lowry 2022). Based on some evidence of recent recruitment and localized abundance increases, the current coastal construction regime in Alaska does not appear to be limiting sunflower sea star recovery. Based on the best information currently available, we do not expect the effects of the proposed project activities combined with the existing activities described in the Environmental Baseline (Section 5) and the cumulative effects (Section 7) to hinder population growth of sunflower sea stars. As a result, this project is not likely to appreciably reduce sunflower sea stars' likelihood of surviving or recovering in the wild.

## 9 CONCLUSION

Section 7(a)(2) of the ESA requires Federal agencies, in consultation with NMFS, to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species, or adversely modify or destroy their designated critical habitat. The jeopardy analysis considers both survival and recovery of the species. The adverse modification analysis considers the impacts to the conservation value of the designated critical habitat.

To jeopardize the continued existence of a listed species means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR § 402.02). As NMFS explained when it promulgated this

definition, NMFS considers the likely impacts to a species' survival as well as likely impacts to its recovery. Further, it is possible that in certain, exceptional circumstances, injury to recovery alone may result in a jeopardy biological opinion (51 FR 19926, 19934; June 3, 1986).

After reviewing the current status of the listed species, the environmental baseline within the action area, the effects of the proposed action, and cumulative effects, it is NMFS's biological opinion that the proposed action is not likely to jeopardize the continued existence of Mexico DPS humpback whales, WDPS Steller sea lions, and sunflower sea stars. Further, it is NMFS's biological opinion that the proposed action is not likely to adversely affect WNP DPS humpback whales, fin whales, North Pacific right whales, sperm whales, or destroy or adversely modify designated critical habitat for North Pacific right whale, Mexico DPS humpback whale, or Steller sea lion. No critical habitat has been designated for fin or sperm whales, and none is currently proposed for sunflower sea stars, therefore none will be affected.

This concludes the conference for the Sitka Seaplane Base project. You may ask NMFS to confirm the conference opinion as a biological opinion issued through formal consultation if the species is listed. The request must be in writing. If NMFS reviews the proposed action and finds that there have been no significant changes in the action as planned or in the information used during the conference, NMFS will confirm the conference opinion as the biological opinion on the project and no further section 7 consultation will be necessary.

## **10 INCIDENTAL TAKE STATEMENT**

Section 9 of the ESA prohibits the take of endangered species unless there is a special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct (16 U.S.C. § 1532(19)). "Incidental take" is defined as take that results from, but is not the purpose of, the carrying out of an otherwise lawful activity conducted by the action agency or applicant (50 CFR § 402.02). Based on NMFS guidance, the term "harass" under the ESA means to: "create the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering" (Wieting 2016). The MMPA defines "harassment" as: any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild [Level A harassment]; or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [Level B harassment] (16 U.S.C. § 1362(18)(A)(i) and (ii)). For this consultation, NMFS and PR1 expect that take will be by both Level A and Level B harassment.

The ESA does not prohibit the take of threatened species unless special regulations have been

promulgated, pursuant to ESA section 4(d), to promote the conservation of the species. Federal regulations promulgated pursuant to section 4(d) of the ESA extend the section 9 prohibitions to the take of Mexico DPS humpback whales (50 CFR § 223.213). ESA section 4(d) rules have not been proposed for the sunflower sea star; therefore, ESA section 9 take prohibitions may not apply to this species. This ITS includes numeric limits on the take of sunflower sea stars because specific amounts of take were analyzed in our jeopardy analysis. These numeric limits provide guidance to the action agency on its requirement to re-initiate consultation if the amount of take estimated in the jeopardy analysis of this biological opinion is exceeded. This ITS includes reasonable and prudent measures and terms and conditions designed to minimize and monitor take of this proposed-threatened species.

Under the terms of section 7(b)(4) and section 7(o)(2) of the ESA, taking that is incidental to an otherwise lawful agency action is not considered to be prohibited taking under the ESA, provided that such taking is in compliance with the terms and conditions of an Incidental Take Statement (ITS).

Section 7(b)(4)(C) of the ESA provides that if an endangered or threatened marine mammal is involved, the taking must first be authorized by section 101(a)(5) of the MMPA. Accordingly, **the terms of this incidental take statement and the exemption from section 9 of the ESA become effective only upon the issuance of MMPA authorization to take the marine mammals identified here.** Absent such authorization, this incidental take statement is inoperative.

The terms and conditions described below must be implemented in order for take authorization of this Incidental Take Statement to be valid, and are nondiscretionary. CBS and PR1 have a continuing duty to regulate the activities covered by this ITS. In order to monitor the impact of incidental take, CBS and PR1 must monitor and report on the progress of the action and its impact on the species as specified in the ITS (50 CFR § 402.14(i)(3)). If CBS or PR1 (1) fails to require the permit holder to adhere to the terms and conditions of the ITS through enforceable terms that are added to the authorization, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

### **10.1 Amount or Extent of Take**

Section 7 regulations require NMFS to estimate the number of individuals that may be taken by proposed actions or utilize a surrogate (e.g., other species, habitat, or ecological conditions) if we cannot assign numerical limits for animals that could be incidentally taken during the course of an action (50 CFR § 402.14(i)(1); see also 80 FR 26832; May 11, 2015).

The taking of Mexico DPS humpback whales and WDPS Steller sea lions will be by incidental (Level B) harassment only and is only anticipated to occur incidental to vibratory and DTH

methods, given the larger Level B harassment zones which will extend beyond the breakwaters. The taking by serious injury or death is prohibited and will result in the modification, suspension, or revocation of the ITS.

While Steller sea lions do not have large Level A harassment zones, they are frequently sighted in the project area within the breakwaters and therefore have some potential for auditory injury. Table 10-1 lists the amount and timing by project phase of authorized take (incidental take by harassment) for this action. The method for estimating the number of listed species exposed to sound levels expected to result in Level A and Level B harassment is described in Section 6.1.2.

Pile driving and DTH activities will be halted as soon as possible when it appears a humpback whale or Steller sea lion is approaching the Level A shutdown zone and before it reaches the Level A isopleth. No Level A take of listed marine mammals is authorized in this biological opinion (Table 10-1).

**Table 10-1. Summary of instances of exposure associated with the proposed pile driving/removal resulting in incidental take of marine mammal DPS by Level A and Level B harassment.**

Species	Stock	Phase 1			Phase 2		
		Level A	Level B	Percent of Stock	Level A	Level B	Percent of Stock
Humpback whale <sup>1</sup>	Hawai'i	0	11	0.1	0	4*	0
	Mexico <sup>2</sup>	0	0	0	0	0	0
Steller sea lion <sup>3</sup>	Eastern US	16	121	0.3	6	35	0.1
	Western US	0	3*	0	0	0	0

<sup>1</sup>Take estimates are weighted based on calculated percentages of population for each DPS, assuming animals present would follow same probability of presence in project area. Humpback whale probability by stock based on Southeast Alaska estimates from NMFS 2021 (98 percent Hawaii DPS; 2 percent Mexico DPS).

<sup>2</sup>ESA listed Mexico humpback whales take calculation resulted in less than 0.5 takes, therefore no takes are expected or are proposed for authorization.

<sup>3</sup>Take estimates are weighted based on calculated percentages of population for each DPS, assuming animals present would follow same probability of presence in project area. Steller sea lion probability by stock based on Hastings et al (2020) (97.8 percent Eastern DPS; 2.2 percent Western DPS).

\*Where proposed calculated take was less than the average group size, the take was rounded up to a group size as that is likely what would be encountered.

### 10.1.1 Amount of Take Associated with Sunflower Sea Stars

Based on the estimated density of sunflower sea stars in the action area and calculations of the area to be affected by pile installation and removal of temporary piles, we expect that less than 0.025 sunflower sea stars in total will be taken due to pile driving in Phase I and Phase II (e.g., harm, wound, kill, collect- see Section 6.2.3).

Based on the estimated density of sunflower sea stars in the action area and calculations of the area to be affected by approximately 2.9 acres of fill placement in the intertidal zone, we expect that less than 24 sunflower sea stars in total will be taken due to fill placement in Phase I and Phase II (e.g., harm, wound, kill, collect - see Section 6.2.3).

**Table 10-2. Summary of instances of exposure associated with the proposed pile driving/removal resulting in incidental take of sunflower sea stars.**

Species	Authorized Non-mammal Takes (animals)
Sunflower sea star ( <i>Pycnopodia helianthoides</i> )	24

### 10.2 Effect of the Take

In Section 9 of this opinion, NMFS determined that the level of expected take, coupled with other effects of the proposed action, is not likely to result in jeopardy to the species.

The takes from the proposed action are associated with behavioral harassment from pile removal/driving and DTH activities. Although the biological significance of behavioral responses remains unknown, this consultation has assumed that exposure to these activities might disrupt one or more behavioral patterns that are essential to an individual animal’s life history. However, any behavioral responses of these whales and pinnipeds to sound sources and any associated disruptions are not expected to affect the fitness of any individuals of these species, the viability of the population, or the species’ survival or recovery.

Humpback whale populations in southeast Alaska are approximately 98 percent Hawaii DPS individuals and two percent Mexico DPS individuals. The current trend of this DPS is unknown, but thought to be declining from a population of ~3,264 individuals (Wade et al. 2016). However, the proposed activities are expected to cause harassment to no more than 14 individual humpback whales, of which less than one would be from the Mexico DPS. The individual and cumulative energy costs of the behavioral responses we have discussed are not likely to increase

the energy budgets of humpback whale individuals, and their probable exposure to these stressors are not likely to reduce their fitness or contribute to population level effects.

Steller sea lions are common in the proposed action area and have been encountered often during previous projects (ABR Inc. 2016). The estimated take for the species is 22 individuals for Level A and 159 individuals for Level B, assuming two to four individuals per day will overlap with project activities during the two phases of work. Only 2.2 percent of the Steller sea lions in the vicinity of the project are expected to be WDPS (Hastings et al. 2020); therefore, the estimated take of the listed DPS are 0 for Level A and 3 for Level B, This level of take accounts for a negligible (0.0) percent of the total DPS, and the action occurs in an area with naturally large amount of human activities and associated sound. Although individual Steller sea lions may experience some level of behavioral disturbance, we do not expect this level of take to have a measurable effect on the population.

We estimate that the proposed activities could affect ~24 sunflower sea stars as they are removed from the shutdown zone prior to in-water work, struck by a pile being installed, or crushed by fill placement. The current range-wide (*i.e.*, global) population estimate for the sunflower sea star is nearly 600 million individuals, based on a compilation of the best available science and information (Gravem et al. 2021). The proposed activities will impact, at most, 0.0000004 percent of the population. Take prohibitions have not been proposed for this species at this point.

### 10.3 Reasonable and Prudent Measures

“Reasonable and prudent measures” are measures that are necessary or appropriate to minimize the impact of the amount or extent of incidental take.” (50 CFR 402.02). Failure to comply with RPMs (and the terms and conditions that implement them) may invalidate the take exemption and result in unauthorized take.

RPMs are distinct from the mitigation measures that are included in the proposed action (described in Section 2.1.4). We presume that the mitigation measures will be implemented as described in this opinion. The failure to do so will constitute a change to the action that may require reinitiation of consultation pursuant to 50 CFR § 402.16.

**NMFS advises the FAA to implement the following reasonable and prudent measures. These measures with their implementing terms and conditions are non-discretionary with respect to Mexico DPS humpback whales and WDPS Steller sea lions. If this conference opinion for sunflower sea stars is adopted as a biological opinion following a listing or designation, these measures that are applicable to sunflower sea stars, with their implementing terms and conditions, will be non-discretionary.**

The RPMs included below, along with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action.

NMFS concludes that the following RPMs are necessary and appropriate to minimize or to monitor the incidental take of Mexico DPS humpback whales, Steller sea lions, and sunflower sea stars resulting from the proposed action.

1. CBS and PR1 must implement a monitoring program that includes all items described in the mitigation measures section of this opinion (Section 2.1.4) and reports the total amount of take as a percentage of the ITS estimate so that NMFS AKR can evaluate the exposure estimates contained in this opinion and that underlie this ITS.
2. CBS and PR1 must submit a final report to NMFS AKR that evaluates the mitigation measures and the results of the monitoring program.

#### **10.4 Terms and Conditions**

In order to be exempt from the prohibitions of section 9 of the ESA, the Federal action agency must comply (or must ensure that any applicant complies) with the following terms and conditions. These terms and conditions are in addition to the mitigation measures included in the proposed action, as set forth in Section 2.1.4 of this opinion. CBS, PR1 or any applicant has a continuing duty to monitor the impacts of incidental take and must report the progress of the action and its impact on the species as specified in this incidental take statement (50 CFR § 402.14(i)(3)).

Any taking that is in compliance with these terms and conditions is not prohibited under the ESA (50 CFR § 402.14(i)(5)). As such, partial compliance with these terms and conditions may invalidate this take exemption and result in unauthorized, prohibited take under the ESA. If the entity to whom a term and condition is directed does not comply with the following terms and conditions, protective coverage for the action may lapse.

These terms and conditions constitute no more than a minor change to the proposed action because they are consistent with the basic design of the proposed action.

To carry out RPM #1, CBS and PR1 must undertake (or require their lessees or permittees to undertake) the following:

- 1.1. The monitoring zones must be fully observed by NMFS-approved PSOs during all in-water work in order to document observed incidents of harassment as described in the mitigation measures associated with this action.
- 1.2. If take of any Steller sea lions totals 80 percent (112 individuals) of the MMPA takes expected for this action, CBS will notify NMFS by email, attention: [leanne.roulson@noaa.gov](mailto:leanne.roulson@noaa.gov), and include [AKR.prd.section7@noaa.gov](mailto:AKR.prd.section7@noaa.gov) in the recipient list, and discuss the need for reinitiation of consultation.

To carry out RPM #2, CBS and PR1 must undertake (or require their lessees or permittees to

undertake) the following:

- 2.1. Adhere to all monitoring and reporting requirements as detailed in the IHA issued by NMFS under section 101(a)(5) of the MMPA.
- 2.2. Adhere to all monitoring and reporting requirements in the IHA and revisions described in this biological opinion.
- 2.3. Submit a project specific report within 90 days of the conclusion of the project that analyzes and summarizes interactions with humpback whales during this project to the Protected Resources Division, NMFS by email to [AKR.prd.records@noaa.gov](mailto:AKR.prd.records@noaa.gov). This report must also contain information described in the mitigation measures located in Section 2.1.4 of this opinion.

## 11 CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of threatened and endangered species. Specifically, conservation recommendations are suggestions regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information (50 CFR § 402.02).

For this proposed action, NMFS suggests the following conservation recommendations:

1. Project vessel crews should participate in the WhaleAlert program to report real-time sightings of whales while transiting in the waters of Southeast Alaska and to minimize the risk of vessel strikes. More information is available at <https://www.fisheries.noaa.gov/resource/tool-app/whale-alert>.
2. Without approaching whales, project vessel crews should attempt to photograph humpback whale flukes and record GPS coordinates of the sightings during transit. These data should be included in the final report submitted to NMFS AKR.
3. Without approaching sea lions, project vessel crews should attempt to photograph Steller sea lions when brand numbers are visible and record GPS coordinates of the sightings during transit. These data should be included in the final report submitted to NMFS AKR.
4. CBS should ensure that the entities responsible for conducting the sunflower sea star surveys have practice and expertise with the methodology they use to conduct the survey, prior to conducting the actual surveys. In addition, CBS should invite PRD biologists to the site when a sunflower sea star survey is being conducted or the equipment to do the survey is being tested to enable PRD to better understand the efficacy of the selected methods and equipment.

5. CBS should publish, or make widely available, a report detailing the methodology used and results of the sunflower sea star surveys conducted as part of this proposed action. Those findings will aid other action agencies and future projects in developing protocols for future surveys and will increase general understanding of sunflower sea star movements and densities, particularly in the Sitka area.

In order to keep NMFS's Protected Resources Division informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, CBS should notify NMFS of any conservation recommendations they implement in their final report.

## **12 REINITIATION OF CONSULTATION**

As provided in 50 CFR § 402.16, reinitiation of consultation is required where discretionary Federal agency involvement or control over the action has been retained or is authorized by law and if: (1) the amount or extent of incidental take is exceeded, (2) new information reveals effects of the agency action on listed species or designated critical habitat in a manner or to an extent not considered in this opinion, (3) the agency action is subsequently modified in a manner that causes an effect on the listed species or critical habitat not considered in this opinion, or 4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount of incidental take is exceeded, section 7 consultation must be reinitiated immediately (50 CFR § 402.14(i)(4)).

## **13 DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW**

Section 515 of the Treasury and General Government Appropriations Act of 2001 (Public Law 106-554) (Data Quality Act (DQA)) specifies three components contributing to the quality of a document. They are utility, integrity, and objectivity. This section of the opinion addresses these DQA components, documents compliance with the DQA, and certifies that this opinion has undergone pre-dissemination review.

### **13.1 Utility**

This document records the results of an interagency consultation. The information presented in this document is useful to CBS, PR1, and the general public. These consultations help to fulfill multiple legal obligations of the named agencies. The information is also useful and of interest to the general public as it describes the manner in which public trust resources are being managed and conserved. The information presented in these documents and used in the underlying consultations represents the best available scientific and commercial information and has been

improved through interaction with the consulting agency.

This consultation will be posted on the NMFS Alaska Region website <http://alaskafisheries.noaa.gov/pr/biological-opinions/>. The format and name adhere to conventional standards for style.

### **13.2 Integrity**

This consultation was completed on a computer system managed by NMFS in accordance with relevant information technology security policies and standards set out in Appendix III, 'Security of Automated Information Resources,' Office of Management and Budget Circular A-130; the Computer Security Act; and the Government Information Security Reform Act.

### **13.3 Objectivity**

**Standards:** This consultation and supporting documents are clear, concise, complete, and unbiased; and were developed using commonly accepted scientific research methods. They adhere to published standards including the ESA Consultation Handbook, ESA Regulations, 50 CFR § 402.01 et seq.

**Best Available Information:** This consultation and supporting documents use the best available information, as referenced in the literature cited section. The analyses in this opinion contain more background on information sources and quality.

**Referencing:** All supporting materials, information, data and analyses are properly referenced, consistent with standard scientific referencing style.

**Review Process:** This consultation was drafted by NMFS staff with training in ESA implementation, and reviewed in accordance with Alaska Region ESA quality control and assurance processes.

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August 11, 2023

David Gann  
National Oceanic and Atmospheric Administration National Marine Fisheries Service  
Alaska Regional Office, Protected Resources Division  
709 W. 9<sup>th</sup> St.  
Juneau, AK 99802

Subject: **Sitka Seaplane Base Project**  
**City and Borough of Sitka, Alaska**

Dear Mr. Gann:

The City and Borough of Sitka is proposing to construct a new seaplane base (SPB) in Sitka Channel on the northern shore of Japonski Island in Sitka, Alaska. The Federal Aviation Administration (FAA) has designated Solstice Alaska Consulting, Inc. as its non-Federal representative to consult with National Marine Fisheries Service under the Endangered Species Act (ESA) for the project.

Please find the attached biological assessment for the proposed Sitka SPB. The findings are presented as a biological assessment of aquatic species listed under Section 7 of the 1973 ESA, as amended (16 U.S.C. 1531 et seq.). The ESA Section 7 consultation process for this project was previously initiated in 2021, and is now being reinitiated as the project design has changed and construction is scheduled to begin in 2024. The new SPB would replace the existing SPB (FAA identifier A29) and would address existing capacity, safety, and condition deficiencies for critical seaplane operations. This project would occur over two phases. Construction of Phase I of the project would occur from July 2024 through July 2025. Construction of Phase II would occur from July 2025 through July 2026.

The NMFS endangered species and critical habitat mapper indicates five species of marine mammals listed under the ESA and one species proposed to be listed under the ESA within the project area. We contend that the project is not likely to adversely affect the endangered fin whale, endangered North Pacific right whale, and endangered sperm whale because these species are not expected in the project vicinity and construction would be halted if they were to approach the action area. The proposed action may affect, and is likely to adversely affect, the threatened Mexico distinct population segment (DPS) of humpback whale, the endangered Western DPS of Steller sea lion, and proposed threatened sunflower sea star. Based on our analysis documented in the BA, we find that the project is not likely to result in destruction or adverse modification of designated critical habitat for any species.

We look forward to working with you and your staff to answer any questions you may have about this application. Please feel free to contact Natalie Kiley-Bergen at 907-929-5960 or via email at [natalie@solsticeak.com](mailto:natalie@solsticeak.com) with additional questions.

Sincerely,



Robin Reich, President  
Solstice Alaska Consulting, Inc.

Enclosed:

Sitka Seaplane Base Project Biological Assessment  
Sitka Seaplane Base Project Action Area Geodatabase



**Endangered Species Act Section 7 Biological Assessment  
for Listed Species under the Jurisdiction of the  
National Marine Fisheries Service**

**City and Borough of Sitka**

**Sitka Seaplane Base**

**Sitka Channel, Sitka, Alaska**

August 2023

Revised October 2023

Prepared for:  
City and Borough of Sitka  
6100 Lincoln St.  
Sitka, AK 99835

Prepared by:



2607 Fairbanks Street, Suite B  
Anchorage, Alaska 99503

Submitted to:  
National Marine Fisheries Service

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**APPENDICES**

Appendix A. Sitka Seaplane Base Project Drawings

Appendix B. Sitka Seaplane Base Project Threshold Calculation Spreadsheets

Appendix C. Sitka Seaplane Base Project Protected Species Monitoring and Mitigation Plan

**ACRONYMS AND ABBREVIATIONS**

μPa	microPascal
ACS	American Cetacean Society
ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish and Game
ANSI	American National Standards Institute
BA	Biological Assessment
BIA	Biologically Important Area
BMP	Best Management Practice
CBS	City and Borough of Sitka
CV	critical value
CY	cubic yards
dB	decibels
DPS	distinct population segment
DTH	down-the-hole
EDPS	eastern distinct population segment
EFH	Essential Fish Habitat
ESA	Endangered Species Act
ESCA	Endangered Species Conservation Act
FAA	Federal Aviation Administration
GPIP	Gary Paxton Industrial Park
hp	horsepower
HTL	high tide line
Hz	hertz
IHA	Incidental Harassment Authorization
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for the Conservation of Nature
kHz	kilohertz
lb	pound
LE	cumulative sound exposure level
LF	low-frequency
Lpk	peak sound pressure level
MHW	mean high water
MLLW	mean lower low water
MMPA	Marine Mammal Protection Act

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NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
OW	otariid pinnipeds
PRD	Protected Resources Division
PBR	potential biological removal
PR1	Permits and Conservation Division
PSMMP	Protected Species Monitoring and Mitigation Plan
PSO	protected species observer
PTS	permanent threshold shift
rms	root mean square
SEARHC	Southeast Alaska Regional Health Consortium
SEL	sound exposure level
SolsticeAK	Solstice Alaska Consulting Inc.
SSWS	sea star wasting syndrome
SPB	Seaplane Base
SPL	sound pressure level
TS	threshold shift
TTS	temporary threshold shift
Turnagain	Turnagain Marine Construction
UME	unusual mortality event
U.S.	United States
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WDPS	western distinct population segment
Windward	Windward Project Solutions

## **EXECUTIVE SUMMARY**

### **ACTIONS AND PARTICIPANTS**

This Biological Assessment (BA) for the City and Borough of Sitka's (CBS's) Sitka Seaplane Base (SPB) Project is being provided in compliance with Section 7(a)(2) of the Endangered Species Act (ESA) of 1973. Section 7 establishes procedures designed to ensure continued existence of listed species and minimize the destruction or adverse modification of designated critical habitat for those species regulated under the ESA. Under Section 7(a)(2) of the ESA, projects considered to be a Federal action are required to consult with National Oceanic and Atmospheric Association's (NOAA's) National Marine Fisheries Service (NMFS) on all actions, or proposed actions, authorized, funded, or undertaken by the agency that may adversely affect listed species.

For this BA the action agencies and their proposed actions for the project are:

- NMFS Alaska Region Protected Resources Division (PRD) would determine whether the proposed action would jeopardize the continued existence of a listed species or adversely modify critical habitat under their jurisdiction of the ESA and issue a Biological Opinion.
- NMFS Office of Protected Resources Permits and Conservation Division (PR1) proposed issuance of an Incidental Harassment Authorization (IHA) to take marine mammals by harassment under the Marine Mammal Protection Act (MMPA) incidental to construction of the project.
- United States (U.S.) Army Corps of Engineers (USACE), Alaska District proposed issuance of a Rivers and Harbors Act Section 10 and Clean Water Act Section 404 permit for the project.

Additional roles and agency involvement include the following:

- The applicant is CBS.
- The non-Federal representative is Solstice Alaska Consulting, Inc. (SolsticeAK).
- Under a separate process, U.S. Fish and Wildlife Service (USFWS) – Alaska Marine Mammals Management Office proposed issuance of an IHA to take marine mammals under USFWS jurisdiction by harassment incidental to construction of the project pursuant to the MMPA.

### **PROJECT SUMMARY**

CBS is proposing to construct a new SPB in Sitka Channel on the northern shore of Japonski Island in Sitka, Alaska. The new SPB would replace the existing SPB (Federal Aviation Administration [FAA] identifier A29) currently located on the eastern shore of Sitka Channel, near Eliason Harbor and downtown Sitka. The new SPB would address existing capacity, safety, and condition deficiencies for critical seaplane operations, and allow seaplanes to transit Sitka Channel more safely.

The project would consist of several components, completed over two phases:

The following components are proposed for Phase I (construction from July 2024 through July 2025):

- Seaplane ramp float
- Drive-down float
- Pedestrian and vehicle transfer bridge
- Approach dock
- Uplands approach, storage area, and parking

The following components are proposed for Phase II (construction from July 2025 through July 2026):

- Transient seaplane float
- Turnaround float
- Expanded uplands approach, storage area, and parking
- Drive-down launch ramp

### **SPECIES, LISTING STATUS, DETERMINATION**

Construction includes the installation of piles, excavating, and placement of fill in marine waters that support several marine mammal species. Pile driving may result in auditory injury (Level A harassment) and behavioral harassment (Level B harassment) of select marine mammal species.

The proposed action has the potential to affect the ESA-listed endangered western distinct population segment (WDPS, DPS) Steller sea lion (*Eumetopias jubatus*), threatened Mexico DPS humpback whales (*Megaptera novaeangliae*), endangered sperm whale (*Physeter macrocephalus*), endangered fin whale (*Balaenoptera physalus*), and endangered North Pacific right whale (*Eubalaena japonica*) (Table 1). There is no critical habitat for WDPS Steller sea lions in the project action area (NMFS 2023). This project also has the potential to affect the sunflower sea star (*Pycnopodia helianthoides*) which are proposed to be listed as threatened under ESA (proposed March 16, 2023).

In conjunction with this BA, CBS is applying for a two phase IHA that includes take of 2 WDPS Steller sea lions by Level A harassment and 4 WDPS Steller sea lion and 2 Mexico DPS humpback whale by Level B harassment. No take of any other ESA-listed species is proposed.

**Table 1. Sitka SPB Project NMFS ESA-Listed Species, Status, and Determination of Effects**

<b>ESA-Listed Species</b>	<b>Status</b>	<b>Species Determination</b>	<b>Critical Habitat</b>	<b>Critical Habitat Determination</b>
WDPS Steller Sea Lion ( <i>Eumetopias jubatus</i> )	Endangered	Likely to Adversely Affect	Designated	No Effect
Mexico DPS Humpback Whale ( <i>Megaptera novaeangliae</i> )	Threatened	Likely to Adversely Affect	Designated	No Effect
Sperm Whale ( <i>Physeter macrocephalus</i> )	Endangered	Not Likely to Adversely Affect	Not Designated	No Effect
Fin Whale ( <i>Balaenoptera physalus</i> )	Endangered	Not Likely to Adversely Affect	Not Designated	No Effect

<b>ESA-Listed Species</b>	<b>Status</b>	<b>Species Determination</b>	<b>Critical Habitat</b>	<b>Critical Habitat Determination</b>
North Pacific Right Whale ( <i>Eubalaena japonica</i> )	Endangered	Not Likely to Adversely Affect	Designated	No Effect
Sunflower Sea Star ( <i>Pycnopodia helianthoides</i> )	Threatened (Proposed)	Likely to Adversely Affect	Not Designated	No Effect

# 1 PROJECT DESCRIPTION

## 1.1 PROJECT LOCATION

The proposed CBS SPB would be located on the north shore of Japonski Island, along the western side of Sitka Channel, approximately 1.5 miles north of downtown Sitka in Southeast Alaska. The project is located in Township 55S, Range 63E, Sections 34 and 35, Copper River Meridian, and within U.S. Geologic Survey Quad Map Sitka A at latitude 57.0568 and longitude -135.3595 (Figure 1; Figure 2; Earthpoint 2020). Sitka Channel is the main route to access Sitka by boat, a commonly used method of transportation in Southeast Alaska, and experiences high levels of marine traffic daily.

The proposed project would be located within the Channel Rock Breakwaters in the Sitka Channel spanning between Japonski Island and Baranof Island. The Channel Rock Breakwaters provide protection for the harbor and other facilities and structures located throughout the channel. Sitka Channel is about 150 feet wide and about 22 feet deep at its narrowest (NOAA 2020). The mean tide range is 7.7 feet, the diurnal tide range is 9.94 feet, and the extreme range is 18.98 feet (NOAA 2020a). Sitka Channel connects to the larger Sitka Sound, an active fishery and transportation corridor.

**Figure 1. Sitka SPB Project Vicinity**



**Figure 2. Sitka SPB Project Location**

## 1.2 PROJECT PURPOSE

The purpose of this project is to construct a new SPB to address capacity, safety, operational, and condition deficiencies at the existing Sitka SPB. This project is needed to support critical seaplane operations and transportation in Southeast Alaska, to resolve existing seaplane and boat conflicts, and to replace the existing base (A29) which is 65 years old and in poor condition.

Since Sitka is not connected to the larger road system, Sitka's intrastate transportation infrastructure includes the Alaska Marine Highway System, the Sitka Airport, and seaplanes and other charter options (CBS 2020). Sitka functions as a central transit hub for more remote communities in Southeast Alaska, and seaplanes are an essential element of transportation for that system. Some communities in the southern portion of Southeast Alaska are without land runways and only have seaplane bases for aviation infrastructure. Within this subregional network of airports, A29 serves as an access hub to essential medical services, facilitates access to a statewide aviation system through Sitka Rocky Gutierrez Airport, and expands retail opportunities for multiple communities (DOWL 2016). Transportation infrastructure is essential for the safety and security of these communities, and deficiencies at the existing SPB are limiting the efficient use of seaplane resources in and around Sitka.

The first SPB in Alaska was established in 1937 on Japonski Island, and built by the U.S. Navy (CBS 2018). With a long history in the region, seaplanes continue to serve Sitka's local economy, particularly the fishery and tourism sectors. As a vibrant community only accessible by water or air, seaplanes facilitate both local and regional transportation. Forecasted growth of seaplane traffic in Sitka projects continued seaplane use and associated facility demands (DOWL 2016). Demand for the existing SPB exceeds capacity, and at times, the facility has had a multi-year waitlist with up to seven additional pilots seeking slip access (DOWL 2016). Given the deteriorated condition of the docks, only some slips are desirable to lease. Pilots have been concerned for multiple years over the condition of the dock, and some minimize use of the facility over concerns that unstable structures could damage aircraft.

CBS identified the need for a new SPB in 2002, and the planning process progressed as conditions at the facility continued to degrade. In 2002, CBS completed a Sitka SPB Master Plan to assess the need for a new SPB and identify a new facility and location (HDR Alaska, Inc. 2002). In 2012, CBS completed a siting analysis to reevaluate SPB sites; CBS confirmed Japonski Island as the recommended location (DOWL HKM 2012). In 2016, CBS conducted another siting analysis which confirmed aviation stakeholder interest, resolved FAA funding concerns, and provided an economic impact study (DOWL 2016). CBS has now received funding for planning and environmental review for the new SPB (CBS 2019).

The existing Sitka SPB, A29, is at the end of its useful life and has several shortcomings, including limited docking capacity. A29 has only eight spaces, four of which cannot be accessed during low tide. The facility is deteriorating after pilings collapsed and temporarily closed the SPB in January 2016 requiring costly municipal maintenance (DOWL 2016). The facility is expensive to maintain and its location introduces wildlife conflicts with a nearby seafood processing plant and requires pilots to navigate a channel busy with ship traffic. Additionally, A29 lacks essential SPB infrastructure and is inadequate for commercial traffic because it lacks sufficient vehicle parking and on-site aircraft maintenance, and does not have a drive-down ramp, passenger shelter, or equipment storage (DOWL 2016).

Both commercial and non-commercial seaplanes need expanded base access. Currently, there is competition for slip access between commercial and non-commercial operators. Given current capacity limitations, commercial operators require approval from the Harbormaster to pick up passengers at A29 (DOWL 2016). There is only one slip accessible to transient pilots; all other slips are leased full time. Occasionally, boats are tied to the dock and float ramp, further impeding seaplane access to the base (AirNav 2020).

In addition to demand exceeding current capacity, A29 lacks an adequate sea lane for landing and takeoff hindering aircraft operation and causing boat traffic safety concerns. The existing site's proximity to Sitka Sound Seafoods fish processing plant has created additional wildlife conflicts. The failing docks also pose a safety hazard to pilots and passengers during loading, unloading, and walking to shore.

The project's proposed location would resolve many of these existing obstacles. While the A29 SPB is located adjacent to a fish processing plant, the proposed SPB location on Japonski Island is over 3,000 feet away, reducing aircraft hazards associated with seabirds that congregate in the vicinity of fish processing plants (DOWL 2016). The proposed SPB location should also

reduce conflicts with marine vessels during landing and takeoff since takeoff, landing, and taxi operations would be relocated to a wider, less congested section of Sitka Channel than the existing sea lane. The proposed SPB would improve safety by relocating seaplane operations away from downtown and out of the heaviest traffic area of Sitka Channel.

## 1.3 PROPOSED ACTION

### 1.3.1 CONSTRUCTION COMPONENTS

The two construction phases of Sitka SPB Project are detailed below (see also the figures provided in Appendix A).

Under Phase I (Figure 3; Table 2), the proposed project would:

- Construct and install the following pile-supported components:
  - 80-foot by 24-foot approach dock
  - 120-foot by 12-foot pedestrian and vehicle transfer bridge
  - 128-foot by 68-foot drive-down float
  - 417-foot by 46-foot seaplane ramp float to support 10 Cessna and 4 Beaver seaplane berths
- Install and remove 12 temporary 16-inch-diameter steel piles as templates to guide proper installation of permanent piles (these temporary piles would be removed prior to project completion) (Table 3).
- Install 10 permanent 16-inch-diameter galvanized steel piles and 16 permanent 24-inch-diameter galvanized steel piles to support the approach dock, pedestrian and vehicle transfer bridge, bridge landing and drive-down float, and seaplane ramp float (Table 3).
- Install other SPB float components such as electricity connections, waterlines, lighting, passenger walkway, hand rail, and mast lights.
- Conduct rock blasting and excavation of about 10,100 cubic yards (CY) of material extending from about 16 to 60 vertical feet above mean lower low water (MLLW; 0.00 datum) located at the end of the Seward Avenue in the southwest corner of the project uplands.
  - All blasting and excavating would occur above high tide line (HTL; +13 feet).
  - Rock blasting and excavation would extend approximately 200 horizontal feet inland.
  - One blasting event per day on 47 days (not consecutive) at an estimated 90 decibels (dB; at the blast center) per event (Southeast Earth Movers 2020).
- Construct 2.6 acres of uplands including bridge abutment, vehicle turnaround, parking, basic amenities, curb, vehicle driveway, security fencing, and landscape buffer (Figure 5).
  - Discharge of 0.03 acres of fill between mean high water (MHW; +9.16 feet) and HTL (+13 feet) and 1.3 acres below MHW.
    - Side slopes of fill would have ratio of 2 horizontal to 1 vertical (2H:1V) slopes with heavy open graded armor rock and interstitial spaces.

Under Phase II (Figure 4; Table 2), the proposed project would:

- Construct and install the following pile-supported components:

- 56-foot by 32-foot vehicle turnaround float
- 144-foot by 56-foot transient float to support 5 transient seaplane berths
- Install and remove 6 temporary 16-inch-diameter steel piles as templates to guide proper installation of permanent piles (these temporary piles would be removed prior to project completion) (Table 3).
- Install 6 permanent 24-inch-diameter galvanized steel piles to support the vehicle turnaround float and transient float (Table 3).
- Install other SPB float components such as bull rail, floating fenders, mooring cleats, electricity connections, waterlines, lighting, passenger walkway, hand rail, and mast lights.
- Add an additional 1.2 acres of supporting infrastructure with the addition of a 183-foot by 34-foot seaplane haul-out ramp, seaplane staging areas, expanded parking, curb, security fencing, landscape buffer, and a covered shelter (Figure 5).
  - Discharge of 0.5 acres of fill between MHW (+9.16 feet) and HTL (+13 feet) and 0.8 acres below MHW.
    - Side slopes of fill would have ratio of 2 horizontal to 1 vertical (2H:1V) slopes with heavy open graded armor rock and interstitial spaces.

**Table 2. Sitka SPB Project Construction Components**

Construction Component	Material	Dimensions (feet)
<b>Phase I</b>		
Approach Dock	Treated timber and galvanized steel	80 x 24
Pedestrian and Vehicle Transfer Bridge	Painted steel w/ galvanized steel grating	120 x 12
Drive-Down Float	Treated timber, galvanized steel, coated polystyrene billets, and polyethylene floatation tubs	128 x 68
Seaplane Ramp Float	Treated timber, galvanized steel, coated polystyrene billets, and polyethylene floatation tubs	417 x 46
Upland Parking Area	Gravel, concrete, riprap	2.6 (acres)
Piles	Galvanized Steel	See Table 3
<b>Phase II</b>		
Vehicle Turn Around Float	Treated timber, galvanized steel, coated polystyrene billets, and polyethylene floatation tubs	32 x 56
Seaplane Transient Float	Treated timber, galvanized steel, coated polystyrene billets, and polyethylene floatation tubs	144 x 56
Seaplane Haul Out Ramp	Gravel, concrete, riprap	183 x 34
Upland Parking Area	Gravel, concrete, riprap	1.2 (acres)
Piles	Galvanized Steel	See Table 3

**Table 3. Sitka SPB Project Pile Installation and Removal Summary**

Project Component	Temp. Pile Install (Steel)	Temp. Pile Remove (Steel)	Permanent Pile Install (Steel)	
Diameter of Piles (inches)	16	16	16	24
<b>Phase I</b>				
Approach Dock	12	12	6	--
Bridge Abutment			4	--
Drive-Down Float			--	6
Seaplane Ramp Float			--	10
<b>Phase I Total</b>	<b>12</b>	<b>12</b>	<b>10</b>	<b>16</b>
<b>Phase II</b>				
Vehicle Turnaround Float	6	6	--	2
Transient Float			--	4
<b>Phase II Total</b>	<b>6</b>	<b>6</b>	<b>0</b>	<b>6</b>
<b>Total number of Piles</b>	<b>18</b>	<b>18</b>	<b>10</b>	<b>22</b>

Figure 3. Sitka SPB Project Proposed Action – Phase I

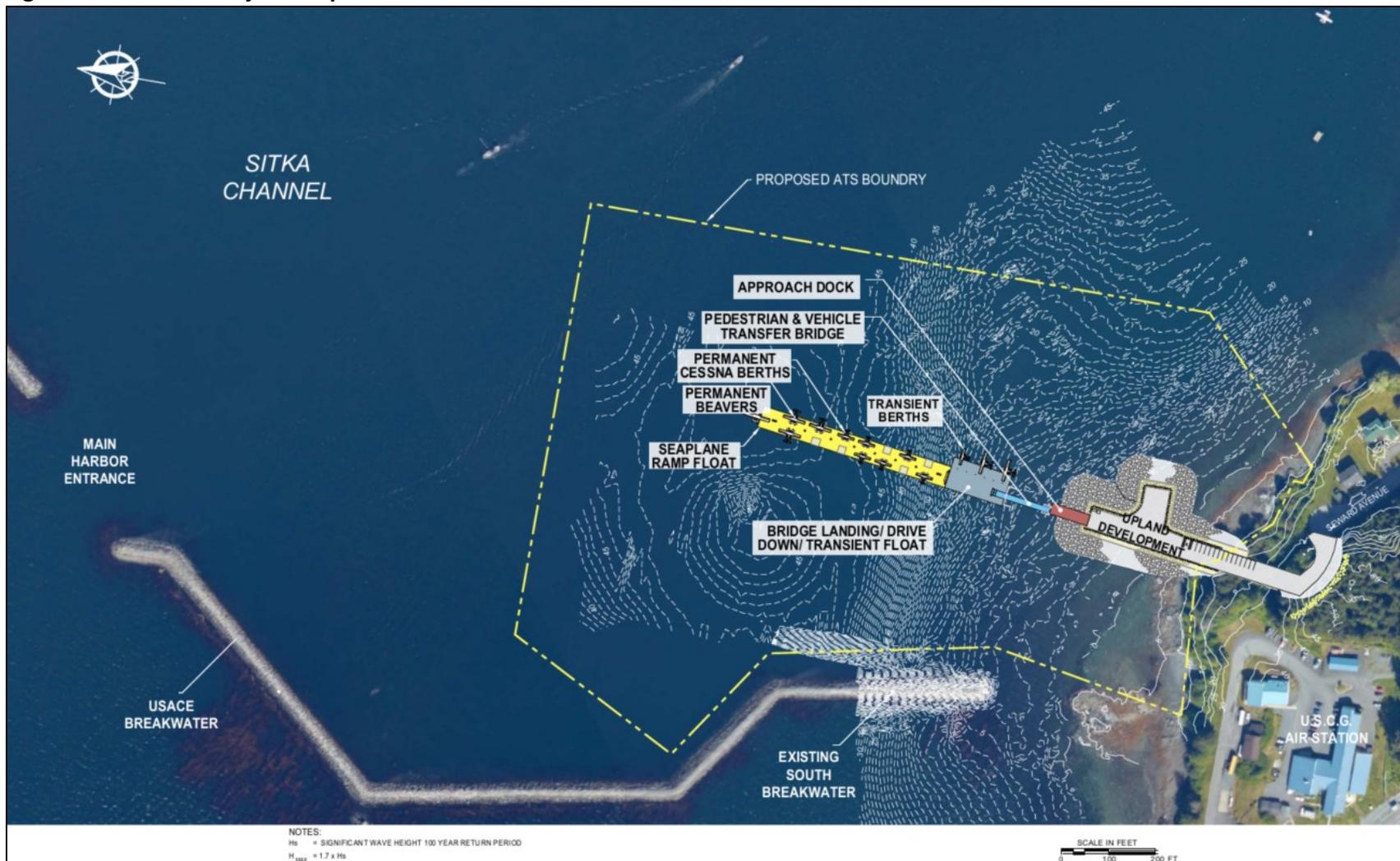


Figure 4. Sitka SPB Project Proposed Action – Phase II

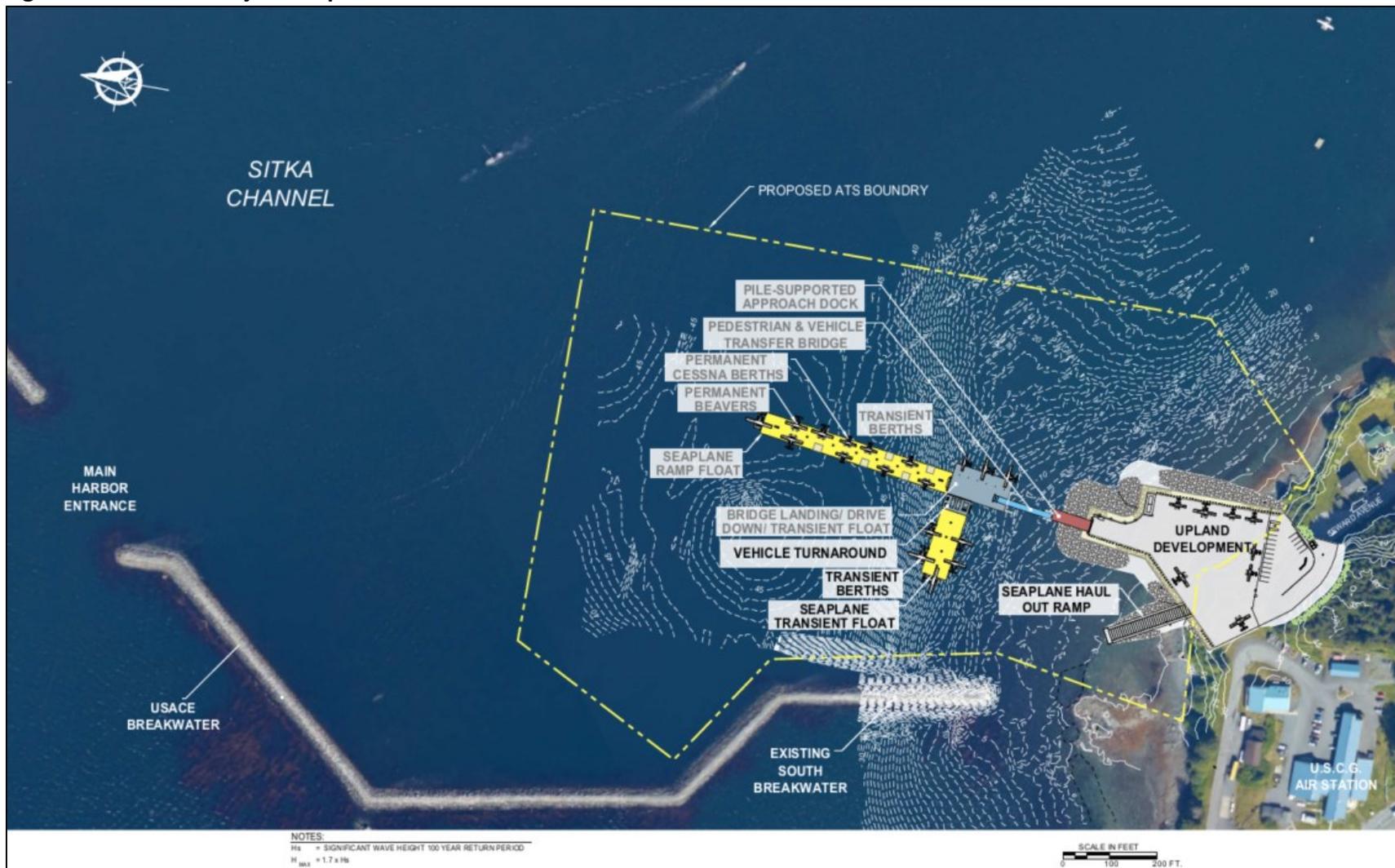
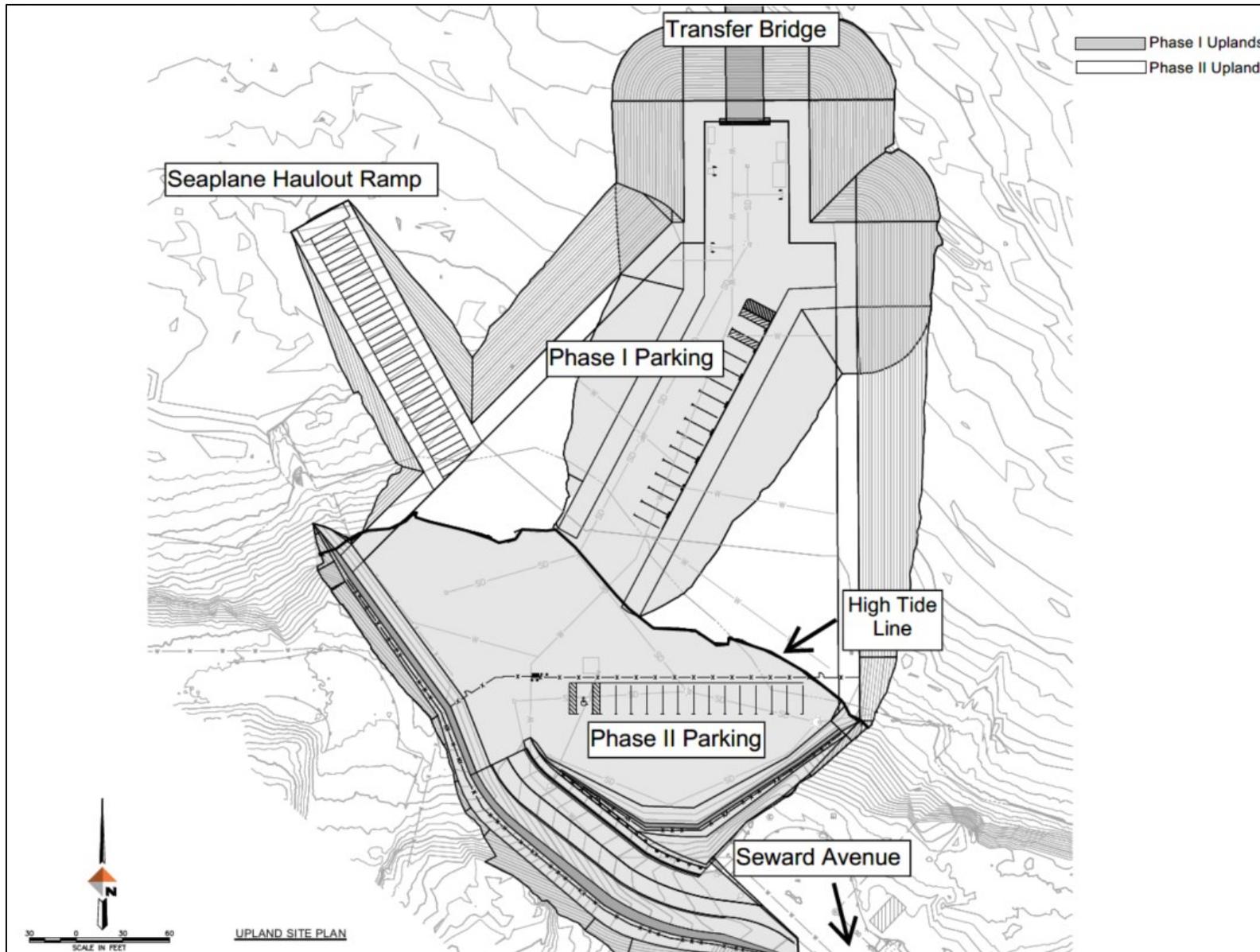


Figure 5. Sitka SPB Project Proposed Action – Phase I & II Uplands



## **1.3.2 CONSTRUCTION METHODS**

### *1.3.2.1 Installation and Removal of Temporary (Template) Piles*

A maximum of 12 temporary 16-inch-diameter piles would be installed and removed using a vibratory hammer and impacting hammer (installation only) to construct the approach dock, bridge abutment, and floats during Phase I. A maximum of 6 temporary 16-inch-diameter piles would be installed and removed using a vibratory hammer and impacting hammer (installation only) in constructing the project floats during Phase II.

### *1.3.2.2 Installation of Permanent Piles*

All permanent 16-inch-diameter and 24-inch-diameter piles would be initially installed with a vibratory hammer. After vibratory driving, piles would be socketed into the bedrock with down-the-hole (DTH) drilling equipment. Finally, piles would be driven the final few inches of embedment with an impact hammer.

Piles at the end of the seaplane ramp float and the corners of the drive-down float would be installed as a steel pipe pile frame for added stability and reinforcement. Please see Table 4 for a conservative estimate of the amount of time required for pile installation and removal.

**Table 4. Sitka SPB Project Pile Installation and Removal Summary – Phase I and Phase II**

Project Component	Temp Install	Temp Remove	Perm Install	Perm Install	Total	Temp Install	Temp Remove	Perm Install	Total	Total
	Phase I					Phase II				I & II
Diameter of Steel Pipe Piles (inches)	16	16	16	24	--	16	16	24	--	--
Total # of Piles	12	12	10	16	--	6	6	6	--	--
<b>Vibratory Pile Driving<sup>1</sup></b>										
Total Quantity	12	12	10	16	--	6	6	6	--	--
Max # Piles Vibrated Per Day	6	6	6	6	--	6	6	6	--	--
Vibratory Time Per Pile (minutes)	10	10	10	10	--	10	10	10	--	--
Vibratory Time Per Day (minutes)	60	60	60	60	--	60	60	60	--	--
Number of Days	2.0	2.0	1.7	2.7	<b>8.4</b>	1.0	1.0	1.0	<b>3.0</b>	<b>11.4</b>
Vibratory Time Total (hours)	2.0	2.0	1.7	2.7	<b>8.4</b>	1.0	1.0	1.0	<b>3.0</b>	<b>11.4</b>
<b>Down-The-Hole Pile Drilling</b>										
Total Quantity	--	--	10	16	--	--	--	6	--	--
Max # of Piles Installed per Day	--	--	2	2	--	--	--	2	--	--
# of Strikes Per Pile	--	--	36,000	54,000	--	--	--	54,000	--	--
# of Strikes Per Second	--	--	10	10	--	--	--	10	--	--
Actual Drilling Time Per Pile (minutes)	--	--	60	90	--	--	--	90	--	--
Time per Day (minutes)	--	--	120	180	--	--	--	180	--	--
Number of Days	--	--	5.0	8.0	<b>13.0</b>	--	--	3.0	<b>3.0</b>	<b>16.0</b>
DTH Drilling Time Total (hours)	--	--	10.0	24.0	<b>34.0</b>	--	--	9.0	<b>9.0</b>	<b>43.0</b>

Project Component	Temp Install	Temp Remove	Perm Install	Perm Install	Total	Temp Install	Temp Remove	Perm Install	Total	Total
	Phase I					Phase II				I & II
<b>Impact Pile Driving</b>										
Total Quantity	12	--	10	16	--	6	--	6	--	--
Max # Piles Impacted Per Day	4	--	4	4	--	4	--	4	--	--
# of Strikes Per Pile	175	--	175	175	--	175	--	175	--	--
Impact Time Per Pile (minutes)	5	--	5	5	--	5	--	5	--	--
Impact Time Per Day (minutes)	20	--	20	20	--	20	--	20	--	--
Number of Days	3.0	--	2.5	4.0	<b>9.5</b>	1.5	--	1.5	<b>3.0</b>	<b>12.5</b>
Impact Time Total (hours)	1.0	--	0.8	1.3	<b>3.1</b>	0.5	--	0.5	<b>1.0</b>	<b>4.1</b>

<sup>1</sup> The total number of days and total time in hours are the same for vibratory pile driving because this IHA request assumes a maximum of 60 minutes (1 hour) of vibratory pile driving per day.

### *1.3.2.1 Other In-water Construction and Heavy Machinery Activities*

In addition to the activities described above, the proposed action would involve other in-water construction and heavy machinery activities. Examples of other types of activities include using standard barges, tug boats, or other equipment to place and position piles on the substrate via a crane (i.e., “stabbing the pile”).

The seaplane floats (constructed elsewhere) would consist of treated timber and galvanized steel fasteners. The submerged timber structural elements of the floats will be pressure treated with creosote because it is the only effective preservative for wood that will always remain wet. All other timber components that will not be fully submerged will be pressure treated with ammoniacal copper zinc arsenate. All preservative treatment will be in accordance with best management practices (BMPs) as set forth by the Western Wood Preservers Institute. Floatation includes closed cell expanded polystyrene billets covered with 100 percent solid polyurethane and/or polyethylene floatation tubs to protect from physical damage, water absorption, colonization by encrusting organisms, and other factors.

### *1.3.2.2 Blasting, Excavating, and Filling Methods*

To develop the SPB uplands, the project would require rock blasting and excavating 9,500 CY above HTL (+13 feet) and excavating an additional 5,925 CY of common material above HTL in Phase I (Table 5). Drilling and blasting would be expected to occur for 564 hours over 47 days (12 hours per day) during Phase I. Material would be excavated from the supratidal shoreline (+16 to +60 feet above MLLW). Excavated soils would be stored at an upland location to dry before being used as fill within the proposed uplands. There would be no blasting or excavating during Phase II.

Following blasting and excavating, excavated materials, armor rock, and underlayment would be placed above and below HTL to develop the SPB uplands such as bridge abutment, approach, vehicle turnaround, parking, basic amenities, curb, and vehicle driveway totaling 34,650 CY during Phase I and 56,650 CY during Phase II. The fill would be placed using an excavator and dozer and then compacted using a vibratory soil compactor.

**Table 5. Sitka SPB Project Groundwork Summary-Phase I and II**

Phase	Total Area (acre)	Volume (CY)	Time (hours)	Days
Phase I	<b>Blasting</b>			
	1.3	9,500	564	47.0
	<b>Excavating</b>			
	1.4	5,925	178	14.8
	<b>Entire footprint (includes areas above HTL)</b>			
	2.6	34,650	1,041	86.7
	<b>Fill in intertidal waters (area between MHW and HTL)</b>			
	0.03	21,340	641	53.4
	<b>Fill in marine waters (area below MHW)</b>			
1.3	360	11	0.9	
Phase II	<b>Entire footprint (includes areas above HTL)</b>			
	1.3	22,000	661	55.1
	<b>Fill in intertidal waters (area between MHW and HTL)</b>			
	0.5	1,690	51	4.2
	<b>Fill in marine waters (area below MHW)</b>			
0.8	7,810	235	19.5	



**Table 6. Sitka SPB Project Construction Equipment**

Driving mechanism	Pile driver/Equipment Type	Properties
Vibratory Pile Driving	ICE 44B/static weight 12,250 pounds	202 tons centrifugal force 207 tons driving force
	APE 200-6/static weight 19,000 pounds	255 tons driving force
Impact Pile Driving	Diesel Delmag D19-32	Max energy: 42,800 feet-pounds; speed (blows per minute): 34-53
	Diesel Delmag ICE-425	Max energy: 42,000 feet-pounds;
DTH Drilling	Drilling shaft drill: Holte top drive with DTH hammer and bit	2,400 feet-pounds
Fill Placement	CAT D4 and D6 dozer	130 horsepower (hp)/215 hp
	CAT 349 excavator	295 kW/396 hp net power
Soil Compaction	CAT CS64B vibratory soil compactor	29,900-pound to 52,600-pound centrifugal force; 30.5 hertz (Hz) vibratory frequency

### 1.3.3.2 Construction Vessels and Movements

The following vessels are expected to be used to support construction:

- One material barge (approximately 250 feet by 76 feet by 15.5 feet) to transport materials from Washington to the project site and to be used onsite as a staging area during construction.
- One construction barge (crane barge 280 feet by 76 feet by 16 feet) to transport materials from coastal Alaska to the project site and to be used onsite to support construction.
- 1 skiff (25-foot skiff with a 125-250 hp outboard motor) transported to the project site on the material barge or acquired locally in Sitka to support construction activities.

### 1.3.3.3 Transport of Materials and Equipment

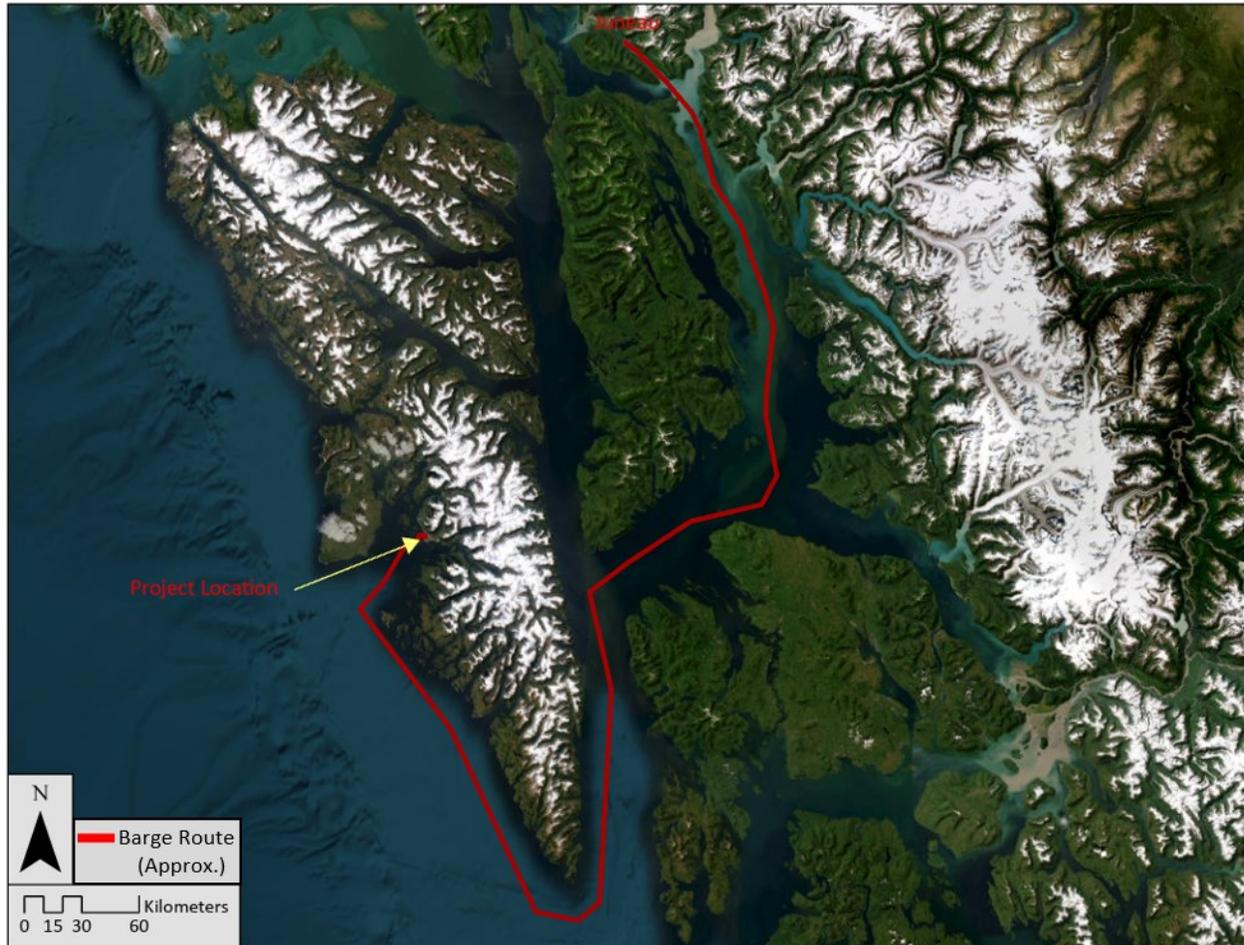
It is expected that prior to each phase of construction, the material barge would transport materials from Washington state and the construction barge would travel from coastal Alaska to the project site (Figure 7 and Figure 8).

The barges would travel at a rate of approximately 6 knots. These types of barges frequently travel this route to, from, and around Southeast Alaska. Once at the project site, the construction barge would be secured in place by four mooring anchors. The anchors would be below the surface and would not be a hazard to navigation. The material barge would be tied to the existing harbor structure, and materials would be moved from the material barge to the construction barge and project site by a crane on the construction barge. Local barge moves to the next pile installation area (in approximately 100-foot increments) would occur at a speed of less than 2 miles per hour.

1.3.3.4 Transport of Workers to and from Work Platform

Construction workers would be transported from shore to the barge work platform by 90 hp skiffs travelling at approximately 5 knots during both phases of construction. The travel distance would be less than 300 feet. There could be multiple shore-to-barge trips during the day; however, the area of travel would be relatively small and close to shore.

Figure 7. Sitka SPB Project Expected Construction Barge Route – Phase I and II



**Figure 8. Sitka SPB Project Expected Material Barge Route – Phase I and II**

#### 1.3.4 CONSTRUCTION SEQUENCE

Although actual construction sequencing would be developed by the contractor, it is expected that in-water construction for Phase I would begin as early as July 2024 and be completed by the end of July 2025. Phase II would begin as early as July 2025 and be completed by end of July 2026.

During Phase I, in-water construction of the SPB would begin with installation of the approach dock and pedestrian and vehicle transfer bridge. Once these pieces are constructed, float would be installed. Construction would use the following sequence:

- 1) Vibrate 12 temporary 16-inch-diameter piles for the approach dock and transfer bridge with a minimum of ten feet into overburden to create a template to guide installation of permanent piles.
- 2) Weld a frame around the temporary piles.
- 3) Within the frame, vibrate, DTH drill (if needed), and impact piles into place for the approach dock and transfer bridge.
- 4) Remove the frame and temporary piles and reinstall in the next location. This process would be repeated for installation of all permanent piles.

After all piles are installed, construction would proceed with installation of the seaplane ramp float, transfer bridge, mechanical systems, connections for electricity, water, and lighting (listed in Section 1.3.1).

During Phase I, in-water (pile driving) construction activities are expected to occur for a total of approximately 45 hours over 31 days (not necessarily consecutive). Most of the in-water work time would be spent DTH pile driving (34 hours). Additionally, placement of fill below HTL would occur over an estimated 652 hours of 55 days. Construction of Phase II would follow a similar sequence with in-water work (pile driving) occurring for approximately 13 hours over 9 days (not necessarily consecutive). Most of the in-water work time would be spent DTH pile driving (9 hours). Additionally, placement of fill below HTL would occur over an estimated 285 hours of 24 days. Please see Table 4 for a conservative estimate of the amount of time required for pile installation and removal for Phase I and Phase II.

Uplands would be completed independently of pile supported structures. Uplands project construction would begin with clearing the uplands area, blasting, and excavating. Excavated materials would be placed on uplands to be used as fill. Placement of fill would create 2.6 acres for Phase I (includes 1.3 acres of fill below HTL) and an additional 1.2 acres during Phase II (includes 1.3 acres of fill below HTL). Please see Table 5 for a conservative estimate of quantities involved in blasting, excavating, and placement of fill.

The total construction duration accounts for the time required to construct both phases of the project, accounting for potential delays in material deliveries, equipment maintenance, inclement weather, and shutdowns that may occur to prevent impacts to marine mammals.

### **1.3.5 PROJECT OPERATION ACTIVITIES**

The new SPB includes designation and operation of a new seaplane takeoff and landing lane and taxi path in Sitka Channel, which would not require any construction. The new sea lane would be located north of the existing sea lane, away from the O'Connell Bridge and seafood processing facilities. The new sea lane would be 4,000 feet long by 200 feet wide.

Use and operation of the SPB float would include seaplane loading, unloading, and general maintenance. The SPB float would provide utility connections for water and electric power. SPB uplands would include an access ramp for hauling out seaplanes, vehicle parking, general storage, and covered shelter for passenger waiting.

SPB operation protocols will incorporate best management practices (BMPs) to prevent or minimize contamination from seaplane accidents, general maintenance, fueling, and nonpoint source contaminants from upland facilities.

## **1.4 ACOUSTIC THRESHOLDS AND ENSONIFIED AREA**

Vibratory pile driving, DTH drilling, and impact pile driving would generate in-water and in-air noise that may result in take of ESA-listed species.

Using the best available science, NMFS has developed acoustic thresholds that identify the level of underwater sound above which exposed marine mammals would be reasonably expected to

be behaviorally harassed (Level B harassment) or to incur permanent threshold shift (PTS) to some degree (Level A harassment).

#### 1.4.1 LEVEL A HARASSMENT

NMFS' *Technical Guidance for Assessing the Effects of Anthropogenic Sounds on Marine Mammal Hearing* identifies criteria to assess auditory injury (Level A harassment) from exposure to noise from two sources (impulsive or non-impulsive) to five marine mammal groups based on hearing sensitivity (NMFS 2018). CBS's activity includes the use of impulsive (impact pile driving and DTH drilling) and non-impulsive (vibratory pile driving) noise sources which could affect ESA-listed species in the action area. The thresholds for auditory injury to ESA-listed species are provided in Table 7.

**Table 7. Thresholds Identifying the Onset of Permanent Threshold Shift**

Hearing Group	PTS Onset Thresholds*(received level)	
	Impulsive (Impact Pile Driving and DTH Drilling)	Non-impulsive (Vibratory Pile Driving)
Low-Frequency (LF) Cetaceans (humpback, fin, and North Pacific right whales)	$L_{pk,flat}$ : 219 dB $L_{E,LF,24h}$ : 183 dB	$L_{E,LF,24h}$ : 199 dB
Medium-Frequency (MF) Cetaceans (sperm whales)	$L_{pk,flat}$ : 230 dB $L_{E,MF,24h}$ : 185 dB	$L_{E,MF,24h}$ : 198 dB
Otariid Pinnipeds (OW) Underwater (Steller sea lions)	$L_{pk,flat}$ : 232 dB $L_{E,OW,24h}$ : 203 dB	$L_{E,OW,24h}$ : 219 dB

(Adapted from: NMFS 2018)

\* Dual metric acoustic thresholds for impulsive sounds: Use whichever results in the largest isopleth for calculating PTS onset. If a non-impulsive sound has the potential of exceeding the peak sound pressure level thresholds associated with impulsive sounds, these thresholds should also be considered.

**Note:** Peak sound pressure ( $L_{pk}$ ) has a reference value of 1 microPascal ( $\mu$ Pa), and cumulative sound exposure level ( $L_E$ ) has a reference value of  $1\mu$ Pa<sup>2</sup>s. In this table, thresholds are abbreviated to reflect American National Standards Institute (ANSI) standards (ANSI 2013). However, peak sound pressure is defined by ANSI as incorporating frequency weighting, which is not the intent for this Technical Guidance. Hence, the subscript "flat" is being included to indicate peak sound pressure should be flat weighted or unweighted within the generalized hearing range. The subscript associated with  $L_E$  thresholds indicates the designated marine mammal auditory weighting function (LF cetaceans and OW pinnipeds) and that the recommended accumulation period is 24 hours. The  $L_E$  thresholds could be exceeded in a multitude of ways (i.e., varying exposure levels and durations, duty cycle).

#### 1.4.2 LEVEL B HARASSMENT

NMFS predicts that all marine mammals are likely to experience Level B harassment when exposed to underwater anthropogenic noise above received levels of 120 dB re  $1\mu$ Pa root mean square (rms; continuous) and above 160 dB re  $1\mu$ Pa rms (non-explosive impulsive sources).

In addition to underwater noise, pinnipeds can be adversely affected by in-air noise. Loud noises can cause hauled-out pinnipeds to flush back into the water, leading to disturbance and possible injury. NMFS has established an in-air noise disturbance threshold of 100 dB rms for Steller sea lions (NMFS 2018).

### 1.5 DEFINITION OF ACTION AREA

The vicinity of the project area that would be affected directly by the action, referred to as the action area in this document, has been determined to be the area of water that would be

ensonified above acoustic thresholds in a day. In this case, the action area is the area where received noise levels from in-water pile installation and removal are expected to decline to 120 dB. As shown in Table 11 and in Table 12, the project action area extends 13.6 kilometers (8.5 miles) from the construction site during Phase I and Phase II.

The ensonified area (action area) is truncated where land masses obstruct underwater sound transmission, thus, the action area is largely confined to marine waters within the northern half of Sitka Channel, although there are a few narrow areas where sound extends north past the breakwaters and south past the end of Sitka channel. Sound would extend approximately 6.0 kilometers (3.7 miles) from the western opening in the Channel Rock Breakwaters, 7.0 kilometers (4.3 miles) from the eastern opening in the Channel Rock Breakwaters, and 13.6 kilometers (8.5 miles) from the south end of Sitka Channel (Figure 9). The transit routes to be taken by the material and construction barges are also considered a part of the action area due to the potential impacts of large vessels on the marine environment (Figure 7 and Figure 8). Note, this document also refers to the project vicinity. This term refers to an area larger than the action area, which includes the waters surrounding Japonski Island and eastern Sitka Sound. This term is used because some of the information available about marine mammals is based on sightings in the general vicinity of Sitka Sound.

Since hauled-out marine mammals such as Steller sea lions can also be adversely affected by in-air noise, an estimate of the in-air ensonified area was included in the analysis of impacts. Pile driving and removal associated with this project would generate in-air noise above ambient levels within the action area but would not extend more than 22 meters and 30 meters from any type of pile being impacted or vibrated, respectively.<sup>1</sup> According to the blasting plan (Southeast Earthmovers 2020), uplands rock blasting would not to exceed 90 dB at the center of the blast, which is below the in-air noise disturbance threshold for Steller sea lions (100 dB). Given that there are no documented Steller sea lion haulouts in the action area, no in-air disturbance to hauled-out individuals are anticipated as a result of the proposed project; thus, land area is not included in the action area.

To minimize impacts to humpback whales, Steller sea lions, fin whales, North Pacific right whales, and sperm whales, monitoring of shutdown and harassment zones would be implemented to protect and document listed marine mammals in the action area. Please see Appendix B for calculated distances to the Level A and B thresholds, Section 1.6 for mitigation information, shutdown and monitoring zones and figures, and the Protected Species Monitoring and Mitigation Plan (PSMMP) for more details on mitigation, shutdown, and monitoring procedures (Appendix C).

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<sup>1</sup> Predicted distances for in-air threshold distances. The Washington State Department of Transportation has documented un-weighted rms levels for a vibratory hammer (30-inch pile) to an average 96.5 dB and a maximum of 103.2 dB at 15 meters (Laughlin 2010). The sound source level is 106 dB rms at 15 m, the median value during impact installation of 24 to 48-inch-diameter steel piles at Naval Base Kitsap Bangor (Illingworth and Rodkin, Inc. 2012).

Figure 9. Sitka SPB Project Action Area and Project Area – Phase I and II



### 1.5.1 CALCULATED DISTANCES TO LEVEL A AND LEVEL B THRESHOLDS

For this project, distances to the Level A and Level B thresholds were calculated based on various sound source levels expressed in sound pressure level (SPL)<sup>2</sup> or sound exposure level (SEL)<sup>3</sup> for a given activity and pile type using the practical spreading model in the spreadsheet tool developed by NMFS (Table 8; Appendix B). For Level A harassment, the maximum duration of that activity per day was also accounted for using the NMFS model. Distances to thresholds are provided in Section 1.7 and range from approximately 10 meters (33 feet) to 13.6 kilometers (8.5 miles).

**Table 8. Sound Source Summary**

Method and Pile Type	Sound Source Level at 10 meters			Literature Source
<b>Barge</b>	<b>dB rms</b>			
Barge movements, pile positioning, etc. (throughout construction)	171-176			Richardson et al. 1995; Kipple and Gabriele 2004
<b>Vibratory Hammer</b>	<b>dB rms</b>			
16-inch steel piles	161			Naval Facilities Engineering Systems Command (NAVFAC) 2015, Table 2-2
24-inch steel piles	161			NAVFAC 2015, Table 2-2
<b>DTH Drill</b>	<b>dB rms</b>	<b>dB SEL</b>	<b>dB peak</b>	
16-inch steel piles	167	146	172	Guan and Miner 2020, Heyvaert and Reyff 2021
24-inch steel piles	167	159	184	Heyvaert and Reyff 2021
<b>Impact Hammer</b>	<b>dB rms</b>	<b>dB SEL</b>	<b>dB peak</b>	
16-inch steel piles	185	175	200	NMFS 2023a
24-inch steel piles	190	177	203	NMFS 2023a

<sup>2</sup> Sound pressure is the sound force per unit  $\mu\text{Pa}$ , where 1 pascal is the pressure resulting from a force of one newton exerted over an area of one square meter. Sound pressure level is expressed as the ratio of a measured sound pressure and a reference level. The commonly used reference pressure level in acoustics is  $1 \mu\text{Pa}$ , and the units for underwater sound pressure levels are decibels re  $1 \mu\text{Pa}$  (NMFS 2018).

<sup>3</sup> A measure of sound level that takes into account the duration of the signal (NMFS 2018).

## **1.6 PROPOSED MITIGATION MEASURES**

To minimize effects to listed species, CBS proposes to implement the mitigation measures outlined below.

### **1.6.1 MITIGATION MEASURES DESIGNED TO REDUCE PROJECT IMPACTS**

The project uses the most compact design possible, while meeting the demands of the seaplanes that would use the facility.

- The project uses a design that does not require dredging or in-water blasting and, to the extent possible given project requirements, minimizes fill and on-land blasting.
- The project uses a design that incorporates the smallest diameter piles practicable while still minimizing the overall number of piles.
- The float will be located in deep water to avoid light limitation and grounding impacts to the intertidal or shallow subtidal zones.
- Floats or barges will not be grounded at any tidal stage.
- Construction will be suspended during the likely start of the herring spawning season and will not resume until after the spawning season concludes (anticipated March 15 to April 30).

### **1.6.2 OIL AND SPILL PREVENTION**

- The contractor will provide and maintain a spill cleanup kit on-site at all times, to be implemented as part of the Shipboard Oil Pollution Emergency Plan for oil spill prevention and response.
- Fuel hoses, oil drums, oil or fuel transfer valves and fittings, and similar equipment will be checked regularly for drips or leaks, and would be maintained and stored properly to prevent spills.
- Oil booms will be readily available for oil or other fuel spill containment should any release occur.
- All chemicals and petroleum products will be properly stored to prevent spills.
- No petroleum products, cement, chemicals, or other deleterious materials will be allowed to enter surface waters.

### **1.6.3 MITIGATION MEASURES DESIGNED TO REDUCE IMPACTS TO ESA-LISTED SPECIES AND MARINE MAMMALS**

- Pile driving softening material will be used to minimize noise during vibratory and impact pile driving. Much of the noise generated during pile installation comes from contact between the pile being driven and the steel template used to hold the pile in place. The contractor will use high-density polyethylene or ultra-high-molecular-weight polyethylene softening material on all templates to eliminate steel on steel noise generation.
- Ramp-up (soft start) procedures will be applied prior to beginning pile driving activities each day and/or when pile driving hammers have been idle for more than 30 minutes:
  - For impact pile driving, contractors will be required to provide an initial set of three strikes from the hammer at 40 percent energy, followed by a 30-second

waiting period. This procedure will be repeated twice more prior to operational impact pile driving.

- A sediment curtain will be employed during the placement of fill and all DTH-drilling activities to contain drill spoils as much as possible to allow them to settle to the sea floor in the immediate area rather than increasing turbidity over a wider area.
- One to three (depending on in-water activity) NMFS-approved protected species observers (PSOs), able to accurately identify and distinguish species of Alaska marine mammals, will be present before and during all in-water construction activities (Appendix C).
- The contractor is required to conduct briefings for construction supervisors and crews, the PSO team, and CBS staff prior to the start of all pile driving activity and when new personnel join the work, in order to explain responsibilities, communication procedures, the marine mammal monitoring protocol, and operational procedures.
- Prior to pile driving, the action area would be surveyed for marine mammal presence for 30 minutes. If any marine mammal is sighted within a shutdown zone during this 30-minute survey period prior to pile driving, or during the soft-start, CBS would delay pile driving/removal until the animal(s) is confirmed to have moved outside of and on a path away from the area or if 15 minutes (for pinnipeds or small cetaceans) or 30 minutes (for large cetaceans and sea otters) have elapsed since the last sighting of the marine mammal within the shutdown zone.
- To ensure that the action area has been surveyed for marine mammal presence, pile driving/removal would not begin until a PSO has given a notice to proceed.
- PSOs will be approved by NMFS prior to deployment. PSO resumes will be provided to the NMFS consultation biologist for approval at least one week prior to the start of in-water work. The agency will provide a brief explanation in instances where a PSO is not approved.
- Prior to in-water construction activities, a shutdown zone will be established (Figure 10 and Figure 12). For this project, the exclusion zone includes all marine waters within an established distance from the sound source.
- Prior to commencing in-water work or at changes in watch, PSOs will establish a point of contact with the construction crew. The PSO will brief the point of contact as to the shutdown procedures if listed species are observed likely to enter or within the shutdown zone, and will request that the point of contact instruct the crew to notify the PSO when a marine mammal is observed. If the point of contact goes "off shift" and delegates his duties, the PSO must be informed and brief the new point of contact.
- Prior to commencing any in-water work, PSOs will scan waters within the appropriate shutdown zone and confirm that no listed species are within the shutdown zone for at least 30 minutes immediately prior to initiation of the in-water activity. If one or more listed species are observed within the shutdown zone, the in-water activity will not begin until the listed species exit(s) the shutdown zone of their own accord, or until the shutdown zone has remained clear of listed species for 30 minutes.

- There will be a nominal 10-meter shutdown zone for construction-related activity where acoustic injury is not an issue. This type of work could include (but is not limited to) the following activities: (1) movement of the barge to the pile location; (2) positioning of the pile on the substrate via a crane (i.e., stabbing the pile); (3) removal of the pile from the water column/substrate via a crane (i.e., deadpull); (4) the placement of sound attenuation devices around the piles; or (5) placement of fill. For these activities, monitoring would take place from 15 minutes prior to initiation until the action is complete.
- PSOs will be positioned such that they can collectively monitor the entirety of each activity's shutdown zone and adjacent waters. PSO locations will be coordinated with NMFS prior to PSO deployment.
- PSOs will have no other primary duties beyond watching for, acting on, and reporting events related to listed species.
- PSOs will work in shifts lasting no longer than four hours with at least a one-hour break from monitoring duties between shifts. PSOs will not perform PSO duties for more than 12 hours in a 24-hour period.
- The on-duty PSOs will continuously monitor the shutdown zone and adjacent waters for the presence of listed species during all in-water operations.
- In-water activities will take place only:
  - a. between civil dawn and civil dusk when PSOs can effectively monitor for the presence of marine mammals;
  - b. during conditions with a Beaufort Sea State of 4 or less;
  - c. when the entire shutdown zone and adjacent waters are visible (e.g., monitoring effectiveness is not reduced due to rain, fog, snow, volcanic ash, etc.).
- If visibility degrades to where the PSO cannot ensure that the entire largest Level A shutdown zone remains devoid of listed species during in-water work, the crew will cease in-water work until the entire largest Level A shutdown zone is visible and the PSO has indicated that the zone has remained devoid of listed species for 30 minutes.
- PSOs will have the ability and authority to initiate appropriate mitigation responses, including shutdowns, to avoid takes of listed species.
- The PSO will order the in-water activities to immediately cease if one or more listed species has entered, or appears likely to enter, the associated shutdown zone.
- If in-water activities are shut down for less than 30 minutes due to the presence of listed-species in the shutdown zone, in-water work may commence when the PSO provides assurance that listed species were observed exiting the shutdown zone. Otherwise, the activities may only commence after the PSO provides assurance that listed species have not been seen in the shutdown zone for 30 minutes (for cetaceans) or 15 minutes (for pinnipeds).
- Following a lapse of in-water activities of more than 30 minutes, the PSO will authorize resumption of activities (using soft-start procedures for impact pile driving activities)

only after assuring that listed species have not been present in the shutdown zone for at least 30 minutes.

- If a listed species is harassed, harmed, injured, or disturbed due to non-construction related activities, PSOs will immediately report that occurrence to the NMFS Office of Law Enforcement (AK Hotline): 1-800-853-1964.
- To determine the location of observed listed species, take action if listed species enter the exclusion zone, and record these events PSO(s) will use the following:
  - a. Binoculars (7x50 or higher magnification)
  - b. Range finder
  - c. Tide table
  - d. Watch or chronometer
  - e. GPS
  - f. Stand-alone compass
  - g. Grid map
  - h. Legible copy of the NMFS's biological opinion for this project and all appendices
  - i. Legible and fillable observation record form allowing for required PSO data entry
  - j. Two-way radio communication with construction foreman/superintendent
  - k. A log book of all activities which will be made available to USACE and NMFS upon request
- All in-water work will be completed within approximately 1,559 hours over 166 days (not consecutive).
- If a listed marine mammal is determined by the PSO to have been disturbed, harassed, harmed, injured, or killed (e.g., a listed marine mammal(s) is injured or killed or is observed entering a shutdown zone before operations can be shut down [unauthorized takes]), it will be reported to NMFS at [akr.section7@noaa.gov](mailto:akr.section7@noaa.gov) within one business day. These PSO reports will include:
  - a. information to be provided in the final report (see Mitigation Measures under the *Data Collecting and Reporting* heading below);
  - b. the number and species of listed animals affected;
  - c. the date, time, and location of each event (with geographic coordinates or identified grid from the grid map);
  - d. a description of the event;
  - e. the time the mammal(s) was first observed or entered the shutdown zone, and, if known, the time the animal was last seen or exited the zone, and the fate of the animal;
  - f. mitigation measures implemented before and after the animal was taken;
  - g. if a vessel struck a marine mammal, the contact information for the PSO on duty, or the contact information for the individual piloting the vessel if there was no PSO on duty; and
  - h. photographs or video footage of the animal(s), if available.

- If PSOs observe an injured, sick, or dead marine mammal (i.e., stranded marine mammal), they will notify the Alaska Marine Mammal Stranding Hotline at 877-925-7773. The PSOs will submit photos and data that will aid NMFS in determining how to respond to the stranded animal. Data submitted to NMFS in response to stranded marine mammals will include date/time, the location of stranded marine mammal, the species and number of stranded marine mammals, a description of the stranded marine mammal's condition, event type (e.g., entanglement, dead, floating), and the behavior of live-stranded marine mammals.
- If PSOs observe marine mammals being disturbed, harassed, harmed, injured, or killed (e.g., feeding or unauthorized harassment), these activities will be reported to NMFS Office of Law Enforcement at (1-800-853-1964).
  - a. Data submitted to NMFS will include date/time, location, description of the event, and any photos or videos taken.
- Lines attached to heavy items on the ocean bottom (e.g., anchors, traps, instruments) will incorporate weak links at the point of connection that can be broken by entangled whales.

#### **1.6.4 PROTECTED SPECIES OBSERVER REQUIREMENTS**

- PSOs will:
  - a. have vision correctable to 20-20;
  - b. have the ability to effectively communicate orally, by radio and in person, with project personnel;
  - c. have prior experience collecting field observations and recording field data accurately and in accordance with project protocols;
  - d. be able to identify species of Alaskan marine mammals;
  - e. be able to record marine mammal behavior; and
  - f. have technical writing skills sufficient to create understandable reports of observations.
- PSOs will complete PSO training prior to deployment. The training will include:
  - a. field identification of marine mammals and marine mammal behavior;
  - b. ecological information on Alaska's marine mammals and specifics on the ecology and management concerns of those marine mammals;
  - c. ESA and MMPA regulations;
  - d. mitigation measures outlined in the biological opinion;
  - e. proper use of equipment;
  - f. methodologies in marine mammal observation and data recording and proper reporting protocols; and
  - g. an overview of PSO roles and responsibilities.

### 1.6.5 DATA COLLECTING AND REPORTING

- PSOs will record observations on data forms or into electronic data sheets. PSOs will record the following:
  - a. date, shift start time, shift stop time, and PSO identifier;
  - b. date and time of each reportable event (e.g., a marine mammal observation, operation shutdown, reason for operation shutdown, change in weather);
  - c. weather parameters (e.g., percent cloud cover, percent glare, visibility) and sea state where the Beaufort Wind Force Scale will be used to determine sea-state (<https://www.weather.gov/mfl/beaufort>);
  - d. species, numbers, and, if possible, sex and age class of observed marine mammals, along with date, time, and location of the observation;
  - e. the predominant sound-producing activities occurring during each marine mammal observation;
  - f. marine mammal behavior patterns observed, including bearing and direction of travel;
  - g. behavioral reactions of marine mammals immediately before and during sound producing activities;
  - h. initial, closest, and last sighting locations of observed marine mammal(s), including the distance between the PSO and the mammal(s) and the minimum distance from the sound-producing activity to the mammal(s);
  - i. whether the presence of marine mammals necessitated the implementation of mitigation measures to avoid acoustic impact, and the duration that normal operations were affected by the presence of marine mammals;
  - j. geographic coordinates for the observed animal(s), with the position recorded using the most precise coordinates practicable (coordinates will be recorded in decimal degrees or a similar standard, or extrapolated from the grid map).
- If possible, observations of humpback whales will be transmitted to AKR.section7@noaa.gov, including:
  - a. photographs (especially flukes) and video obtained.
  - b. geographic coordinates for the observed animals, with the position recorded using the most precise coordinates practicable (coordinates will be recorded in decimal degrees, or a similar standard, or extrapolated from the grid map).
  - c. Number of animals per observation event; and number of adults/juveniles/calves per observation event (if determinable).
  - d. Environmental conditions as they existed during each observation event, including sea conditions, weather conditions, visibility, lighting conditions, and percent ice cover.
- Submit interim monthly PSO monitoring reports, including data sheets. These reports will include a summary of marine mammal species and behavioral observations, shutdowns or delays, and work completed.

- Monthly reports will be submitted to [AKR.section7@noaa.gov](mailto:AKR.section7@noaa.gov) by the 15<sup>th</sup> day of the month following the reporting period. For example, the report for activities conducted in September 2024 will be submitted by October 15, 2024.
- A final report will be submitted to NMFS within 90 calendar days of the completion of the project summarizing the data recorded and submitted to [AKR.section7@noaa.gov](mailto:AKR.section7@noaa.gov). The report will summarize all in-water activities associated with the proposed action, and the results of PSO monitoring conducted during the in-water project activities. The final report will include:
  - a. summaries of monitoring efforts including total hours, and marine mammal distribution through the study period, accounting for sea state and other factors that affect visibility and detectability of marine mammals;
  - b. analyses on the effects from various factors that may have influenced detectability of marine mammals (e.g., sea state, number of observers, fog, glare, and other factors as determined by the PSOs);
  - c. species composition, occurrence, and distribution of marine mammal observations, including date, water depth, numbers, age/size/gender categories (if determinable), group sizes, and ice cover;
  - d. number of marine mammals observed (by species) during periods with and without project activities (and other variables that could affect detectability);
  - e. initial, closest, and last marine mammal observation distances versus project activity at time of observation;
  - f. observed marine mammal behaviors and movement types versus project activity at time of observation;
  - g. numbers of marine mammal observations/individuals seen versus project activity at time of observation;
  - h. distribution of marine mammals around the action area versus project activity at time of observation; and
  - i. digital, queryable documents containing PSO observations and records, and digital, queryable reports.

### **1.6.6 MONITORING AND SHUTDOWN AREAS**

For species where take is permitted, Level A and Level B harassment zones will be implemented as monitoring areas with a 10-meter shutdown area for approved construction activities. For species where take is not permitted, Level A and Level A harassment zones will be implemented as shutdown areas for all applicable construction activities.

#### *1.6.6.1 Level A Harassment Zones*

The CBS will implement shutdowns to protect ESA-listed species without authorized take from incurring Level A harassment as shown in Table 9 for Phase I and Table 10 for Phase II. Figure 10 and Figure 11 show the Level A harassment zones by hearing group for Phase I and Phase II. These shutdowns will prevent auditory injury during vibratory installation, vibratory removal, DTH drilling, and impact installation.

**Table 9. Sitka SPB Project Level A Harassment Zones — Phase I**

Activity	Level A Harassment Zones (meters; Area [sq km]) <sup>1, 2</sup>	
	LF	OW
<b>In-Water Activities</b>		
Barge movements, pile positioning, etc. (throughout construction) <sup>3</sup>	10 (0.2)	10 (0.2)
<b>Vibratory Pile Removal/Installation</b>		
16-inch steel temporary installation 12 piles, 60 minutes/day (2.0 days)	10 (0.2)	10 (0.2)
16-inch steel temporary removal 12 piles, 60 minutes/day (2.0 days)	10 (0.2)	10 (0.2)
16-inch steel permanent installation 10 piles, 60 minutes/day (1.7 days)	10 (0.2)	10 (0.2)
24-inch steel permanent installation 16 piles, 60 minutes/day (2.7 days)	10 (0.2)	10 (0.2)
<b>DTH Pile Installation</b>		
16-inch steel permanent installation 10 piles, 2.0 hours/day (5.0 days)	60 (0.04)	10 (0.2)
24-inch steel permanent installation 16 piles, 3.0 hours/day (8.0 days)	570 (0.36)	30 (0.03)
<b>Impacting Pile Installation</b>		
16-inch steel temporary installation 12 piles, 20 minutes/day (3.0 days)	235 (0.13)	10 (0.2)
16-inch steel permanent installation 10 piles, 20 minutes/day (2.5 days)	235 (0.13)	10 (0.2)
24-inch steel permanent installation 16 piles, 20 minutes/day (4.0 days)	315 (0.18)	20 (0.02)

<sup>1</sup> Level A harassment zone distances refer to the maximum radius of the zone and are rounded.

<sup>2</sup> Area within the harassment zone isopleth is provided in parentheses for each distance, rounded to the nearest 5 meters. For species with a smaller shutdown zone isopleth in addition to the harassment zone isopleth, area is provided for the larger harassment zone isopleth. The smaller shutdown zone isopleth distance is indicated with an asterisk (\*).

<sup>3</sup> Although acoustic injury is not the primary concern with these activities, shutdowns will be implemented to avoid impacts to species.

**Table 10. Sitka SPB Project Level A Harassment Zones — Phase II**

Activity	Level A Harassment Zones (meters; Area [sq km]) <sup>1, 2</sup>	
	LF	OW
<b>In-Water Activities</b>		
Barge movements, pile positioning, etc. (throughout construction) <sup>3</sup>	10 (0.02)	10 (0.02)
<b>Vibratory Pile Removal/Installation</b>		
16-inch steel temporary installation 6 piles, 60 minutes/day (1.0 days)	10 (0.02)	10 (0.02)
16-inch steel temporary removal 6 piles, 60 minutes/day (1.0 days)	10 (0.02)	10 (0.02)
24-inch steel permanent installation 6 piles, 60 minutes/day (1.0 days)	10 (0.02)	10 (0.02)
<b>DTH Pile Installation</b>		
24-inch steel permanent installation 6 piles, 4 hours/day (3.0 days)	570 (0.36)	30 (0.03)
<b>Impacting Pile Installation</b>		
16-inch steel temporary installation 6 piles, 20 minutes/day (1.5 days)	235 (0.13)	10 (0.02)
24-inch steel permanent installation 6 piles, 20 minutes/day (1.5 days)	315 (0.18)	20 (0.02)

<sup>1</sup> Level A harassment zone distances refer to the maximum radius of the zone and are rounded.

<sup>2</sup> Area within the harassment zone isopleth is provided in parentheses for each distance, rounded to the nearest 5 meters. For species with a smaller shutdown zone isopleth in addition to the harassment zone isopleth, area is provided for the larger harassment zone isopleth. The smaller shutdown zone isopleth distance is indicated with an asterisk (\*).

<sup>3</sup> Although acoustic injury is not the primary concern with these activities, shutdowns will be implemented to avoid impacts to species.

Figure 10. Sitka SPB Project Level A LF Harassment Zones – Phase I & II

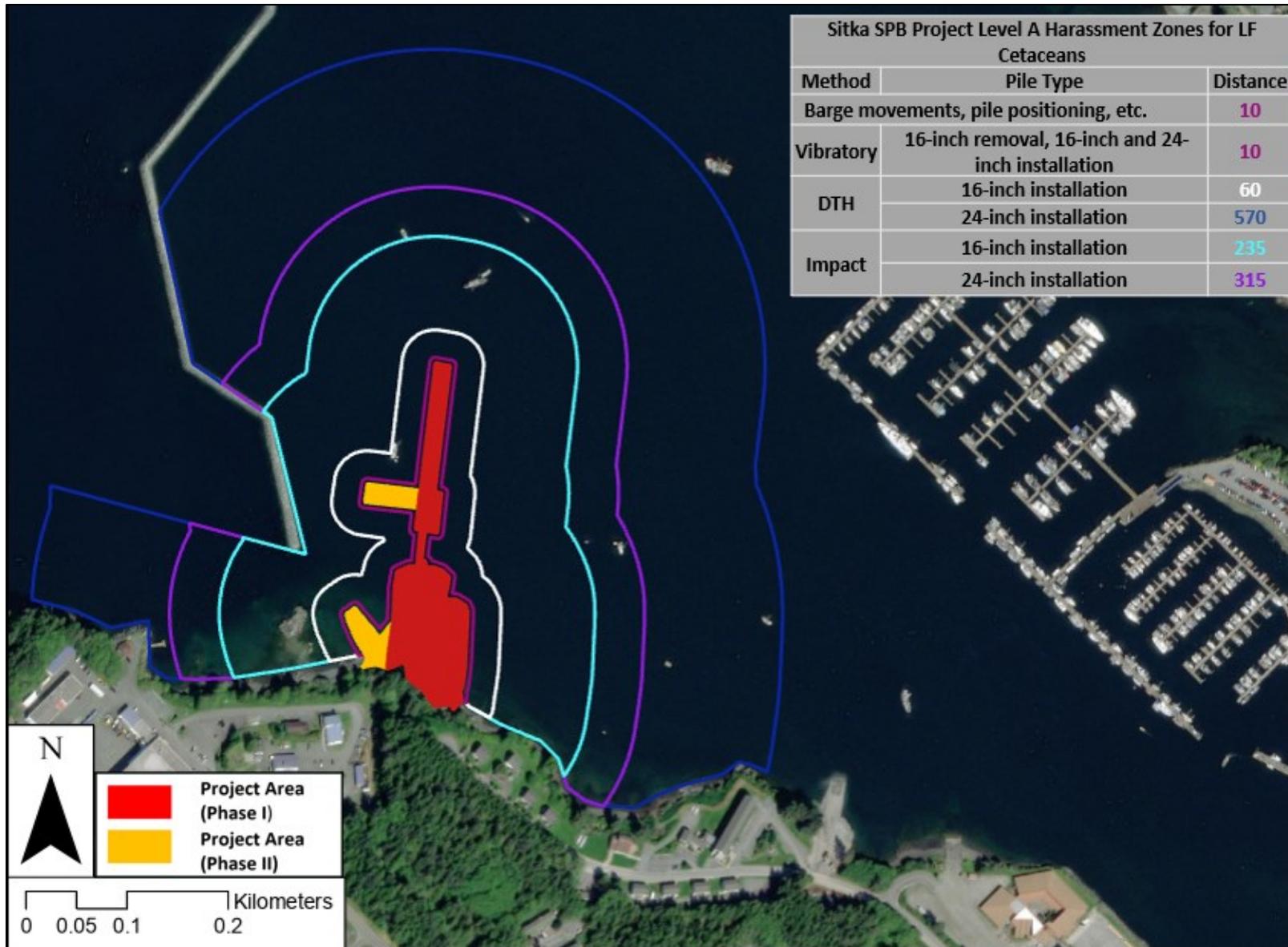
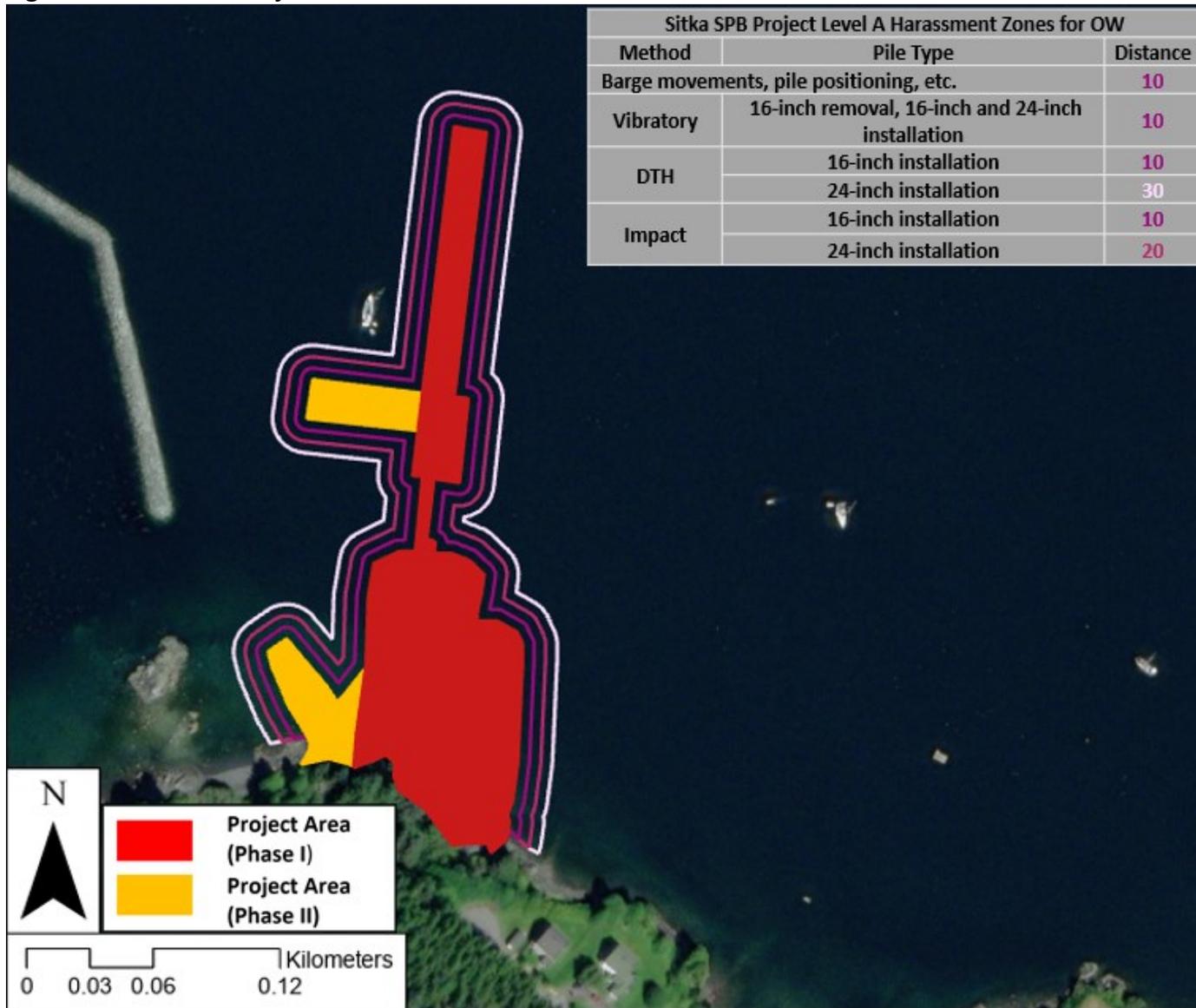


Figure 11. Sitka SPB Project Level A OW Harassment Zones – Phase I & II



### 1.6.6.2 Level B Harassment Zones

The CBS is requesting Level B take of Mexico DPS humpback whales (during vibratory pile driving and DTH drilling only) and Steller sea lions (during all pile driving) incidental to constructing the new SPB. The harassment zones associated with Level B disturbance are outlined in Table 11 for Phase I and Table 12 for Phase II. Figure 12 shows the Level B harassment zones by sound for Phase I and Phase II.

In the unlikely event that a marine mammal species other than those addressed in this BA were to enter the action area, in-water work would be shut down as summarized below to avoid Level B take of those species.

**Table 11. Sitka SPB Project Level B Harassment Zones – Phase I**

Source	Level B Harassment Zones (meters; Area [sq km]) <sup>11</sup>
<b>Vibratory Pile Removal/Installation</b>	
16-inch steel temporary installation 10 piles, 60 minutes/day (2.0 days)	5,415 (2.07)
16-inch steel temporary removal 10 piles, 60 minutes/day (2.0 days)	5,415 (2.07)
16-inch steel permanent installation 10 piles, 60 minutes/day (1.7 days)	5,415 (2.07)
24-inch steel permanent installation 16 piles, 60 minutes/day (2.7 days)	5,415 (2.07)
<b>DTH Pile Installation</b>	
16-inch steel permanent installation 10 piles, 2.0 hours/day (5.0 days)	13,600 <sup>2</sup> (2.40; Stopped at 8,500 meters)
24-inch steel permanent installation 16 piles, 3.0 hours/day (8.0 days)	13,600 <sup>2</sup> (2.40; Stopped at 8,500 meters)
<b>Impacting Pile Installation</b>	
16-inch steel temporary installation 12 piles, 20 minutes/day (3.0 days)	465 (0.28)
16-inch steel permanent installation 10 piles, 20 minutes/day (2.5 days)	465 (0.28)
24-inch steel permanent installation 16 piles, 20 minutes/day (4.0 days)	1,000 (0.70)

<sup>11</sup>Level B harassment zone distances, in meters, refer to the maximum radius of the zone and are rounded (see Appendix B for calculated distances). Areas are provided for the harassment isopleth rounded to the nearest 5 meters.

<sup>2</sup>The farthest distance that sound will transmit from the source is 8,500 meters before transmission is stopped by land masses. See Appendix B for calculated distances based on the practical spreading model. Since land masses prevent sound transmission, area is only provided for 8,500-meter zone.

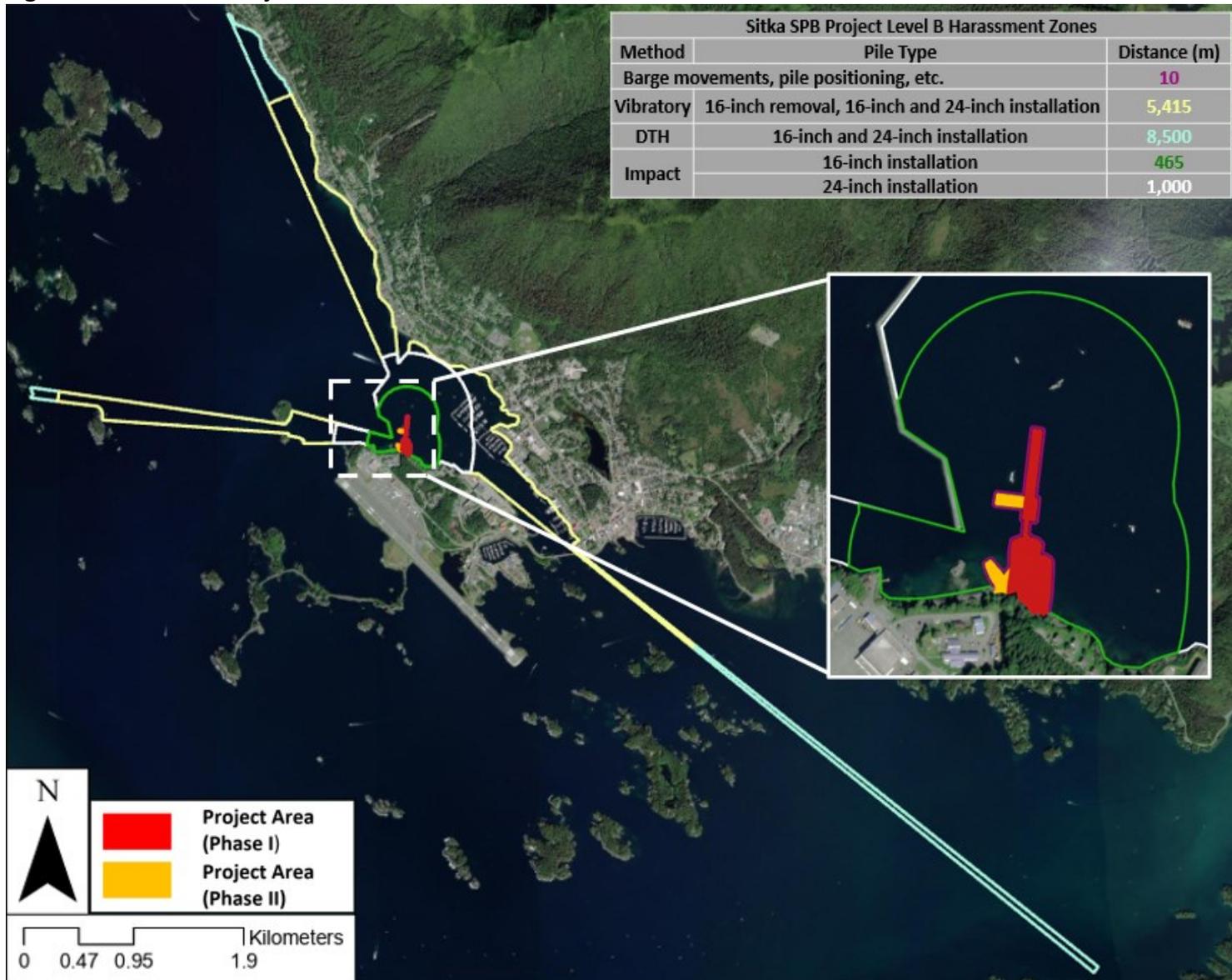
**Table 12. Sitka SPB Project Level B Harassment Zones – Phase II**

Source	Level B Harassment Zones (meters) <sup>1</sup>
<b>Vibratory Pile Removal/Installation</b>	
16-inch steel temporary installation 6 piles, 60 minutes/day (1.0 days)	5,415 (2.07)
16-inch steel temporary removal 6 piles, 60 minutes/day (1.0 days)	5,415 (2.07)
24-inch steel permanent installation 6 piles, 60 minutes/day (1.0 days)	5,415 (2.07)
<b>DTH Pile Installation</b>	
24-inch steel permanent installation 6 piles, 4 hours/day (3.0 days)	13,600 <sup>2</sup> (2.40; Stopped at 8,500 meters)
<b>Impacting Pile Installation</b>	
16-inch steel temporary installation 6 piles, 20 minutes/day (1.5 days)	465 (0.28)
24-inch steel permanent installation 6 piles, 20 minutes/day (1.5 days)	1,000 (0.70)

<sup>1</sup>Level B harassment zones, in meters, refer to the maximum radius of the zone and are rounded (see Table 6 for calculated distances). Areas are provided for the harassment isopleth rounded to the nearest 5 meters.

<sup>2</sup>The farthest distance that sound will transmit from the source is 8,500 meters before transmission is stopped by land masses. See Appendix B for calculated distances based on the practical spreading model. Since land masses prevent sound transmission, area is only provided for 8,500 meter zone.

Figure 12. Sitka SPB Project Level B Harassment Zones



### 1.6.7 STRIKE AVOIDANCE AND VESSEL TRANSIT MITIGATION MEASURES

- Vessel (skiff and barge) operators will take reasonable precautions to avoid interaction with listed whales by taking the following actions:
  - a. Vessel operators will maintain a watch for listed marine mammals at all times while underway.
  - b. Vessels will stay at least 91 meters (100 yards) away from listed marine mammals, or 460 meters (500 yards) from endangered North Pacific right whales (50 CFR § 224.103(d)).
  - c. Operators will reduce vessel speed to less than 5 knots (9 kilometers/hour) when within 274 meters (300 yards) of a whale.
  - d. Unless necessary to reduce the risk of collision, vessel operators will avoid changes in direction and speed when within 274 meters (300 yards) of whales.
  - e. Vessel operators will not position vessel(s) in the path of whales, and will not cut in front of whales in a way or at a distance that causes the cetaceans to change their direction of travel or behavior (including breathing/surfacing pattern).
  - f. Operate vessel(s) to avoid causing a whale to make changes in direction.
  - g. Check the waters immediately adjacent to the vessel(s) to ensure that no whales will be injured when the propellers are engaged.
  - h. Reducing vessel speed to 10 knots or less when weather conditions reduce visibility to 1.6 kilometers (1 miles) or less.
- If a whale's course and speed are such that it will likely cross in front of a vessel that is underway, or approach within 91 meters (100 yards) of the vessel, and if maritime conditions safely allow, the engine will be put in neutral and the whale will be allowed to pass beyond the vessel. Vessels will remain 460 meters (500 yards) from North Pacific right whales (50 CFR § 224.103(d)).
- If the vessel is taken out of gear, vessel crew will ensure that no whales are within 50 meters of the vessel when propellers are re-engaged, minimizing risk of marine mammal injury.
- Vessels will take reasonable steps to alert other vessels in the area to the presence of whales in the vicinity.
- Vessels will not allow lines to remain in the water, and no trash or other debris will be thrown overboard, thereby reducing the potential for marine mammal entanglement.
- The transit route for the vessels will avoid designated critical habitat to the extent practicable.
- For North Pacific right whales vessels will:
  - a. remain 460 meters (500 yards) from North Pacific right whales (50 CFR § 224.103(d)); or
  - b. avoid traveling within or through North Pacific right whale critical habitat (73 FR 19000). If travel within or through North Pacific right whale critical habitat cannot be avoided:

- c. vessels will travel through North Pacific right whale critical habitat at 5 knots or less; or
  - d. vessels will travel through North Pacific right whale critical habitat at 10 knots or less while PSOs maintain a constant watch for marine mammals from the bridge;
  - e. vessel speed while within North Pacific right whale critical habitat will not exceed 10 knots; and
  - f. operators will maintain a ship log indicating the time and geographic coordinates at which vessels enter and exit North Pacific right whale critical habitat.
- For WDPS Steller Sea Lions:
    - a. vessels will not approach within 5.5 kilometers (3 nautical miles) of rookery sites listed in (50 CFR § 224.103(d)); and
    - b. vessels will avoid approaching within 914 meters (3,000 feet) of any Steller sea lion haulout or rookery.

#### **1.6.8 MITIGATION MEASURES TO REDUCE IMPACTS TO SUNFLOWER SEA STARS**

- To prevent direct placement of a pile on an ESA-listed sunflower sea star, a pre-construction survey and biweekly (every other week) surveys of the seafloor near the project area will take place.
  - An initial sunflower sea star survey will be conducted prior to, but no more than 24 hours prior to, in-water work in areas where fill will be placed on the sides of the dock and along the face of the dock.
  - If a sunflower sea star is identified during the pre-construction or biweekly surveys, more frequent surveys prior to piling may be required.
  - The contractor, at their own discretion, may monitor the seafloor during the placement of every pile in lieu of a pre-construction or bi-weekly surveys
  - If a sunflower sea star is attached to a pile being removed from the water, the sunflower sea star will be gently removed from the pile by the Lead PSO, or a crew delegate due to possible safety concerns, and immediately released into an intertidal location nearby. The star will not be placed in a container nor transported any significant distance away from the project location.
- Each day prior to fill operations below MHW, sunflower sea star surveyors will systematically examine all intertidal and subtidal areas that may be impacted by fill operations during that day.
- Survey transects will run roughly parallel to shore, with two-meter separation between each transect line, until the area that will be covered with fill that day is surveyed (see example transect diagrams, Appendix C). Surveys may be done on foot at low tide or by snorkelers in areas where the substrate is not visible by foot during low tide. During surveys, bathymetry must be sufficiently visible so that surveyors can accurately assess for the presence of sunflower sea stars of all size classes. In areas that are not visible to snorkelers, surveys may be done by a diver or remotely operated vehicle equipped with a camera.

- As feasible, sunflower sea stars that are found in fill areas will be gently moved into a container of water collected at the site, and taken to a location at least 100 meters away from the project area and gently released onto the substrate. The number and approximate diameter of sunflower sea stars moved will be recorded and reported to NMFS.
- If it appears that a sunflower sea star has sea star wasting syndrome or if any dead sunflower sea stars are observed, pictures of the individuals will be taken and infected individuals will be counted. The infected sunflower sea stars will not be touched or moved. All sunflower sea star findings will be reported to NMFS, including latitude/longitude and transect line, at [akr.section7@noaa.gov](mailto:akr.section7@noaa.gov) (see fact sheet, Appendix C).
- Fill material will be obtained from local sources when available, avoiding the need to ship fill through marine mammal habitat and minimizing the risk of introducing non-native species.

## 2 DESCRIPTION OF THE SPECIES AND THEIR HABITAT

Five species of ESA-listed marine mammals and one species proposed to be ESA-listed under NMFS's jurisdiction may occur in the action area:

- Endangered WDPS Steller sea lion (*E. jubatus*)
- Threatened Mexico DPS humpback whale (*M. novaeangliae*)
- Endangered fin whale (*B. physalus*)
- Endangered North Pacific right whale (*E. japonica*)
- Endangered sperm whale (*P. macrocephalus*)
- Proposed threatened sunflower sea star (*Pycnopodia helianthoides*)

Critical habitat has been designated for two of these species, the WDPS Steller sea lion and the North Pacific right whale (Table 1); however, the project action area does not encompass critical habitat of any ESA-listed species, and thus this project would have no effect on critical habitat.

### 2.1 SPECIES THE PROJECT IS NOT LIKELY TO ADVERSELY AFFECT

Based on published references and data from nearby marine mammal monitoring projects, CBS concludes that the following species are not likely to be adversely affected by the proposed action: fin whale, North Pacific right whale, and sperm whale. These analyses are provided below.

#### 2.1.1 FIN WHALE

##### 2.1.1.1 Description

Fin whales are classified in the same suborder as humpback whales, Mysticeti, with the indicative baleen plates in place of teeth. Fin whales are the second largest cetacean species with measured lengths of 24 meters (78 feet). Females are typically larger than males. Individuals range in weight from 50 to 70 tons. At birth, calves measure 5.5 to 6.5 meters (14 to 20 feet) and weigh approximately two tons. Male fin whales reach sexual maturity at about 6 to

10 years while females reach sexual maturity at 7 to 12 years. Fin whales have a maximum lifespan of 90 years (NMFS 2023b; American Cetacean Society [ACS] 2017).

The anatomy of a fin whale is streamlined and lends to their reputation as “greyhounds of the sea” with measured speeds of 37 kilometers per hour (23 miles per hour). Fin whales have a distinguishable, V-shaped head that is flat on top and an atypically colored jaw that is white or creamy yellow on the right side and mottled black on the left side. The topside of the body is light gray to brownish black and the underside of the body, fluke, and flippers are white. A prominent, curved dorsal fin is located far back on the body and is the most identifiable feature (ACS 2017).

Fin whales fast during their winter migration to warmer climates but feed on up to two tons per day of krill, small schooling fish, and squid at their summer feeding grounds. They have been documented lunge feeding and circling prey at high speeds before turning on their side to engulf a ball of fish (ACS 2017).

#### *2.1.1.2 Status*

The fin whale was listed as an endangered species under the Endangered Species Conservation Act (ESCA) in 1970 (35 FR 18319; December 2, 1970) and continued to be listed as endangered following passage of the ESA in 1973. The fin whale is listed as depleted throughout its range under the MMPA of 1972. The main reason for listing is that fin whales were depleted by historic and modern whaling practices (NMFS 2015).

#### *2.1.1.3 Hearing Ability*

Fin whales are classified as LF cetaceans with a generalized hearing range of 7 hertz (Hz) to 35 kilohertz (kHz; NMFS 2018). There is a lack of studies on the hearing capabilities of fin whales. The only current study was based on anatomical laboratory findings from a young whale and suggests that fin whales may have the best sensitivity at 1.2 kHz, with thresholds within 3 dB of best sensitivity from about 1 to 1.5 kHz (Cranford and Krysl 2015).

#### *2.1.1.4 Range*

Fin whales are present in all oceans of the world with the highest concentration in temperate to polar latitudes. A migratory species, fin whales generally spend the spring and early summer feeding on krill and small fish in cold, high latitude waters as far north as the Chukchi Sea, with regular feeding grounds in the Gulf of Alaska, Prince William Sound, along the Aleutians Islands, and around Kodiak Island. In the fall, fin whales tend to return to low latitudes for the winter breeding season, though some may remain in residence in their high latitude ranges if food resources remain plentiful (Alaska Department of Fish and Game [ADF&G] 2008). In the eastern Pacific, fin whales typically spend the winter off the central California coast and into the Gulf of Alaska.

Fin whales are found in deep offshore waters. Panigada et al. (2005) found water depth to be the most significant variable in describing fin whale distribution, with more than 90 percent of sightings occurring in waters deeper than 2,000 meters (6,560 feet).

#### *2.1.1.5 Abundance*

Given the challenges to tracking and surveying fin whales, there are no reliable estimations of current or historical abundances of the Northeast Pacific fin whale stock (Muto et al. 2022). A

conservative minimum population estimate based on surveys in the Gulf of Alaska is 2,554 fin whales; however, since this estimate is based on a 2013 survey that only covered a small portion of the stock's range, NMFS considers this an unreliable estimate.

#### *2.1.1.6 Fin Whales in Sitka Channel*

Fin whales are rare in the inside waters of Southeast Alaska (Neilson et al. 2012). Fin whales are not expected in the project area because of its location in the shallow and narrow north end of Sitka Channel. Fin whales are rare in the action area and have not been observed during various marine mammal monitoring efforts around Sitka Channel. Fin whales were not observed during five days of monitoring in March 2022 during the geotechnical survey for this project (SolsticeAK 2022). No fin whales were observed during 39 days of monitoring for the Crescent Harbor Float Replacement Project, about 2,000 meters (6,600 feet) away from the Sitka SPB Project area (SolsticeAK 2020). Fin whales were also not observed during the following monitoring efforts near Sitka Channel: 21 days of monitoring for the construction of Gary Paxton Industrial Park (GPIP) Dock in October and November 2017 (Turnagain Marine Construction [Turnagain] 2017); 8 days of monitoring during the construction of the Sitka Petro Dock in January 2017 (Windward Project Solutions [Windward] 2017); monitoring at Biorka Island in June, July, August, or September 2018 (Turnagain 2018); or limited monitoring conducted in September 2018 at the O'Connell lightering Float (SolsticeAK 2019). From 1994 to 2002, marine biologist Jan Straley conducted periodic land-based and vessel-based marine mammal surveys of Sitka Channel and Sitka Sound. No fin whales were observed during these surveys (Straley and Pendell 2017). Given that no fin whales have been observed in marine mammal surveys conducted around Sitka Channel, no fin whales are expected to occur within the action area.

CBS has not requested, and NMFS PR1 does not intend to authorize, any injury or harassment of fin whales in association with the project. Given their expected low density in the project area, the shallowness of the area relative to the species' preferred foraging depths (Panigada et al. 2005), and the implementation of shutdown procedures if a marine mammal is observed likely to enter the shutdown zone, the Sitka SPB Project **is not likely to adversely affect fin whales**.

#### *2.1.1.7 Critical Habitat*

Critical habitat has not been designated for the fin whale (NMFS 2023b).

### **2.1.2 NORTH PACIFIC RIGHT WHALE**

#### *2.1.2.1 Description*

North Pacific right whales are baleen whales with large, callosities-covered black bodies without a dorsal fin. Their head accounts for one-third of their body and females are typically larger than males. Using ear bone aging techniques, right whales are estimated to live at least 70 years. Females and males typically reach sexual maturity around eight years of age (NMFS 2023c).

Like other toothless whales they filter zooplankton, krill, and small fish through baleen plates using a skimming method in which they move through the water with their mouth open (NMFS 2023c).

#### 2.1.2.2 Status

The North Pacific right whale was listed as an endangered species under the ECSA in 1970 (73 FR 12024; 2008) and continued to be listed as endangered following passage of the ESA in 1973. The North Pacific right whale is considered depleted throughout its range under the MMPA. In 2008, NMFS listed the endangered northern right whale (*Eubalaena spp.*) as two separate, endangered species: North Pacific right whale (*E. japonica*) and North Atlantic right whale (*E. glacialis*). The main reason for listing is that the whales were heavily exploited by whaling in the North Pacific (NMFS 2015a). A final recovery plan for North Pacific right whales was adopted by NMFS in 2013 (78 FR 34347).

#### 2.1.2.3 Hearing Ability

North Pacific right whales are classified as LF cetaceans under the NMFS *Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammals* (NMFS 2018). They are estimated to have a hearing frequency range of 10 Hz to 22 kHz (Parks et al. 2007).

#### 2.1.2.4 Range

North Pacific right whales inhabit the Pacific Ocean, particularly between 20°N and 60°N. They primarily occur in coastal or shelf waters, although movements over deep waters are known. Few sightings of right whales occur in Alaska; those that do occur in Alaska are primarily in the central North Pacific and Bering Sea. Since 1996, right whales have been consistently observed in Bristol Bay (southeastern Bering Sea) during the summer months. Sightings have been reported as far south as central Baja California in the eastern North Pacific, as far south as Hawaii in the central North Pacific, and as far north as the sub-Arctic waters of the Bering Sea and Sea of Okhotsk in the summer (NMFS 2015a).

Migratory patterns of the North Pacific right whale are unknown, although it is thought the whales spend the summer on high-latitude feeding grounds far from shore and migrate to more temperate waters during the winter. For much of the year, their distribution is strongly correlated to the distribution of their prey. The primary food sources are zooplankton, including copepods, euphausiids, and cyprids.

#### 2.1.2.5 Abundance

According to NMFS, right whales are the rarest of all large whale species. Depleted by whaling and illegal harvesting, only an estimated 30 North Pacific right whales remain in the eastern stock (the population of whales that summers in the southeastern Bering Sea and Gulf of Alaska) (NMFS 2015b). Based on visual and photo-identification surveys, a minimum estimate of the population of the eastern North Pacific stock right whales is approximately 26 individuals (Wade et al. 2011 and Muto et al. 2022).

#### 2.1.2.6 North Pacific Right Whales in Sitka Channel

North Pacific right whales are rare in the action area and have not been observed during various marine mammal monitoring efforts around Sitka Channel. North Pacific right whales were not observed during five days of monitoring in March 2022 during the geotechnical survey for this project (SolsticeAK 2022). No North Pacific right whales were observed during 39 days of monitoring for the Crescent Harbor Float Replacement Project, about 2,000 meters (6,600 feet) away from the Sitka SPB Project area (SolsticeAK 2020). North Pacific right whales were also not observed during the following monitoring efforts near Sitka Channel: 21 days of

monitoring for the construction of GPIP Dock in October and November 2017 (Turnagain 2017); 8 days of monitoring during the construction of the Sitka Petro Dock in January 2017 (Windward 2017); monitoring at Biorka Island in June, July, August, or September 2018 (Turnagain 2018); or limited monitoring conducted in September 2018 at the O’Connell lightering Float (SolsticeAK 2019). From 1994 to 2016, marine biologist Jan Straley conducted periodic land-based and vessel-based marine mammal surveys of Sitka Channel and Sitka Sound. No North Pacific right whales were observed during these surveys (Straley and Pendell 2017). Given that no North Pacific right whales have been observed in marine mammal surveys conducted around Sitka Channel, no North Pacific right whales are expected to occur within the action area.

North Pacific right whales are not expected in the project area because they are very rare, and because the project location is not a documented feeding or calving area. CBS has not requested, and NMFS PR1 does not intend to authorize, any injury or harassment of North Pacific right whales in association with the project. Given their expected low density in the project area and implementation of shutdown procedures if a marine mammal is observed likely to enter the shutdown zone, we conclude that the Sitka SPB Project **is not likely to adversely affect North Pacific right whales**.

#### *2.1.2.7 Critical Habitat*

In April 2008, because the North Pacific right whale was a newly listed entity, previously listed as a separate, endangered species (northern right whale), NMFS was required to designate critical habitat for the North Pacific right whale. The same two areas, within the Gulf of Alaska (just southeast of Kodiak Island) and within the Bering Sea (west of Bristol Bay and north of False Pass), that were previously designated as critical habitat (71 FR 38277; 2006) for the northern right whale are now designated as critical habitat for the North Pacific right whale (73 FR 19000, 2008) (NMFS 2015a; NMFS 2007).

The designated critical habitat in the Gulf of Alaska (located over 900 kilometers [550 miles] west of the proposed action) is the closest designated critical habitat for the North Pacific right whale and is well outside the action area. The project would have **no effect on North Pacific right whale critical habitat**.

### **2.1.3 SPERM WHALE**

#### *2.1.3.1 Description*

Sperm whales are in the order Cetacea and suborder Odontoceti, meaning “toothed whales” in Latin. The scientific name, *Physeter macrocephalus*, is further indicative of the whales’ “blow pipe” structure and large head. Sperm whales are the largest toothed whales. Males typically reach lengths of more than 50 feet and weigh up to 70 tons, and the smaller females reach lengths of about 35 feet and weigh up to 20 tons. They have distinct head structures that account for one-third of their body composition and a single blow hole that is located on the left side of the head (NMFS 2023d).

Sperm whales can dive to depths of around 2,000 feet for approximately 45 minutes and prefer deep waters that support copepods, squid, sharks, skates, and bottom feeding fish. Their diet is determined by their immediate habitat and prey availability (NMFS 2023d).

### *2.1.3.2 Status*

The sperm whale was listed as an endangered species under the ECSA in 1969 (35 FR 18319; December 2, 1970) and continued to be listed as endangered following passage of the ESA in 1973. The sperm whale was listed as depleted under the MMPA of 1972. The main reason for its listing is that most sperm whale populations were depleted by modern whaling (NMFS 2010).

### *2.1.3.3 Hearing Ability*

Sperm whales produce sounds greater than 180 dB re 1  $\mu$ Pa and have an estimated best hearing sensitivity from 0.1 to 30 kHz with frequencies of 2 to 4 and 10 to 16 kHz (Madsen et al. 2006). NMFS considers sperm whales to be in the mid-frequency hearing group with a generalized hearing range of 150 Hz to 160 kHz (NMFS 2018).

### *2.1.3.4 Range*

Sperm whales are found typically far from land throughout the world's oceans in deep waters between about 60°N and 60°S. They tend to inhabit areas with a water depth of 600 meters (1,970 feet) or more, and are uncommon in waters less than 300 meters (980 feet) deep (NMFS 2023d). Sperm whale calls have been detected year-round in the Gulf of Alaska (Mellinger et al. 2004). They can also be found in the Bering Sea and throughout the Aleutian Islands (ADF&G 2020). There is no reliable abundance estimate for the North Pacific sperm whale stocks because the only available data is more than eight years old (Muto et al. 2022).

Sperm whale distribution is dependent on their food source (primarily large squid, sharks, skates, and fishes) and suitable conditions for breeding, and varies with the sex and age composition of the group. The species abundance and migrations are not as predictable or well understood as migrations of most baleen whales. In some mid-latitudes, there seems to be a general trend to migrate north and south depending on the seasons (whales move poleward in the summer). However, in tropical and temperate areas, there appears to be no obvious seasonal migration. Females and young whales generally stay in tropical and temperate waters. Male sperm whales tend to migrate north in the summer to feed (NMFS 2023d).

### *2.1.3.5 Abundance*

Abundance estimates for this species are limited and considered unreliable. Surveys conducted in 2009 and 2015 in the Gulf of Alaska estimated 129 (critical value [CV] = 0.44) and 345 (CV = 0.43) whales, respectively (Rone et al. 2017). Using the estimates from Rone et al. 2017, NMFS calculated a minimum population estimate of 244 (CV = 0.43) sperm whales; however, this is an unreliable estimate and does not account for the nomadic tendencies of the species (Muto et al. 2022).

### *2.1.3.6 Sperm Whales in Sitka Channel*

Sperm whales are rare in the action area and have not been observed during various marine mammal monitoring efforts around Sitka Channel. Sperm whales were not observed during five days of monitoring in March 2022 during the geotechnical survey for this project (SolsticeAK 2022). No sperm whales were observed during 39 days of monitoring for the Crescent Harbor Float Replacement Project, about 2,000 meters (6,600 feet) away from the Sitka SPB Project area (SolsticeAK 2020). Sperm whales were also not observed during the following monitoring efforts near Sitka Channel: 21 days of monitoring for the construction of GPIP Dock in October

and November 2017 (Turnagain 2017); 8 days of monitoring during the construction of the Sitka Petro Dock in January 2017 (Windward 2017); monitoring at Biorka Island in June, July, August, or September 2018 (Turnagain 2018); or limited monitoring conducted in September 2018 at the O’Connell Lightering Float (SolsticeAK 2019). No sperm whales were observed during Straley’s periodic marine mammal surveys of Sitka Channel and Sitka Sound spanning two decades from 1994 to 2016 (Straley and Pendell 2017). Given that no sperm whales have been observed in marine mammal surveys conducted around Sitka Channel, no sperm whales are expected to occur within the action area.

Sperm whales are not expected in the project area because of its location in the shallow and narrow north entrance of Sitka Channel. CBS has not requested, and NMFS PR1 does not intend to authorize, any injury or harassment of sperm whales in association with the project. Given their expected low density in the project area, the shallowness of the area relative to the species’ preferred habitat depths, and the implementation of shutdown procedures if a marine mammal is observed likely to enter the shutdown zone, we conclude that the Sitka SPB Project **is not likely to adversely affect sperm whales.**

#### *2.1.3.7 Sperm Whale Critical Habitat*

Critical habitat has not been designated for the sperm whale.

## **2.2 SPECIES THE PROJECT MAY OR IS LIKELY TO ADVERSELY AFFECT**

After reviewing information about the Mexico DPS humpback whale and WDPS Steller sea lion, it is likely these species would be adversely affected by the proposed action. Analyses are provided below.

### **2.2.1 MEXICO DPS HUMPBACK WHALE**

#### *2.2.1.1 Description*

Humpback whales are classified in the cetacean suborder Mysticeti, whales characterized by having baleen plates for filtering food from water. The humpback whale is one of the larger baleen whales, weighing up to 25-40 tons (50,000-80,000 pounds) and measuring up to 60 feet long, with females growing larger than males. Newborns are about 15 feet long and weigh about 1 ton (2,000 pounds). Humpback whales reach sexual maturity at 4 to 7 years, and their lifespan is around 50 years or more. The species is known for long pectoral fins, which can be up to 15 feet long. The body coloration is primarily dark grey, but individuals have varying amounts of white on their pectoral fins and belly. This variation is so distinctive that tail fluke pigmentation patterns are used to identify individual whales, analogous to human fingerprints (NOAA 2011).

Humpback whales filter feed on tiny crustaceans (mostly krill), plankton, and small fish and can consume up to 3,000 pounds of food per day. Well-documented North Pacific humpback whale prey include: krill, Pacific herring, juvenile salmon, capelin, Pacific sandlance, juvenile walleye pollock, eulachon, Pacific sandfish, surf smelt and lanternfish (NMFS 2023d). Hunting methods involve using air bubbles to herd, corral, or disorient fish (Wiley et al. 2011).

### 2.2.1.2 Status

In 1970, the humpback whale was listed as endangered worldwide under the ESCA of 1969 (35 FR 8491; June 2, 1970), primarily due to decimation from whaling. Congress replaced the ESCA with the ESA in 1973, and some stocks of humpback whales continued to be listed as threatened or endangered. Following the cessation of most legal whale harvesting, humpback whale numbers increased.

On September 8, 2016, NMFS published a final decision changing the status of humpback whales under the ESA (81 FR 62259), effective October 11, 2016. Previously, humpback whales were listed under the ESA as an endangered species worldwide. In the 2016 decision, NMFS recognized the existence of 14 DPSs, classified four of those as endangered and one as threatened, and determined that the remaining nine DPSs do not warrant protection under the ESA.

NMFS is in the process of updating humpback whale stocks. In a draft marine mammal stock assessment, NMFS defined five stocks that are present in the North Pacific based on genetic analysis, photo identification, and migration patterns (Young et al. 2023). They are the Central America/Southern Mexico-California/Oregon/Washington stock (Central America to the west coast of the U.S.; includes the Central America DPS), the Mainland Mexico-California/Oregon/Washington stock (Mexico to the West Coast of the U.S., Alaska, and Russia; includes the Mexico DPS), the Hawaii stock (Hawaii to the west coast of the U.S., Alaska, and Russia; includes the Hawaii DPS), the Mexico-North Pacific stock (Mexico to the west coast of the U.S.; includes the Mexico DPS), and the Western North Pacific (WNP) stock (Asia to Russia and Western Alaska/Bering Sea; includes the WNP DPS) (Young et al. 2023). Four of the stocks (the Central America/Southern Mexico-California/Oregon/Washington, Mexico-North Pacific, Mainland Mexico-California/Oregon/Washington, and WNP) are designated as depleted under the MMPA. The Hawaii stock is not listed as depleted under the MMPA (Young et al. 2023).

In 2015, a large whale unusual mortality event (UME) was reported for the Western Gulf of Alaska and British Columbia which included 22 humpback whales in Alaska. A definitive cause for the UME was not determined, but was likely attributable to ecological factors (i.e., oceanographic changes driven by climate change; Savage 2017).

### 2.2.1.3 Hearing Ability

Humpback whales are classified by NMFS as LF cetaceans with a generalized hearing range of 7 Hz to 35 kHz (NMFS 2018). No direct measurement of whale hearing is available due the lack of captive subjects and logistical challenges of bringing experimental subjects into a laboratory. Consequently, hearing in Mysticetes is estimated based on other means such as vocalizations, anatomy, behavioral responses to sound, and nominal natural background noise conditions in their likely frequency ranges of hearing (Racicot 2021; Fournet et al. 2018). The combined information, from these and other sources, strongly suggests that Mysticetes are likely most sensitive to sound from perhaps tens of hertz to about 10 kHz, and evidence suggests that humpbacks can hear sounds as low as 7 Hz (Southall et al. 2007), up to 24 kHz, and possibly as high as 30 kHz (Au et al. 2006; Ketten 1997).

Humpbacks communicate with each other through vocal signals (singing) and surface-generated signals such as breaching or tail slapping (Fournet et al. 2018a). Generally, humpback

whales use communication networks that may extend for several miles with a diverse set of vocalizations and non-song acoustic communication during foraging, breeding, and other social interactions (Dunlop 2010). It has been suggested that they use vocalizations during feeding to coordinate feeding maneuvers or to stun or trap prey (National Park Service [NPS] 2020; Leighton et al. 2004).

#### *2.2.1.4 Range*

Humpback whales are distributed worldwide in all ocean basins with a broad geographical range from tropical to temperate waters in the Northern Hemisphere and from tropical to near-ice-edge waters in the Southern Hemisphere (Allen and Angliss 2015).

Humpback whales migrate seasonally between warmer, tropical or sub-tropical waters in winter months (where they reproduce and give birth to calves) and cooler, temperate or sub-Arctic waters in summer months (where they feed) (Bettridge et al. 2015). Figure 13 shows migratory destination for winter (green areas) and summer (blue areas) for humpback whales in the North Pacific Ocean (Wade 2021). Patterns of occurrence likely follow the spatial and temporal changes in prey abundance and distribution with humpback whales adjusting their foraging locations to areas of high prey density (NMFS 2012). Historical studies found that humpback whales are frequently sighted in the northern reaches of the Gulf of Alaska and off the Aleutian Islands following prey in the spring and then move south to Southeast Alaska in early fall to feed on krill (Krieger and Wing 1986). However, based on more recent sightings, it is also likely that some humpback whales stay in the Gulf of Alaska to feed in the winter (Straley et al. 2018).

Humpback whales may be seen at any time of year in Alaska, but most animals winter in temperate or tropical waters near Mexico, Hawaii, and in the western Pacific near Japan. In the spring, the animals migrate back to Alaska where food is abundant. They tend to concentrate in several areas, including Southeast Alaska, Prince William Sound, near Kodiak Island, the Barren Islands at the mouth of Cook Inlet, and along the Aleutian Islands. The Chukchi Sea is the northernmost area for humpbacks during their summer feeding; although, in 2007, humpbacks were seen in the Beaufort Sea east of Barrow, suggesting a northward expansion of their feeding grounds (Zimmerman and Karpovich 2008).

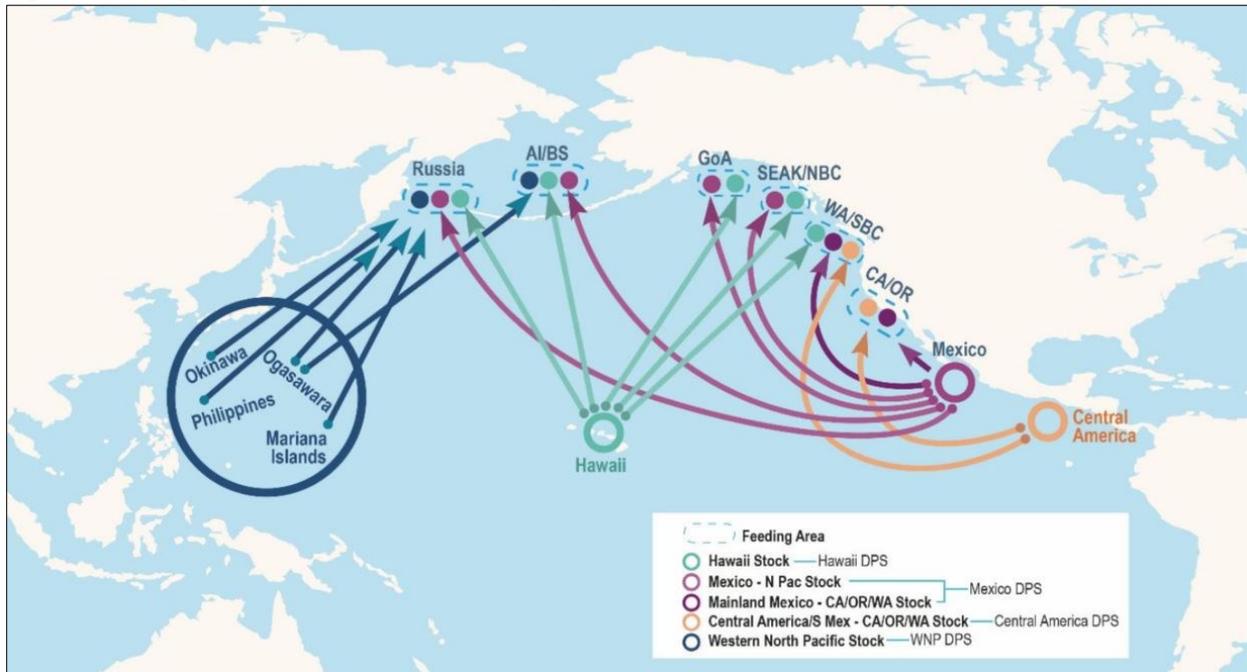
Three DPSs of humpback whales occur in waters off the coast of Alaska: the WNP DPS which is listed as endangered under the ESA; the Mexico DPS which is listed as threatened under the ESA; and the Hawaii DPS which is not protected under the ESA. Whales from these three DPSs overlap to some extent on feeding grounds off Alaska (Figure 13).

#### *2.2.1.5 Abundance*

Using fluke identification photographs from 2004 through 2006, Barlow et al. (2011) estimated that there are 21,063 humpback whales in the North Pacific. More recently, using a multi-strata analysis, Wade (2021) estimated that the abundance of humpback whales in the North Pacific using the multi-state model is 16,293 for the winter areas and 18,942 for the summer areas.

The humpback whale population in the North Pacific has increased substantially since the cessation of major commercial whaling operations, and the current abundance estimate exceeds some pre-whaling estimates. According to the Structure of Populations, Levels of

Abundance, and Status of Humpbacks report, the Gulf of Alaska abundance estimates range from approximately 3,000 to 5,000 animals, depending on the modeling approach employed (Calambokidis et al. 2008).

**Figure 13. Migratory Destinations of Humpback Whales in the North Pacific Ocean**

Source: Young et al. 2023

#### 2.2.1.6 Humpback Whales in Sitka Channel

Based on an analysis of migration between winter mating/calving areas and summer feeding areas using photo-identification, Wade et al. (2016) concluded that humpback whales feeding in Alaska waters belong primarily to the Hawaii DPS (now recovered), with small contributions of Mexico DPS (threatened) and WNP DPS (endangered) individuals. In the action area most humpback whales are likely to be from the recovered Hawaii DPS (98%), with remainder likely to be from the threatened Mexico DPS (2%; NMFS 2021; Table 13).

Within Southeast Alaska, humpback whales are found throughout all major waterways and in a variety of habitats, including open-ocean entrances, open-strait environments, near-shore waters, area with strong tidal currents, and secluded bays and inlets. They tend to concentrate in several areas, including northern Southeast Alaska. Patterns of occurrence likely follow the spatial and temporal changes in prey abundance and distribution with humpback whales adjusting their foraging locations to areas of high prey density (Allen and Angliss 2012). Humpback whale diets are dominated by euphausiid species and small pelagic fish, including Pacific herring which are found in the project action area. Pacific herring serve an important ecological role within Sitka Sound and are known to spawn on intertidal and subtidal substrates within the project area in spring (ADF&G 2019).

During 190 hours of observation from 1994 to 2002 from Sitka's Whale Park, 440 humpback whales were observed (Straley and Pendell 2017). During 21 days of monitoring during the construction of GPIP Dock between October 9 and November 9, 2017, 39 humpback whales were observed (Turnagain 2017). No humpback whales were observed within Sitka Channel during the eight days of monitoring in January 2017 during the construction of the Sitka Petro Dock (Windward 2017). Near Biorka Island, about 25 kilometers south of the project, humpback

whales were sighted in June (22 whales), July (3 whales), and September (2 whales) 2018 (Turnagain 2018). No whales were sighted in August during that monitoring effort. Humpback whales were not observed during recent monitoring conducted for short periods over eight days in September 2018 within a 400-meter radius surrounding the O’Connell Bridge Lightering Float (SolsticeAK 2019). During 39 days of monitoring in January through March 2020 for the Crescent Harbor Float Rebuild Project, no humpbacks were observed. Humpback whales were not observed during five days of monitoring in March 2022 during the geotechnical survey for this project (SolsticeAK 2022).

Given their widespread range and their opportunistic foraging strategies, humpback whales may be in the project vicinity year-round but are more likely to occur in the summer months.

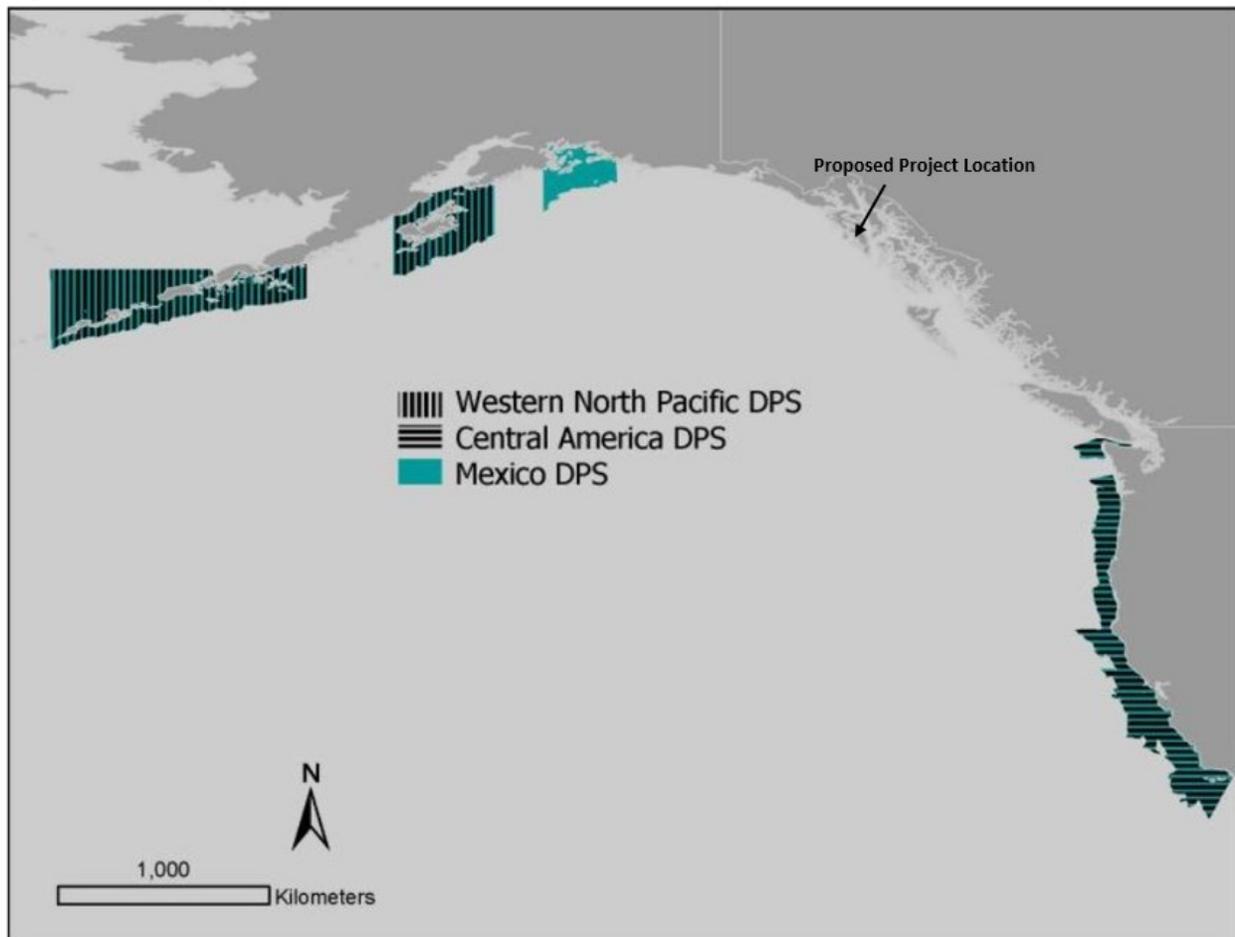
**Table 13. Estimated Humpback Whale DPS Occurrence in Southeast Alaska**

Humpback Whale DPS	Status	Percentage <sup>1</sup>
Hawaii	Not Listed	98
Mexico	Threatened	2

<sup>1</sup>Source: NMFS 2021, adopted from Wade et al. 2021

#### *2.2.1.7 Critical Habitat*

Critical habitat for humpback whales was finalized on April 21, 2021, and became effective on May 21, 2021 (86 FR 21082). There is no humpback whale critical habitat designated in Southeast Alaska (NMFS 2023f). The nearest critical habitat for humpback whales is in Prince William Sound, more than 600 kilometers (380 miles) north of the project (Figure 14). The project would have **no effect on humpback whale critical habitat**.

**Figure 14. Humpback Whale Critical Habitat**

Source: NMFS 2023f

## 2.2.2 WDPS STELLER SEA LION

### 2.2.2.1 Description

Steller sea lions are pinnipeds and members of the Otariidae or “eared seals” family. They are the largest of the eared seals, with males measuring up to 2,500 pounds and 11 feet long. Females of the species are slightly smaller, weighing up to 800 pounds. They are characterized by light blonde to reddish brown coats and long white whiskers on their muzzles used to sense prey and navigate within the water. They have long front flippers that are used to propel themselves in water and shorter back flippers that can be turned for walking on land (NMFS 2023g). As social animals, they gather in large groups on land at rookeries for resting, breeding, and raising young pups. They are known to haul out on land, docks, buoys, and navigational markers. Different from rookeries, haulouts are more informal gathering locations used for resting and molting. In their aquatic habitat Steller sea lions are generally solitary hunters and excellent divers and often gather in large rafts, or clusters, at the surface.

Steller sea lions are opportunistic foraging feeders with diets consisting of a variety of fish and cephalopod species, depending on prey availability. Feeding habits vary with season. During spring, energetic demands are high for pregnant females and for males preparing for extended

fasting. Beginning in May and throughout the breeding season, males may fast for up to two months while occupying and defending their rookery territory and breeding females forage closer to rookeries and return often to their nursing pups (NMFS 2023g).

#### *2.2.2.2 Status*

The Steller sea lion was listed as a threatened species under the ESA on November 26, 1990 due to significant population decline (55 FR 49204). Speculated causes of the decline included competition with commercial fisheries, environmental change, disease, predation, incidental take, and shooting (NMFS 2016). In 1997, NMFS reclassified Steller sea lions with two DPSs based on genetic studies and other information (62 FR 24345; May 7, 1997). At that time, the eastern DPS (EDPS) (which includes animals born east of Cape Suckling, Alaska, at 144°W) was listed as threatened, and the WDPS (which includes animals breeding west of Cape Suckling, both in Alaska and Russia) was listed as endangered. On November 4, 2013, the EDPS was removed from the endangered species list (78 FR 66140). The WDPS remains on the ESA's endangered list. There have been no UMEs declared for this species in recent years (NMFS 2023h).

#### *2.2.2.3 Hearing Ability*

Steller sea lions have a generalized in-water hearing range of 60 Hz to 39 kHz (NMFS 2018). The ability to detect sound and communicate underwater is important for a variety of Steller sea lion life functions, including reproduction and predator avoidance. The ability to detect sound and communicate underwater is important for a variety of Steller sea lion life functions, including reproduction and predator avoidance. Sea lions have a range of vocalizations used on land and in water in conjunction with territorial behaviors, breeding, and communication between mother/pup pairs (Charrier 2021). Studies of Steller sea lion auditory sensitivities have found that this species detects sounds underwater between 1 to 25 kHz (Kastelein et al. 2005) and in air between 30 Hz and 250 kHz (Mulsow and Reichmuth 2010).

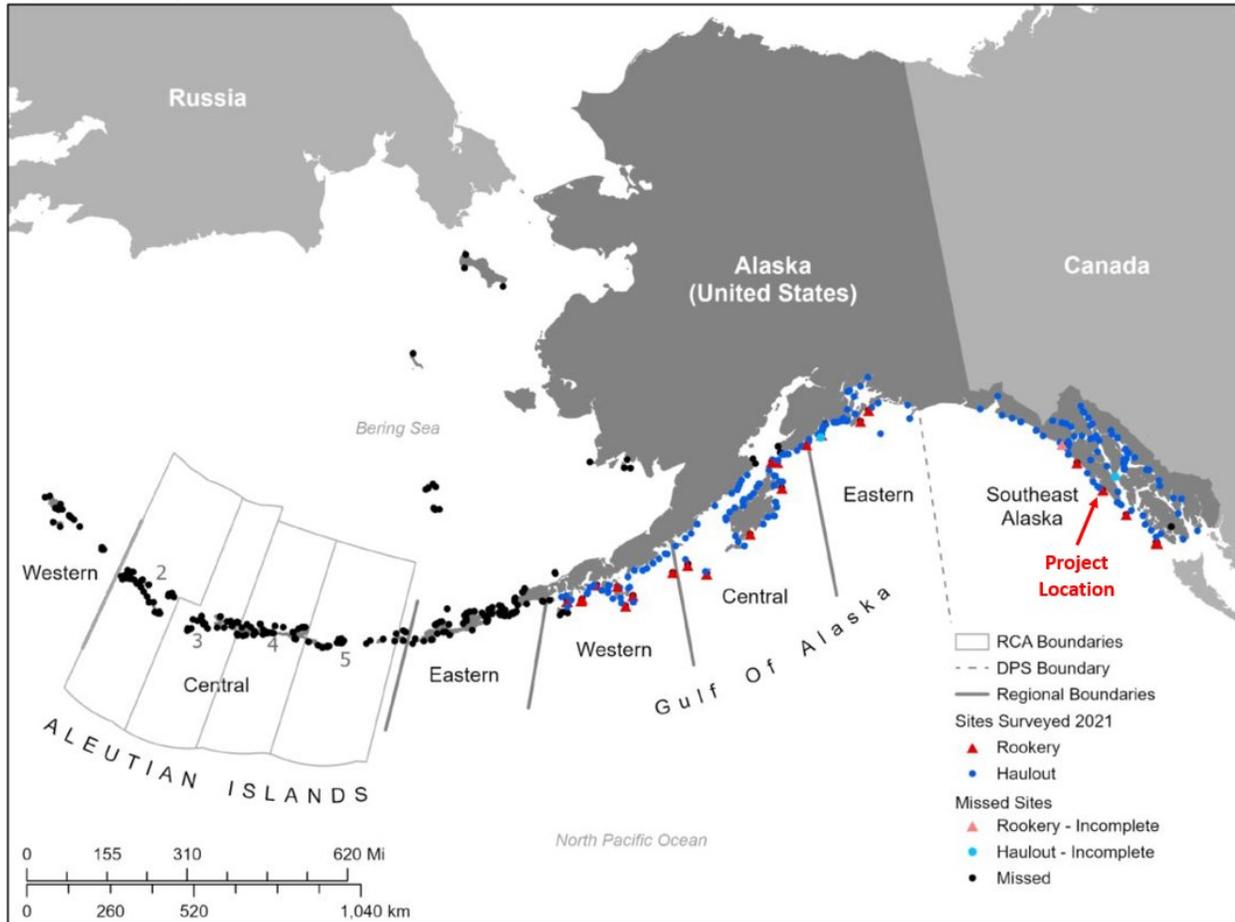
#### *2.2.2.4 Range*

Steller sea lions' range runs along the North Pacific Ocean from northern Japan to California, with centers of abundance in the Gulf of Alaska and Aleutian Islands. They are distributed mainly on the coastlines and coastal waters but can be found in pelagic waters (NMFS 2023g). Steller sea lions are not known to migrate annually, but individuals may disperse widely outside of the breeding season (Jemison et al. 2013; Allen and Angliss 2015).

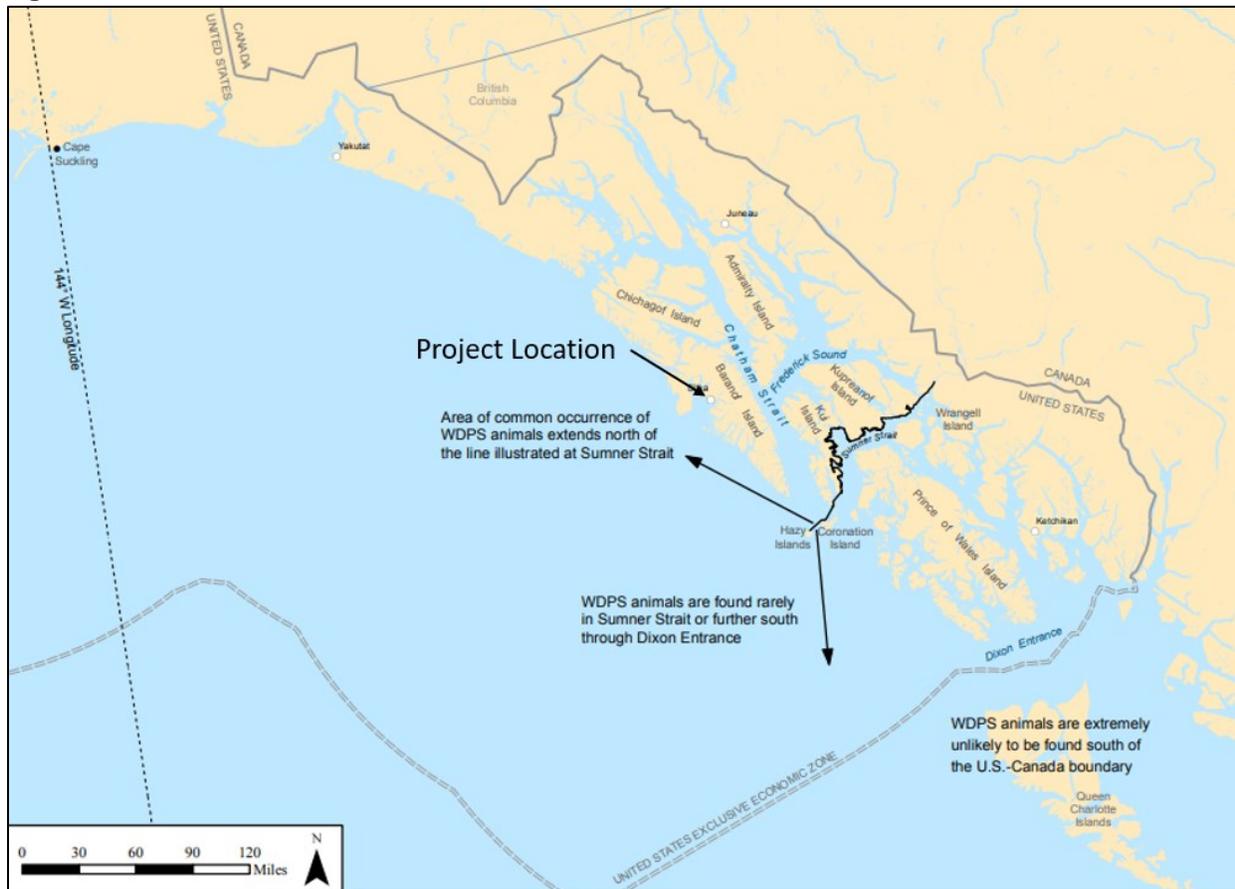
Of the two Steller sea lion populations in Alaska, the WDPS includes sea lions born on rookeries at or west of Cape Suckling, and the EDPS includes sea lions born on rookeries from California north through Southeast Alaska. A dividing line, based on genetic studies, is established at 144°W as shown in Figure 15 (Hastings et al. 2020).

While it is expected that mainly EDPS Steller sea lions are found within the project area (NMFS 2023g), Jemison et al. (2013) found that there is regular movement of WDPS Steller sea lions across the 144°W boundary (Figure 16). Most of the cross-boundary movements are temporary with individuals returning to their natal DPS for breeding, but some females from the WDPS have likely emigrated permanently and have given birth to pups at White Sisters and Graves Rocks rookeries. Most confirmed sightings of WDPS animals have been in northern areas of Southeast Alaska, north of Sumner Strait (Jemison et al. 2013, NMFS 2013).

Figure 15. Separation of WDPS and EDPS Steller Sea Lion Rookeries at 144°W



Source: Hasting et al. 2020

**Figure 16. Area of Occurrence of WDPs Steller Sea Lions North and South of Summer Strait**

Source: NMFS 2013

#### 2.2.2.5 Abundance

The most recent population assessment for the U.S. portion of the WDPs Steller sea lion stocks is 52,932 animals, based on aerial photographic and land-based survey data (Muto et al. 2022). There have been no UMEs declared for this species in recent years (NMFS 2023h); however, an anomalous warming event was reported in the North Pacific Ocean in 2014-2016 and 2018-2019 which may have caused abnormal declines in sea lion counts observed in the Gulf of Alaska in subsequent years (Sweeney et al. 2022).

#### 2.2.2.6 Steller Sea Lions in Sitka Channel

Steller sea lions occur year-round in the project area. Most are expected to be from the EDPS; however, it is likely that some Steller sea lions in the action area are from the WDPs (Jemison et al. 2013; NMFS 2013). Jemison et al. (2013) estimated an average annual breeding season movement of WDPs Steller sea lions to southeast Alaska of 917 animals. Based on surveys and analysis conducted by Hastings et al (2020), an estimated 2.2 percent of Steller sea lions in the vicinity of the project are WDPs Steller sea lions.

From May until September between 1994 and 2000, marine biologist Jan Straley conducted weekly land-based surveys of marine mammals from September to May at Sitka's Whale Park, located at the entrance to Silver Bay. From 2000 to 2016, Straley also collected marine mammal data from small vessels or 100-foot catamarans throughout the year. Steller sea lions were seen

during every month of monitoring (September to May) between 1994 and 2002. Based on Straley's surveys, Steller sea lion numbers are highest near the project area in January and February. January was the most abundant month with about 190 Steller sea lions spotted. February and November were next with about 170 and 120 Steller sea lions spotted respectively. The fewest Steller sea lions were spotted in the month of May (1995-2002). Sea lions were often seen in groups of 4 or more; however, a group of more than 100 was sighted on at least one occasion (Straley and Pendell 2017).

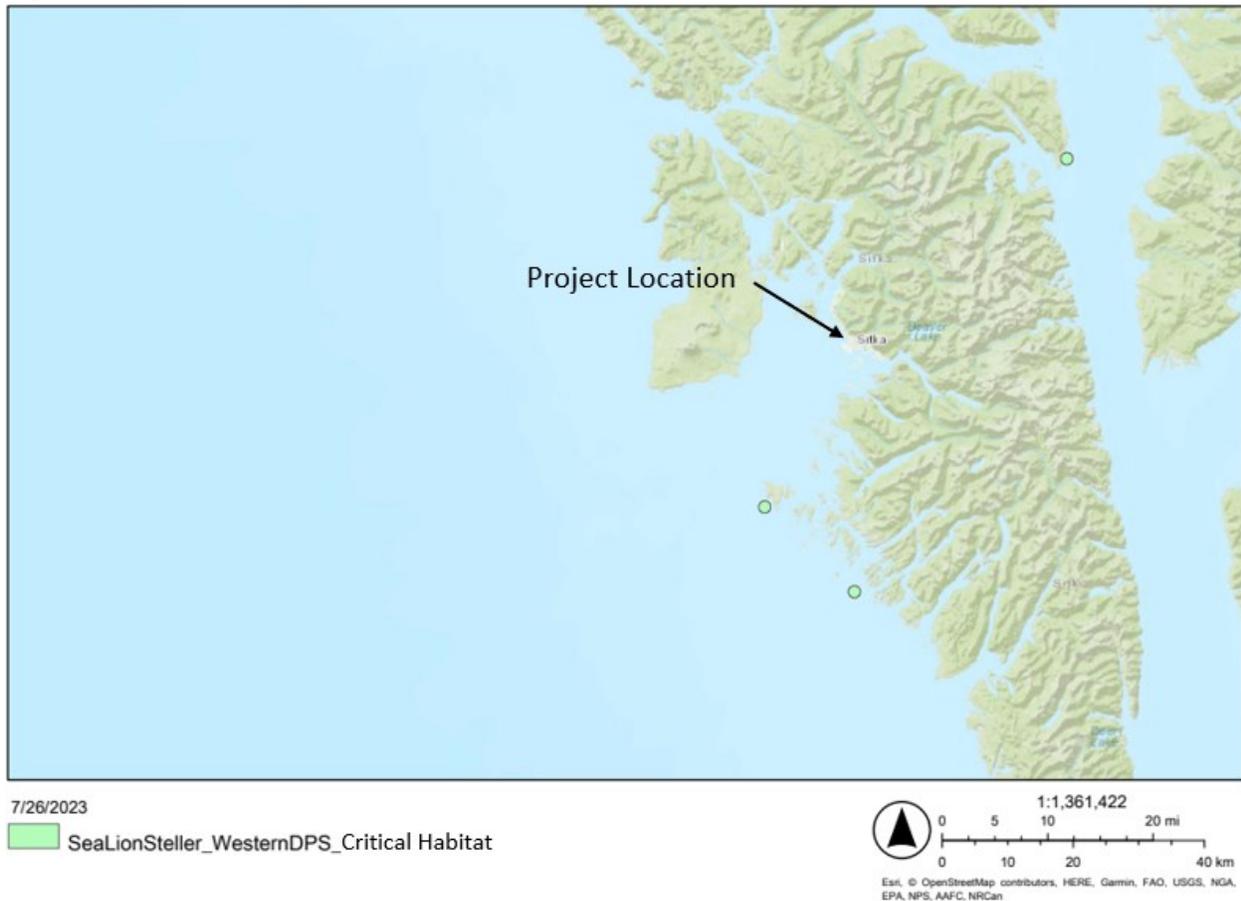
Individual sea lions were seen on 19 of 21 days in Silver Bay and Easter Channel during monitoring for GPIP dock construction between October and November 2017 (Turnagain 2017). Near Biorka Island, sea lions were seen infrequently; sea lions were sighted in June (6 animals), July (2 animals), and no sea lions were seen in August 2018 (Turnagain 2018). During eight days of monitoring for the Petro Marine dock, about 1.6 kilometers (1 mile) southwest of the Sitka SPB in January 2017, individual sea lions were seen on three days (Windward 2017). Steller sea lions were observed five of eight days during monitoring conducted for 15-minute periods over eight days in September 2018 within a 400-meter radius surrounding the O'Connell Bridge Lightering Float approximately 1.8 kilometers (1.9 miles) from the proposed project (SolsticeAK 2019). During in-water construction work for the O'Connell Bridge Lightering Float Pile Replacement Project between June 9 and June 12, 2019, 42 Steller sea lions were sighted (SolsticeAK 2019). During 39 days of marine mammal monitoring for the Crescent Harbor Float Replacement Project January through February 2020, six sea lions were observed southwest of Sitka Channel (SolsticeAK 2020). Anecdotal evidence also indicates that sea lions are common in Sitka Channel near the project footprint.

During Straley's surveys, Steller sea lions were often seen in groups of 2 to 3; however, a group of more than 100 was sighted on at least one occasion (Straley et al. 2018). Steller sea lions in groups ranging from one to eight individuals were observed around Sitka GPIP dock construction. All Steller sea lions were alone in Sitka Channel during Petro Marine Dock construction monitoring (Windward 2017). Steller sea lions were observed in groups of two to three during the O'Connell Bridge Lightering Float Pile Replacement Project and Crescent Harbor Float Rebuild Project and (SolsticeAK 2019 and SolsticeAK 2020).

As a result, Steller sea lions may be in the project vicinity year-round during the proposed project activities.

#### *2.2.2.7 Steller Sea Lion Critical Habitat*

NMFS designated critical habitat for the Steller sea lion on August 27, 1993 (58 FR 45269). The project action area does not overlap Steller sea lion critical habitat. The Biorka Island haul out (over 20 kilometers [12 miles] southwest of the proposed action area) is the closest haulout, and is designated critical habitat; however, it is well outside the action area (30 kilometers [20 miles]; Figure 17). The project would have **no effect on Steller sea lion critical habitat**.

**Figure 17. Steller Sea Lion Critical Habitat near Sitka Sound**

## 2.2.3 SUNFLOWER SEA STAR

### 2.2.3.1 Description

The sunflower sea star (*Pycnopodia helianthoides*) is a member of the Asteriidae family. Adults can measure up to one meter in diameter with 15 to 24 arms or “rays” making them one of the largest sea stars in the world. The sunflower sea star is fast compared with other sea stars, moving at a pace of around five to ten feet per minute (Woodford 2022). Sunflower sea stars are broadcast spawners, meaning that they must congregate in close proximity for successful fertilization; they may also reproduce asexually through larval cloning (Lowry et al. 2022). Sunflower sea stars play an important role in maintaining healthy marine ecosystems throughout the Pacific Ocean by regulating the population of sea urchins. Sea urchins prey on kelp forests, an important habitat for other marine species. Predation on sea urchins by sunflower sea stars helps to keep the urchin population in check, and prevents the depletion or destruction of kelp forest habitat (NMFS 2023i). No specific populations of sunflower sea stars have been delineated, and they are assumed to be genetically homogenous throughout their range (Lowry et al. 2022).

Sunflower sea star prey includes benthic and epibenthic invertebrates such as sea urchins, snails, crab, clams, sea cucumbers, and other sea stars as well as sessile invertebrates including

barnacles and mussels. Sunflower sea stars are also scavengers, consuming dead or injured prey such as fish, sea birds, and octopus. The large invertebrates are also known to forage for clams by excavating them from sandy or muddy substrate (Lowry et al. 2022).

#### *2.2.3.2 Status*

Since 2013, sunflower sea stars have been impacted by sea star wasting syndrome (SSWS). SSWS is caused by an unknown pathogen and leads to sickness and death of sea stars, causing them to lose limbs and disintegrate. SSWS has been especially severe for sunflower sea stars. Research suggests that SSWS may be linked to stressful conditions in the ocean, including changes in water temperature, pH, and pollution (NMFS 2023i).

As a result of impacts to the species from SSWS, the International Union for the Conservation of Nature (IUCN) listed the sunflower sea star as critically endangered in August 2021 (Gravem et al. 2021). On March 16, 2023, NMFS proposed to list the sunflower sea star as threatened under the ESA (88 FR 16212) based on the IUCN listing and recent dramatic declines in the population throughout its range. If NMFS finalizes the proposed listing, a separate notice with protective regulations will be issued in the Federal Register.

#### *2.2.3.3 Hearing Ability*

Behavioral and physiological experiments conducted on sensory abilities of sea stars generally conclude that they possess several senses, including chemoreception (smell), mechanoreception (touch), and photoreception. Other senses including hearing might also be present, but it has not been evaluated experimentally (Garm 2017).

#### *2.2.3.4 Range*

The sunflower sea star's range is from the Aleutian Islands in Western Alaska to Baja California. Prior to 2013, the species was commonly found throughout its range along the Pacific coast. The sunflower sea star is a habitat generalist with no known preferences for specific habitats, but is most commonly found at depths of around 25 meters (82 feet) to around 435 meters (1,427 feet). They are also found in the rocky intertidal zone and in eelgrass beds at depth less than 25 meters (Lowry et al. 2022).

#### *2.2.3.5 Abundance*

A single, systematically collected data set for sunflower sea star population abundance does not exist (NMFS 2023i). While there has been some research on sunflower sea stars, it is often done in conjunction with other primary research; thus, dedicated research on the abundance of sunflower sea stars is lacking, making historical abundance difficult to determine.

More recently, research has focused on understanding the impacts of SSWS, but because this research began after the onset of SSWS it does not provide reliable baseline population numbers. Declines in population due to SSWS have been documented throughout the sunflower sea star's range, and are most pronounced in the southern part (Lowry et al. 2022). Within its southern range (Baja, California to Cape Flattery, Washington), research suggests that the sunflower sea star has declined in abundance by nearly 100% (99.2%) (Hamilton et al. 2021). There have been few documented observations of the sunflower sea star in California or Mexico since 2017 (Lowry et al. 2022). Hamilton et al. (2021) estimates that in the eastern Gulf

of Alaska, the sunflower sea star has declined in abundance by 93.8% and by 96% in Southeast Alaska.

#### *2.2.3.6 Sunflower Sea Stars in Sitka Channel*

Sunflower sea stars are distributed throughout Southeast Alaska and as habitat generalists, occupy a diverse range of habitats. Ocean depths in the project area range from 0 to 50 feet. Although there were no sunflower sea stars observed within the project footprint during the 2020 intertidal assessment (SolsticeAK 2020a), sunflower sea stars can be expected to occur throughout this range of depths. As a result, sunflower sea stars may be found in the project area.

#### *2.2.3.7 Critical Habitat*

No critical habitat has been proposed for the sunflower sea star (88 FR 16212).

### 3 ENVIRONMENTAL BASELINE

The environmental baseline considers the past and present impacts of all Federal, state, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early Section 7 consultation, and the impact of state or private actions that are contemporaneous with the consultation in process (50 CFR § 402.02).

The project vicinity is an area of high human use and habitat alteration. Ongoing human activity in the action area that impacts marine mammals includes marine vessel activity, pollution, climate change, noise (e.g., aircraft, vessel, pile-driving, etc.), and coastal zone development.

#### 3.1 PHYSICAL ENVIRONMENT

The Sitka SPB Project is located on the north shore of Japonski Island (1.5 square kilometers [0.6 miles]) in the Sitka Channel near the Sitka Rocky Gutierrez Airport Terminal, a United States Coast Guard (USCG) Air Station, Mount Edgumbe High School, Mt. Edgumbe Medical Center, and the University of Alaska Southeast Sitka campus. Sitka Channel separates Japonski Island from Sitka Harbor and downtown Sitka on the much larger Baranof Island (4,160 square kilometers [1,600 square miles]). The mean tide range in the Sitka Channel is 7.7 feet, the diurnal tide range is 9.94 feet, and the extreme range is 18.98 feet (NOAA 2020a).

The Sitka Channel is located on the eastern shore of Sitka Sound, west of Crescent Bay and adjacent to Whiting Harbor. Sitka Channel is contained by the Channel Rock Breakwaters to the north and the James O'Connell Bridge to the south, about 2,200 meters (7,220 feet). Sitka Channel is approximately 150 feet wide and about 22 feet deep at its narrowest, which is on the east side of the breakwaters (NOAA 2020). USACE first constructed the breakwaters in 2007 with three distinct segments and two vessel entrances. Following a review in 2012, the opening between the south and main breakwaters was closed to reduce excessive wave energy in the channel harbors (USACE 2012).

Most of the project footprint is previously undisturbed, but proximal to recent construction on the Channel Rock Breakwaters (approximately 500 feet away). Currently there is no infrastructure or active development at the site. Facilities associated with the Mt. Edgumbe Medical Center and the Southeast Alaska Regional Health Consortium (SEARHC) are immediately to the south of the project site. The USCG Air Station Sitka is located due west of the project site, located beside the Sitka Rocky Gutierrez Airport Terminal.

The channel is characterized by multiple marine habitats that support a wide variety of fish and wildlife species. Habitats in the channel range from calm protected embayments to high energy wave-swept exposed coastlines. Much of the developed Sitka waterfront area has a rocky shoreline (USACE 2012). The seafloor in the channel contains a mosaic of bottom types including a mixed-soft bottom (mixture of silt, sand, pebbles, cobbles, boulders, and shell) and bedrock outcrops.

According to the ShoreZone Mapper (ShoreZone 2020), the project intertidal area has a semi-protected/partially mobile/sediment or rock and sediment habitat class and a sand and gravel flat or fan coastal class. The area has a semi-protected biological wave exposure, a narrow

splash zone, and a sheltered tidal flats environmental sensitivity index. According to the website, the oil residency index is month to years (moderate persistence).

### **3.2 INTERTIDAL HABITAT/INTERTIDAL ENVIRONMENT**

According to an intertidal zone field survey conducted June 5 and 6, 2020 (SolsticeAK 2020a), the high intertidal zone of the project area is characterized by boulders and bedrock outcroppings, little algal growth, and some common acorn barnacles (*Balanus glandula*), snails (primarily *Littorina sitkana*), and limpets (*Lottiidae* sp.). Although the mid-intertidal zone varies somewhat with substrate, most of the area is dominated by rockweed (*Fucus gardneri*) and barnacles (*B. glandula*/*Semibalanus balanoides*) comprise the second highest cover. A small mussel (*Mytilus trossulus*) bed is found on the eastern edge of the mid-intertidal area of the project area. The lower intertidal zone, is comprised four different areas including: a small eelgrass bed (*Zostera marina*); an area dominated with mud and sugar kelp (*Saccharina latissimi*); an area characterized by the invasive algal species wireweed (*Sargassum muticum*); and an area dominated by a sugar kelp bed.

### **3.3 FISH AND ESSENTIAL FISH HABITAT**

The waters off the north shore of Japonski Island in Sitka Channel are designated as Essential Fish Habitat (EFH) under the Magnuson Stevens Fisheries and Conservation Management Act for 23 species of ground fish and all five species of Pacific salmon. These ground fish species include: coho salmon, chum salmon, pink salmon, Chinook salmon, sockeye salmon, Aleutian skate, pacific cod, walleye pollock, shortspine thornyhead rockfish, shortraker rockfish, Pacific Ocean perch, redbanded rockfish, black rockfish, dusky rockfish, silvergrey rockfish, quillback rockfish, redstriped rockfish, rosethorn rockfish, sablefish, yellow Irish lord, great sculpin, bigmouth sculpin, arrowtooth flounder, northern rock sole, dover sole, yellowfin sole, Alaska plaice, and octopus (NMFS 2020). The ADF&G and NMFS have also identified Pacific herring and pacific halibut as important fish species in the project area (ADF&G 2019).

There are no anadromous streams that flow directly into the SPB site. The ADF&G Catalog of Waters Important for Spawning, Rearing, or Migration of Anadromous Fishes lists one anadromous stream that flows into the action area. Peterson Creek is anadromous (113-41-10185) for all Pacific salmon species and Dolly Varden and located along the eastern perimeter of the action area (ADF&G 2020a). Since construction and operation of the proposed project would be occurring exclusively in marine waters opposite Sitka Channel from Peterson Creek, direct impacts to the creek are not anticipated from this project. According to the NMFS EFH mapper, Sitka Channel does not have any designated Habitat Areas of Particular Concern.

### **3.4 MARINE VESSEL ACTIVITY**

The action area experiences high levels of marine vessel traffic with the highest volumes occurring May through September. Marine vessels that use the action area include passenger ferries, commercial freight vessels/barges, commercial tank barges, cruise ships, commercial fishing boats, charter vessels, recreational vessels, kayaks, and floatplanes (Nuka Research and Planning Group [Nuka] 2019). The Alaska Marine Highway operates year-round in Sitka with

sailings multiple days a week and provides transit to numerous communities in Southeast Alaska, Washington state, and Canada.

The waters of the Inside Passage support marine cargo transportation. According to automatic identification system passage-line data plots obtained from the Marine Exchange of Alaska, 1,489 vessels moved north or south between Alaska and British Columbia in 2011. The data show that 288 vessels moved east or west between the Dixon Entrance and the Pacific Ocean during the year. Cargo ships calling at Prince Rupert dominated the east-west large vessel traffic. Cruise ships, tugs, and ferries dominated the north-south traffic (Nuka 2012). In 2018, 644 unique commercial vessels were working in or transiting through Southeast Alaska traveling 2,297,966 tracked nautical miles (Nuka 2019).

From analysis of 2018 vessel traffic in Southeast Alaska, Sitka had the second highest number of commercial vessel port calls (approximately 1,800) following Ketchikan (Nuka 2019). The most common type of vessel traffic was cargo, followed by cruise ships. In 2018, 45.5 million pounds of cargo transited Sitka port totaling \$61 million (NOAA 2020b).

Cruise ships are the largest vessels that routinely use the action area. After renovations to the Old Sitka Dock in 2018, Sitka can support two to three ships a day during peak traffic in the summer (May to September). Cruise ship traffic in Sitka has ebbed based on geopolitical events, peaking in 2008 with nearly 290,000 visitors (KCAW 2018) and the next highest number of visitors was in 2019 (210,000 visitors; Alaska Public Media 2019) before the pandemic shutdown cruise ship activity in Alaska in 2020. Cruise ship traffic appears to be rebounding and Sitka received more than 13,000 visitors from cruise ships in a single day in June 2023 (KCAW 2023).

Numerous commercial and charter fishing vessels and recreational craft, such as powerboats and sailboats, operate in the project vicinity. CBS Harbor Department operates and maintains the following five boat harbors: Crescent Harbor, Sealing Cove Harbor, ANB Harbor, Thomsen Harbor, and Eliason Harbor. Thomsen and Eliason Harbors are directly across Sitka Channel from the proposed project.

Vessel strikes of humpback whales are a general concern for the population. Neilson et al. (2012) summarized 108 reported whale-vessel collisions in Alaska from 1978 to 2011, none of which were from seaplanes. Most strikes (86%) involved humpback whales. Small vessel strikes were most common (<15 meters, 60%), but medium (15–79 meters, 27%) and large (≥80 meters, 13%) vessels also struck humpback whales. Most strikes (91%) occurred in May through September, and there were no reports from December or January. The majority of strikes (76%) were reported in southeastern Alaska. The number of humpback whale collisions detected in Southeast Alaska increased by 5.8% annually from 1978 to 2011, which closely matches the 6.8% annual growth rate of the humpback whale population in southeastern Alaska between 1986 and 2008. The report identifies whale-vessel collision hotspots in southeastern Alaska and does not classify the action area or surrounding waters as areas where such hotspots occur. In August of 2017, the Princess Cruises Ship Grand Princess came into the port of Ketchikan with a humpback whale carcass on its bow, NOAA later performed a necropsy to determine the cause of death (NOAA 2017).

An examination of all known ship strikes for large (baleen and sperm) whales from all shipping sources indicates vessel speed is a principal factor in whether a vessel strike results in death (Laist et al. 2001; Vanderlaan and Taggart 2007). In assessing records with known vessel speeds, Laist et al. (2001) found a direct relationship between the occurrence of a whale strike and the speed of the vessel involved in the collision. The authors concluded that most deaths occurred when a vessel was traveling in excess of 14.9 miles per hours (13 knots). Inside Sitka Channel is a no wake zone requiring vessels to go 5 miles per hour or slower; however, outside the channel in Sitka Sound ships may be travelling much faster (CBS 2020a). The largest ships usually travel at speeds between 23-27 miles per hour (20-24 knots).

From 2007 to 2013, there were four documented cases of Steller sea lions killed or injured by vessel strikes in Alaska, none from seaplanes (NMFS 2020a). Vessel activity can disturb sea lions, instigating mass stampedes that can crush or injure smaller animals and disrupt normal nursing cycles in rookeries. Vessel traffic and associated noise can also disrupt feeding and other water activities (NMFS 2020a).

### **3.5 FISHERY INTERACTIONS INCLUDING ENTANGLEMENTS**

Marine mammal entanglement, or by-catch, is a documented source of injury and mortality to cetaceans, including humpback whales. The International Whaling Commission recently listed by-catch as a primary concern. Entanglement may result in only minor injury or may potentially significantly affect individual health, reproduction, or survival (NMFS 2019, NMFS 2018a).

Entanglement is considered one of the primary causes of anthropogenic mortality in humpback whales (NMFS 2016a). Bettridge et al. (2015) report that fishing gear entanglements may moderately reduce the population size or the growth rate of ESA-listed whales. Whales are reported entangled in fishing gear (particularly crab and shrimp pot gear and gill net fishing gear) in Alaska every year. Other gear interactions with whales in Alaska have occurred with purse seine fisheries, anchoring systems and breasting lines, and marine debris. The minimum average annual mortality and serious injury rate due to all fisheries between 2014 and 2018 is 1.7 WNP DPS humpback whales due to commercial fisheries (0.9), recreational fisheries (0.4), and unknown fisheries (0.4) (Muto et al. 2022).

NMFS considers competition with fisheries to be a threat to Steller sea lions that may have a potentially high impact on recovery of the species. Additionally, entanglement in fishing gear is a documented source of injury and mortality to the species. Entanglement may result in minor injury or may potentially significantly affect individual health, reproduction, or survival (NMFS 2023g). Most entangling materials are unidentifiable because of being deeply embedded in the animal's flesh; however, when visible, the most commonly identified materials are plastic packing bands, rubber straps from crab pots, and various netting, ropes, and monofilament line (Raum-Suryan et al. 2017).

Freed et al. (2022) found that Steller sea lions were the most common species reported in human-caused mortality and serious injury events due to commercial fishing between 2016 and 2020, and the WDPS Steller sea lions were primarily subject to injuries caused by federal groundfish trawl fisheries. The average annual mortality and serious injury rate caused by U.S. commercial fisheries in 2014 to 2018 is 38 WDPS Steller sea lions. As this is less than 10% of the

potential biological removal for the species calculated by Muto et al. (2022), this number can be considered insignificant. However, this number is likely an underestimation since no observers have been assigned to several fisheries that are known to interact with this stock.

### **3.6 POLLUTION**

Intentional and accidental discharges of contaminants pollute the marine waters of Alaska. Intentional sources of pollution including domestic, municipal, and industrial wastewater discharges are managed and permitted by the Alaska Department of Environmental Conservation (ADEC). Pollution may also occur from unintentional discharges and spills.

The action area is not a water quality impaired water body according to ADEC's water quality database and the water quality at the project area is expected to be good (ADEC 2023). A search of the ADEC contaminated sites database does not list any active or clean-up complete sites in the immediate action area (Figure 18). There are no contaminated sites with an active status within a half-mile radius of the project area; however, there are multiple contaminated sites near the action area designated as cleanup complete and cleanup complete-institutional control sites (ADEC 2023a).

Several intentional and accidental discharges of contaminants pollute the marine waters of Alaska annually. Intentional sources of pollution are managed and permitted by ADEC, including domestic, municipal, and industrial wastewater discharges (ADEC 2023b). Within the action area, there are ADEC-permitted seafood processing discharges associated with two seafood processing plants. Seafood Producers Cooperative Sitka Seafood Plant (onshore processor) within Sitka Channel, approximately 1.1 kilometers (0.7 miles) southeast from the project location and outside the action area, discharges 5.4 million gallons of fish processing waste annually (permit number AKG520101). North Pacific Seafoods Sitka Plant (onshore processor) within Sika Channel, approximately 1.3 kilometers (0.8 miles) southeast from the project location and outside the action area, discharges 4.1 million gallons of fish processing waste annually (permit number AKG520065). CBS also discharges treated community domestic wastewater approximately 2 kilometers (1.2 miles) southwest of the project site and outside the action area in Sitka Sound's Middle Channel (U.S. Environmental Protection Agency 2001).

**Figure 18. ADEC Contaminated Sites Mapper**



Source: ADEC 2023a

### 3.7 CLIMATE AND OCEAN REGIME CHANGE

There is widespread consensus within the scientific community that atmospheric temperatures on earth are increasing as a result of anthropogenic greenhouse gas emissions and will continue to increase for the next several decades (Collins et al. 2013). The Intergovernmental Panel on Climate Change (IPCC) estimated in their 2022 report that average global land and sea surface temperature has increased by 1.09°C since the mid-1800s. This temperature increase is greater than what would be expected given the range of natural climatic variability recorded over the past 1,000 years (Crowley 2000). The time period between 2010 and 2021 contain the 10 warmest years globally on record (NOAA National Centers for Environmental Information 2022). This warming is thought to lead to increased variability and frequency in extreme weather events. The likelihood of further global-scale changes in weather and climate events is virtually certain (Overland and Wang 2007; IPCC 2022).

Ocean warming as a result of climate change has a cascade of effects. Changes occurring in the ocean are attributed to increased decadal and inter-annual climatic variability and increases in extreme weather events, from hurricanes to wildfire and drought. As the planet’s largest continuous ecosystem and source of biodiversity, the ocean is a critical food resource for humans and marine species (United Nations 2017; IPCC 2019).

Effects to marine ecosystems from climate change include ocean acidification, expanded oligotrophic gyres, temperature shifts, circulation, stratification, and nutrient input (Doney et al. 2012). Upward-trending temperatures change wind patterns and, in turn, ocean circulation and increase frequency and strength of ocean storms. These large-scale shifts have the potential to disrupt existing trophic pathways as the abundance and distribution of ocean fish species are impacted (Doney et al. 2012; Salinger et al. 2013). The strongest warming is expected in the north, exceeding the estimate for mean global warming by a factor of 3, due in part to the “ice-albedo feedback,” whereby as the reflective areas of Arctic ice and snow retreat, the earth absorbs more heat, accentuating the warming (Rose et al. 2017).

For ESA-listed species that undergo long migrations, if either prey availability or habitat suitability is disrupted by changing ocean temperature regimes and acidification, the timing of migration may change and could negatively impact population sustainability (Doney et al. 2013). Specifically, krill distribution has been linked to ocean temperature (Klein et al. 2018). As a major food source for baleen whales, impacts to krill distribution could have effects on whale migration patterns and reproduction rates. The indirect effects of climate change on baleen whales would likely include changes in the distribution of temperatures suitable for many stages of their life history, the distribution and abundance of prey, and the distribution and abundance of competitors or predators.

Alterations in ocean temperature have led to changes in the quantity, quality, distribution, and accessibility of prey species of fish for Steller sea lions. Trites et al. (2007) hypothesize that a major contributing factor to Steller sea lion population decline in the 1970s through the 1990s was a shift in abundance of prey species from high-energy fish to low-energy fish. This led to a state of prolonged nutritional stress in some Steller sea lion groups. They further hypothesize that nutritional stress would have compromised survival and reproduction if sea lions could not maintain normal growth and body condition. Changes in prey abundance and availability may have also led to increased foraging times and increases exposure to predators. Additional climate change threats to Steller sea lions include sea level rise that flood and submerge traditional terrestrial rookery and haulout sites and harmful algae blooms from elevated algae levels in warmer waters that cause sickness or death (NMFS 2023g). Climate change may impact marine mammals through changes in the distribution of temperatures suitable for rearing young, the distribution and abundance of prey, and the distribution and abundance of competitors or predators. Salmon may lose habitat through thermal refuge, increase in the intensity of rainfall, and an increase in saltwater intrusion may affect rearing and deteriorate spawning habitats (Haufler et al. 2010).

Shifts in ocean climate are the most parsimonious underlying explanation for the broad suite of ecosystem changes that have been observed in the North Pacific Ocean in recent decades (Trites et al. 2007; Miller et al. 2005). Changes in ocean climate are hypothesized to have affected the quantity, quality, and accessibility of prey, which in turn may impact populations of marine mammals, including humpback whales and Steller sea lions (Trites et al. 2007; Miller et al. 2005). Sea level rise has altered El Niño-Southern Oscillation, complex annual weather patterns in the Pacific Ocean, which also affects Steller sea lion and humpback whale prey abundance and geographic distribution. Additionally, sea level rise means that shallow islands

are at risk of being submerged by rising waters which would affect active rookery and haul out sites for Steller sea lions (NMFS 2023g).

Increased ocean acidification has negatively impacted marine life and disrupts predator prey relationships. An oceanographer for NOAA's Pacific Marine Environmental Laboratory explained that waters in Southeast Alaska are naturally more acidic when compared to other areas due to glacial discharge (Juneau Empire 2019). Glacial runoff dilutes the water's alkalinity which enables the surface water to absorb carbon dioxide which decreases the pH in the water (NPS 2018). Another factor that naturally increases acidification is the marine dependent communities that are in the area (Juneau Empire 2019).

### **3.8 COASTAL ZONE DEVELOPMENT**

Coastal zone development results in the loss and alteration of nearshore marine mammal habitat and changes habitat quality. Increased development may prevent marine mammals from reaching or using important feeding, breeding, and resting areas. The shoreline in the immediate project area is primarily developed with impervious surfaces directly adjacent to the shoreline of the project footprint. Few areas of natural shoreline exist in the project site, mostly near the proposed upland parking area and haul out ramp. There is little opportunity for further development within Sitka Channel as the SPB is located between USCG Air Strip and SEARHC facilities.

### **3.9 IN-WATER NOISE**

The project area is subject to noise from many anthropogenic sources, including marine vessels, seafood processing, shoreline and dock construction, aircraft, and land vehicles. Beyond Sitka Channel and the Channel Rock Breakwaters, the project action area extends into highly trafficked marine vessel routes in Sitka Sound.

## 4 EFFECTS OF THE ACTION

“Effects of the action” refers to all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (50 CFR 402.02).

Direct effects defined under the ESA are immediate effects caused by the proposed action and occurring concurrently with the proposed action. Indirect effects defined under the ESA are effects from the proposed action that occur at a later time, but are still reasonably certain to occur. Direct and indirect effects that may arise from the proposed action include noise associated with pile driving and operation of support vessels. In addition, construction activities could result in some temporary turbidity increases and habitat loss.

### 4.1 MARINE VESSEL ACTIVITY

Vessels transiting the marine environment have the potential to collide with, or strike, marine mammals (Laist et al. 2001; Nielsen et al. 2012). As mentioned above, Sitka Sound is a medium-risk area for humpback whale-vessel collisions and the probability of strike events depends largely on vessel speed (Laist et al. 2001). Vessels associated with the project would follow well-established, frequently utilized navigation lanes as they cross Sitka Sound and enter Eastern, Middle, and Sitka Channels, and they would be traveling at slow speeds. Humpback whales and sea lions in the action area exposed to ship traffic in this area daily, and are unlikely to change their behavior in response to vessel traffic associated with this project.

Tugs and barges would be used to deliver materials to the project site and would remain onsite during project construction. Additionally, a small skiff would be used for day-to-day project construction. After all piles are placed and the SPB is operational, overall vessel traffic in the action area is not expected to increase, but seaplane traffic is expected to be redistributed along a different route in Sitka Channel. There is the potential for some increase in seaplane traffic with improved and updated base facilities, but an increase in large vessels (like the yachts, fish processors, and research vessels) is not expected as a result of this project. Despite a potential increase in seaplane traffic, this project would provide more appropriate and safe space for operation and likely would reduce conflicts with marine mammals and overall vessel congestion in Sitka Channel, because the landing and transit areas would be farther away from seafood processing facilities. As a result of this project, marine mammals in the area would be exposed to some additional marine vessel traffic during construction, but not likely to encounter increased conflicts from SPB operation once the base is completed.

Ongoing activities within the waters near the community of Sitka, including frequent vessel traffic, contribute to elevated background levels of underwater noise in the action area. Tugs and barges can emit significant noise levels, around 171-176 dB (Richardson et al. 1995; Kipple and Gabriele 2004). Marine mammals in the area are currently exposed to such sounds, yet they continue to use the waters. Given the transitory nature of vessels used for this project, any

disturbance of a particular individual by a project-associated vessel would be very limited in space and time.

This project would not increase marine vessel activity or the likelihood of accidental ship strikes, which may cause injury or mortality of marine species. There are no known Steller sea lion rookeries or haul outs near the action area (Figure 15) and sea lions are habituated to vessel traffic in this busy area; therefore, the chances of injury or stress due to vessel traffic associated with construction would be minimal. There are no known documented cases of Steller sea lion seaplane strikes, and it is unlikely that the change in seaplane traffic would result in seaplane strikes in Sitka Channel.

It is unlikely that sunflower sea stars would be impacted by vessel traffic during construction since barges would remain offshore and not grounded. Support vessels would transit between existing harbor floats and the barge. Seaplanes would use the new float system and not near sunflower sea star habitat.

## **4.2 ACOUSTIC DISTURBANCE/NOISE**

As explained in Section 1.4, underwater and in-air noise from pile driving and removal is anticipated to rise above ambient noise levels and radiate into Sitka Channel from the construction of the proposed SPB.

If a sound is loud enough, it may cause discomfort or tissue damage to auditory or other systems of all animals, including humans (Le et al. 2017). Marine species exposed repeatedly or for prolonged periods to high intensity sound can experience a hearing threshold shift (TS), which is the loss of hearing sensitivity at certain frequency ranges. A TS can be PTS, in which case hearing sensitivity is not recoverable, or temporary (TTS), in which case the animal's hearing threshold can recover over time (Southall et al. 2007).

Marine species depend on acoustic cues for vital biological functions (e.g., orientation, communication, finding prey, avoiding predators); thus, TTS may result in reduced fitness in survival and reproduction. However, this depends on the frequency and duration of TTS, as well as the biological context in which it occurs (Kastak et al. 2005). A TTS of limited duration, occurring in a frequency range that does not coincide with that used for recognition of important acoustic cues, would have little to no effect on an animal's fitness. Although repeated TTS sound exposure could cause PTS, which constitutes injury. NMFS classifies TTS as a disturbance (Level B) harassment (Southall et al. 2007; NMFS 2018). While research on the effects of noise on sea stars is lacking, the broader consensus from research on marine invertebrate species is that underwater anthropogenic noise can negatively impact feeding and mating behavior and can also lead to physiological responses associated with stress. Injuries associated with sound have also been reported (Harding and Cousins 2022; Solan et al. 2016).

Direct impacts of noise to marine species depend not only on sound magnitude but also on the species receiving the sound, exposure type (e.g., continuous vs. pulse), duration, site characteristics, and individual animal characteristics such as habituation, season, or motivation (Ellison et al. 2012). Some of the in-water sound source levels from pile installation and removal from the proposed action will generate noise loud enough to harm or harass ESA-listed species at certain distances. Possible impacts include injury and disturbance ranging from mild (e.g.,

startle response or masking of species relevant sounds) to severe (e.g., abandonment of habitat).

Auditory interference, or masking, occurs when an interfering noise is similar in frequency and volume to (or is louder than) the auditory signal received by an animal while it is processing echolocation signals or listening for acoustic information from other animals. Masking can interfere with an animal's ability to gather acoustic information about its environment, such as predators, prey, conspecifics, and other environmental cues (Francis and Barber 2013). The impacts of masking may be greater for cetaceans, which produce complex vocalizations such as whistling, echolocation click production, calling, and singing for different purposes and across multiple modes. Exposure to anthropogenic noise may result in changes to cetacean vocalization behavior. For example, in the presence of potentially masking signals, humpback whales have been observed to increase the length of their songs in areas of increased anthropogenic noise (Fristrup et al. 2003).

Construction activities for the proposed project could mask vocalizations or other important acoustic information for marine species present in the action area. This could affect communication among individuals or affect their ability to receive information from their environment. However, the primary effects of project activities will occur in an active waterway, where masking from other vessel sounds and harbor activity is likely (Erbe et al. 2019). Masking from noise external to the project would be more pronounced during the summer months when marine traffic is at its peak in Sitka Sound.

ESA-listed species could experience a temporary loss of suitable habitat in the action area if elevated noise levels associated with in-water construction results in their displacement from the area. The area is already somewhat loud and busy, and displacement of ESA-listed species or their prey by noise would not be permanent nor would it result long-term effects to the local population. No known rookeries or major haulouts would be impacted. The nearest designated critical habitat for WDPS Steller sea lions is approximately 20 nautical miles southwest on Biorka Island. The project action area does not extend to this critical habitat and therefore the project would not impact the essential physical and biological features that make the area critical habitat for WDPS Steller sea lions, such as good water quality, prey availability, or open space for transiting and foraging.

The impacts on marine mammal prey, including small crustaceans (mostly euphausiids or krill) and small fish, are not as well studied or understood. A 2015 study examined the impacts of sound produced by seismic air guns on marine invertebrates, specifically zooplankton. Seismic air guns produce low frequency, high intensity underwater sound ranging from 156dB re 1  $\mu\text{Pa}^2 \text{s}^{-1}$  to 183dB re 1  $\mu\text{Pa}^2 \text{s}^{-1}$  approximately 509 meters to 658 meters from the source. The seismic air gun used in this study is within or below the range of pile installation equipment that will be deployed during the proposed project and results have been translated to assessments of pile-driving noise on marine species (Corbett 2019). The results indicate that there was an increased mortality in adult and larval zooplankton and total mortality of larval krill (adults were not present) (McCauley et al. 2017).

High underwater SPLs have been documented to alter behavior, cause hearing loss, and injure or kill individual fish by causing serious internal injury (Popper and Hawkins 2019). Fish

populations in the project area that serve as marine mammal prey could be affected by noise from in-water pile-driving. It is expected that most fish will be able to move away from the proposed activity to avoid harm and will still be available to marine mammals as a food source. The quantity, quality, and availability of adequate food resources are therefore not likely to be reduced (due to the small area affected, mobility of fish, anticipated recolonization, and the temporary nature of the project).

In general, impacts from this project to prey species are expected to be minor and temporary. The area likely impacted by the proposed project is relatively small compared to the available habitat in and around Sitka Channel and Sitka Sound. Any behavioral avoidance by fish of the immediate area will still leave large areas of fish and foraging habitat in the action area. Further, mitigation measures will be implemented to reduce impacts of noise on habitat. Therefore, effects on marine mammal prey during the proposed project are not expected to be substantial.

The impacts of pile driving noise on sunflower sea stars is not known because noise impacts on echinoderms are poorly investigated (Sole, et al. 2023). A study on brittle stars (*Amphiura filiformis*) showed the species has signs of physiological stress after low-frequency noise exposure (Solan et al. 2016), and studies on the Black sea urchins (*Arbacia lixula*) found significant change in enzyme activity and in gene and protein expression when exposed to high frequency sound in a laboratory (Vazzana et al. 2020b). A study showed that there was no difference in Australian sea urchin (*Heliocidaris erythrogramma*) larvae swimming behavior when exposed to sound from an outboard motor; however other invertebrate larvae (bryozoan, gastropod, and mollusks) swimming responses were species-specific, with species showing some response to sound and apparently distinguishing among different sound frequencies (Stocks et al. 2012).

### **4.3 TURBIDITY/SEDIMENTATION**

A temporary and localized increase in turbidity near the seafloor will occur in the immediate area surrounding the proposed SPB area during an estimated 54 hours of pile driving and 670 hours of placement of fill below HTL during Phase I and an estimated 13 hours of pile driving and 285 hours of placement of fill before HTL during Phase II. A portion of the in-water work will involve DTH hammering which would also release drill cuttings (seafloor) into the marine environment from the top of the piles and increase turbidity in the immediate area during pile driving.

Temporary and localized turbidity associated with the proposed project may cause displacement of small schooling fish from the construction area; however, such distribution shifts are likely to be temporary and it is expected that fish will return after of pile driving is complete. Although prey species such as herring and salmon can congregate in Sitka Sound, the project site does not support a consistent abundance of prey for humpback whales or Steller sea lions.

A sediment curtain would be employed during the placement of fill and all DTH drilling activities; therefore, the temporary and localized turbidity associated with the SPB project is unlikely to measurably affect humpback whales or Steller sea lions, or their prey, in the action

area. No indirect effects are anticipated that would cause an increase in turbidity in the action area.

To avoid turbidity impacts on sunflower sea stars, a field survey for the species would occur within the project footprint prior to construction of each project phase. All identified sunflower sea star would be transported away from the project area. Collection, transport, and release may result in the take of sunflower sea stars due to harassment or injury; however, it is expected that this activity would not result in mortality and would be more beneficial to the species than exposing them to turbidity and sedimentation.

#### **4.4 POLLUTION**

As stated in Section 3.6, permitted and un-permitted sources have the potential to produce pollutants in the action area. Additionally, there is potential for an oil or pollution spill from activities associated with the project; however, the risk of spills and pollutants related to the project would be mitigated by implementing BMPs and policies to prevent accidental spills. If a spill were to occur, plans would be in place, and materials would be available for cleanup activities. The probability of project effects to Mexico DPS humpback whales, Steller sea lions, or sunflower sea stars from accidental spills or other pollution sources is very small. Pollution is not anticipated to cause adverse effects to marine mammals in Sitka Channel or Sitka Sound, an area which represents a very small fraction of the range of Mexico DPS humpback whales and WDPS Steller sea lions.

#### **4.5 HABITAT LOSS OR MODIFICATION**

Anticipated loss or modification of ESA-listed species habitat in the action area as a result of the project may arise from physical alteration of habitat (presence of new piles, upland base parking area, and riprap shore protection), water quality (increased turbidity), distribution of prey species, and acoustic disturbance during construction.

As discussed in Section 1.6.7, a survey of the project area for sunflower sea stars will be conducted before project construction and any sunflower sea stars identified in the project area will be moved 100 meters (330 feet) from the project area. If sunflower sea stars are listed under ESA, movement of an individual of these species will be considered take under ESA. Moving sunflower sea stars may harass or injure individuals but is not expected to cause mortality. Additionally, moving these individuals is expected to avoid mortality because these individuals would not be harmed by placement of fill below HTL. Although sunflower sea stars were not observed during a 2020 intertidal survey, based on local knowledge sunflower sea stars are present in low numbers project vicinity (KTOO 2022) and the area of fill below HTL (1.3 acres during Phase I and 1.3 acres during Phase II), CBS estimates:

- A maximum of 5 sunflower sea stars per acre within the project area
- A maximum of 7 sunflower sea stars moved from construction of each phase of the project resulting in a total take of 14 sunflower sea stars associated with the project

Piles installed to support the SPB floats would permanently impact a small area of nearshore benthic habitat. Direct impacts to ESA-listed species' habitat expected as a result of the proposed project, such as physical destruction or alteration of habitat, would be minimal since

the project footprint is relatively small as compared with available marine habitat in Sitka Channel and Sitka Sound.

#### **4.6 CUMULATIVE EFFECTS**

“Cumulative effects” are those effects of future state, local, tribal, or private activities, not involving Federal activities, that are reasonably certain to occur within the action area (50 CFR § 402.02). Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to Section 7 of the ESA.

Reasonably foreseeable future activities within and immediately adjacent to the proposed SPB would likely involve the placement of fill, dredging, or structures in the area, requiring authorization from the USACE and consultation pursuant to Section 7 of the ESA. Therefore, such activities do not meet the ESA definition of cumulative effects and are not addressed here.

#### **5 DETERMINATION OF EFFECT**

The proposed Sitka SPB Project is likely to adversely affect the ESA-listed Mexico DPS humpback whales and WDPS Steller sea lions due to the noise associated with the pile-driving. Noise associated with the project may reach levels exposing Mexico DPS humpback whales and WDPS Steller sea lions to Level A and B harassment under the ESA. However, mitigation measures described in Section 1.7 would be implemented throughout the duration of the project to reduce exposure to noise associated with the pile-driving. These mitigation measures include minimization of construction noise, marine mammal monitoring, safety radii, clearing the safety radii, soft-starts procedures, and shut-down procedures to minimize Level A and B takes.

Additionally, the proposed project is likely to adversely affect individual sunflower sea stars, proposed as threatened under the ESA (as of March 16, 2023). CBS expects to take up to 14 sunflower sea stars during the project by moving them outside the project area to avoid mortality from project construction. Based on the limited footprint of the proposed project within the available habitat in the project vicinity and implementation of proposed mitigation measures, this project would not reduce the reproduction, numbers, or distribution of sunflower sea stars or reduce the likelihood of survival and recovery of species and is not likely to jeopardize the continued existence of sunflower sea stars.

In conjunction with this Biological Assessment, CBS is applying for an IHA to take 4 ESA-listed WDPS Steller sea lions and 2 ESA-listed Mexico DPS humpback whale by Level B harassment, and 2 WDPS Steller sea lions by Level A harassment.

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<sup>4</sup> Olivia Cohn, Solstice Alaska Consulting, Inc., contacted Paul Wade, National Oceanic and Atmospheric Administration, via email on December 15, 2021 and January 7, 2022 to ensure that the data had not been superseded or found to contain errors. No response was received.

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**Appendix A: Sitka Seaplane Base Project Drawings**

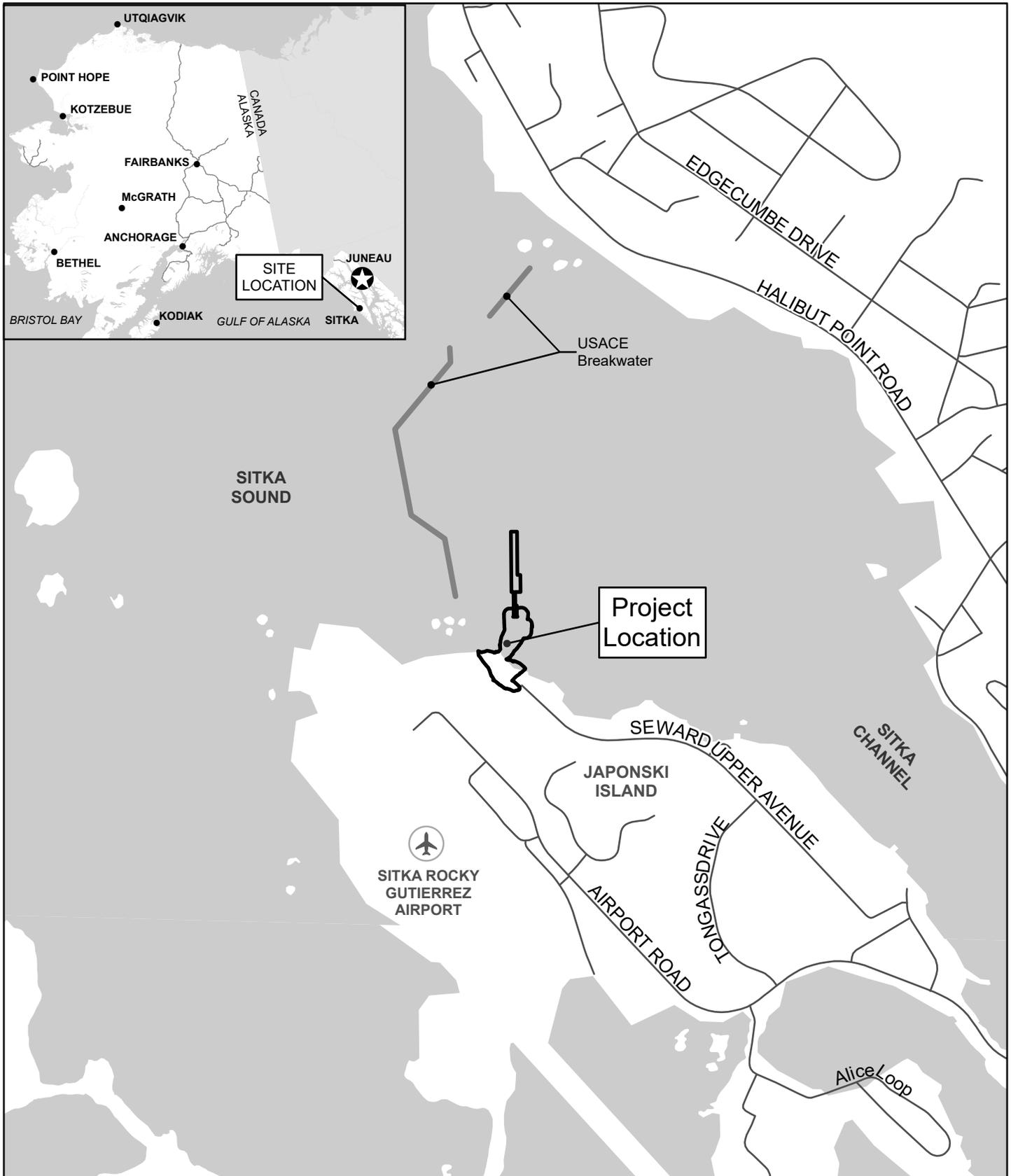
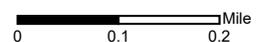


FIGURE 1: Vicinity Map

POA-2020-00370  
 Applicant: City and Borough of Sitka  
 Proposed Activity: Sitka Seaplane Base  
 Section 34-35 T 55 S, R 63 E Copper River Meridian USGS  
 Lat.: 57.055868° N Long.: 135.364283° W  
 Sheet: 1 of 6

Date: 7/6/2023

-  Project Outline
-  DOT&PF Road



# SITKA CHANNEL

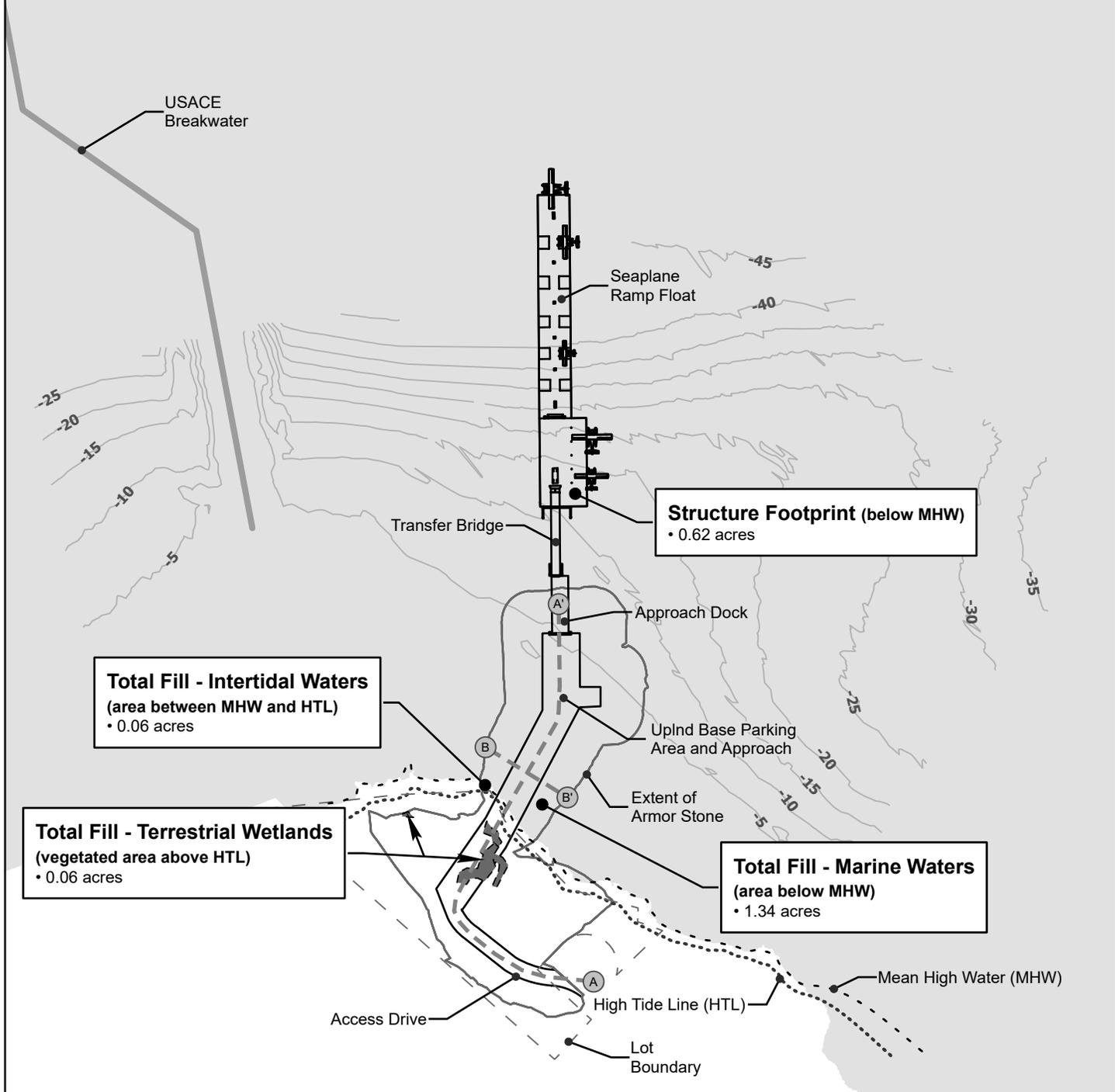


FIGURE 2: Plan View - Proposed

POA-2020-00370  
 Applicant: City and Borough of Sitka  
 Proposed Activity: Sitka Seaplane Base  
 Section 34-35 T 55 S, R 63 E Copper River Meridian USGS  
 Lat.: 57.055868° N Long.: 135.364283° W  
 Sheet: 2 of 6

Date: 7/6/2023

Lot Boundary	High Tide Line (HTL)
Waterbody	Mean High Water (MHW)
Wetland Impact	Water Depth (feet)

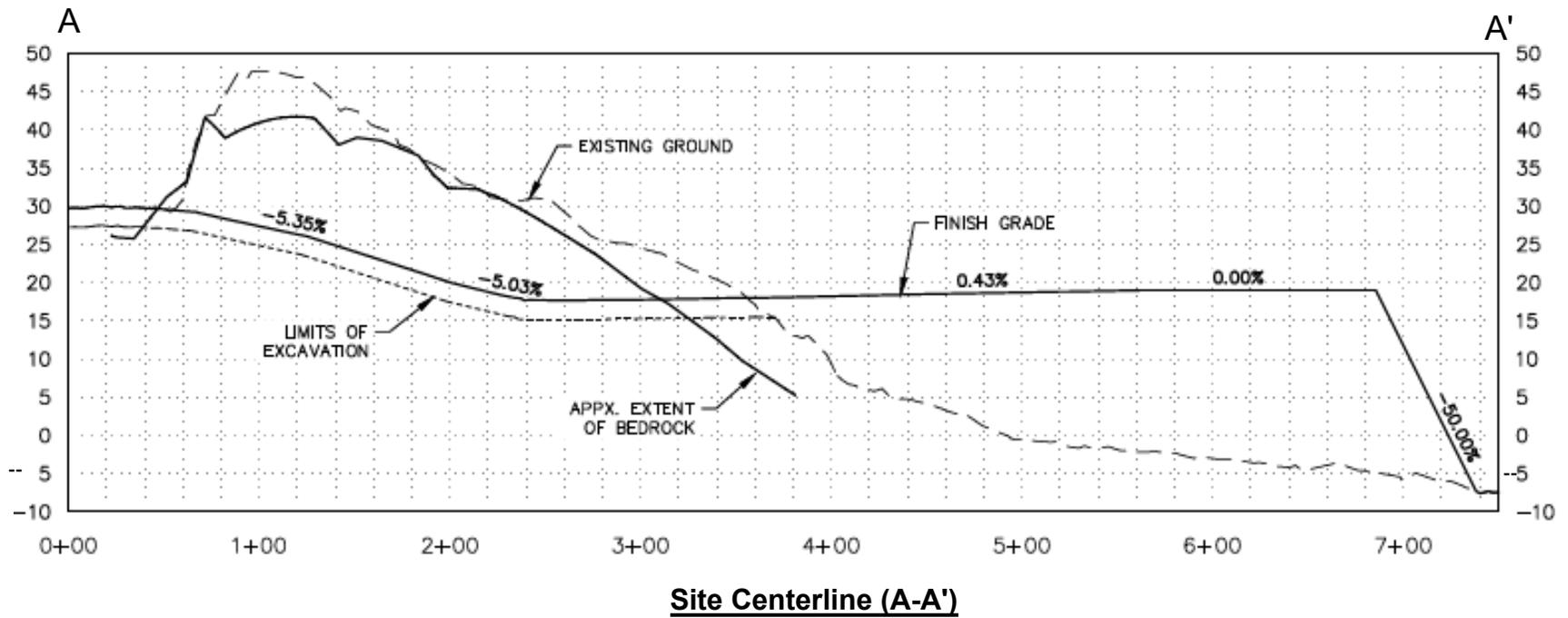
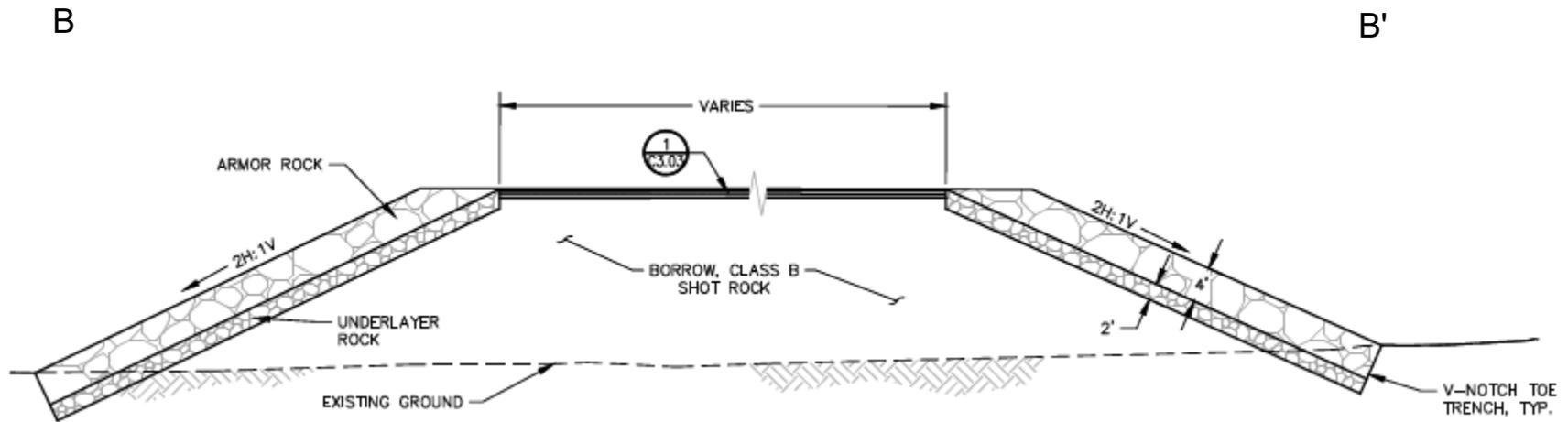


FIGURE 3A: Elevation View

POA-2020-00370  
 Applicant: City and Borough of Sitka  
 Proposed Activity: Sitka Seaplane Base  
 Section 34-35 T 55 S, R 63 E Copper River Meridian USGS  
 Lat.: 57.055868° N Long.: 135.364283° W  
 Sheet: 3 of 6

Date: 7/6/2023



**Uplands Section - Typical (B-B')**

FIGURE 3B: Elevation View

POA-2020-00370

Applicant: City and Borough of Sitka

Proposed Activity: Sitka Seaplane Base

Section 34-35 T 55 S, R 63 E Copper River Meridian USGS

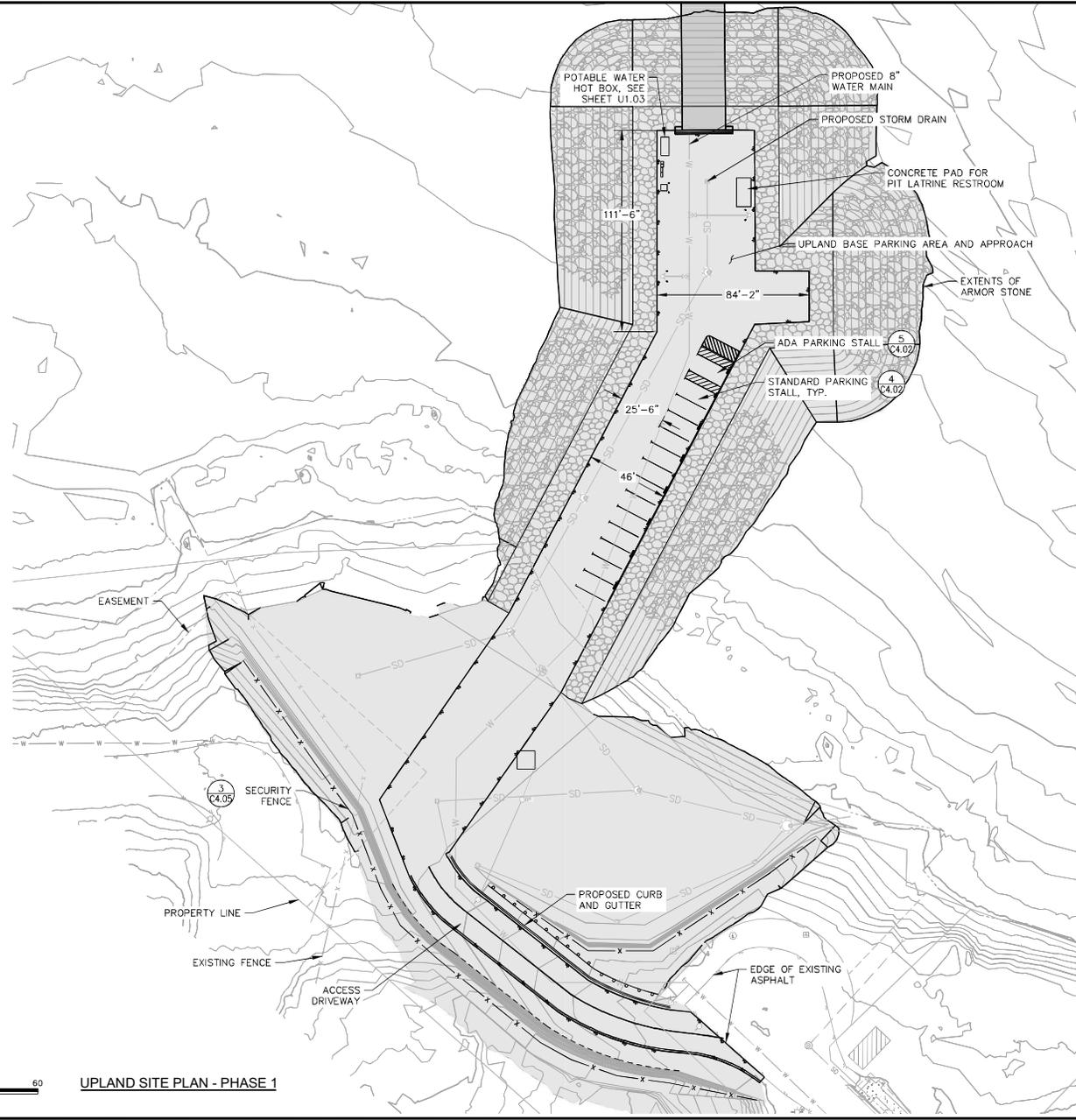
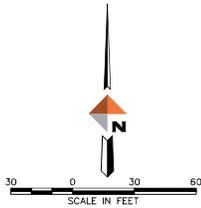
Lat.: 57.055868° N Long.: 135.364283° W

Sheet: 4 of 6

Date: 7/6/2023



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UPLAND SITE PLAN - PHASE 1

REV	DATE	DESCRIPTION	BY

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REVIEW

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4041 B Street  
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907-562-2000

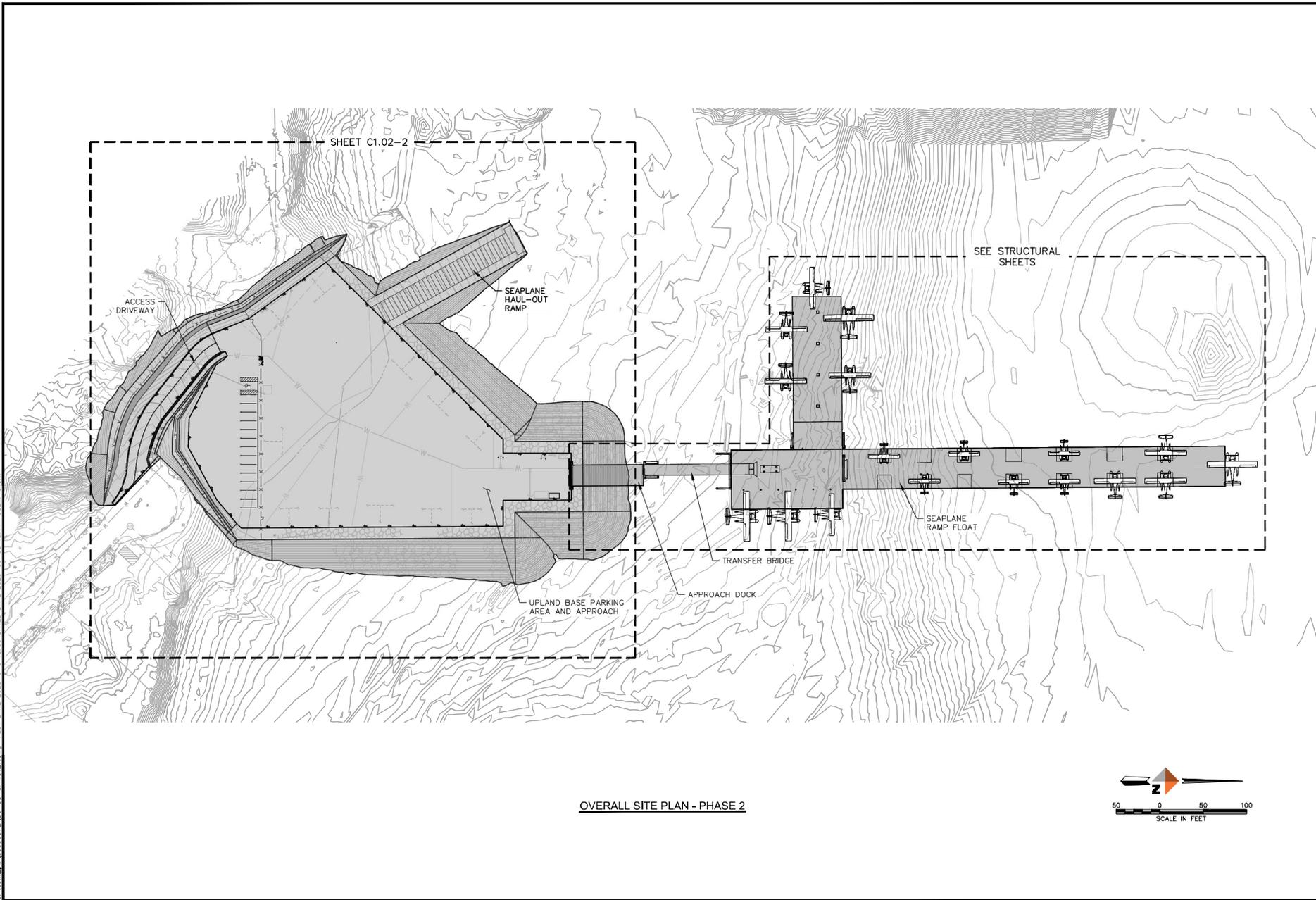
NEW SITKA SEAPLANE BASE  
SEWARD AVENUE, JAPONSKI ISLAND  
UPLANDS SITE PLAN - PHASE 1  
1180 SEWARD AVENUE  
CITY AND BOROUGH OF SITKA, ALASKA

PROJECT 2023.15127.01  
DATE 5/5/2023

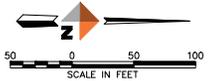
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C1.02-1

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OVERALL SITE PLAN - PHASE 2



REVISIONS	DATE	DESCRIPTION	BY

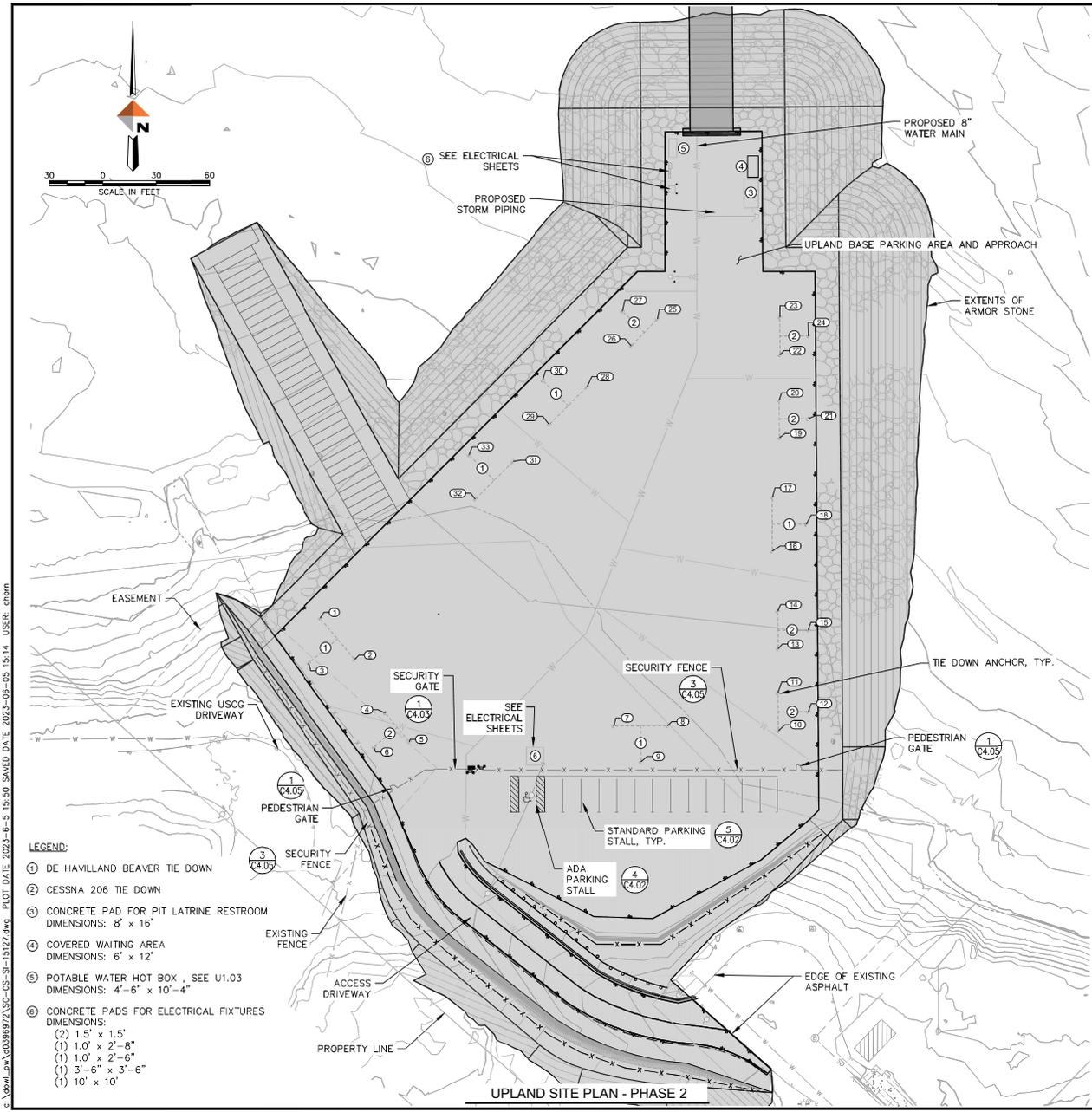
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Anchorage, Alaska 99503  
907-562-2000

NEW SITKA SEAPLANE BASE  
SEWARD AVENUE, JAPONSKI ISLAND  
OVERALL SITE PLAN - PHASE 2  
1190 SEWARD AVENUE  
CITY AND BOROUGH OF SITKA, ALASKA

PROJECT 2023.15127.01  
DATE 6/5/2023

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SHEET  
C1.01-2



**POINT TABLE**

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
1	1911418.19	2347862.86	19.00	TIE DOWN 1: BEAVER - LEFT WING
2	1911395.20	2347882.14	19.00	TIE DOWN 1: BEAVER - RIGHT WING
3	1911393.21	2347856.41	19.00	TIE DOWN 1: BEAVER - TAIL
4	1911365.24	2347899.22	19.00	TIE DOWN 2: 206 - LEFT WING
5	1911349.15	2347912.71	19.00	TIE DOWN 2: 206 - RIGHT WING
6	1911346.28	2347892.93	19.00	TIE DOWN 2: 206 - TAIL
7	1911357.95	2348027.32	19.00	TIE DOWN 3: BEAVER - LEFT WING
8	1911358.10	2348057.32	19.00	TIE DOWN 3: BEAVER - RIGHT WING
9	1911338.02	2348042.42	19.00	TIE DOWN 3: BEAVER - TAIL
10	1911355.31	2348119.56	19.00	TIE DOWN 4: 206 - LEFT WING
11	1911376.31	2348119.18	19.00	TIE DOWN 4: 206 - RIGHT WING
12	1911366.11	2348136.37	19.00	TIE DOWN 4: 206 - TAIL
13	1911401.08	2348119.30	19.00	TIE DOWN 5: 206 - LEFT WING
14	1911422.08	2348119.14	19.00	TIE DOWN 5: 206 - RIGHT WING
15	1911411.73	2348136.22	19.00	TIE DOWN 5: 206 - TAIL
16	1911455.78	2348116.05	19.00	TIE DOWN 6: BEAVER - LEFT WING
17	1911485.78	2348116.21	19.00	TIE DOWN 6: BEAVER - RIGHT WING
18	1911470.67	2348135.13	19.00	TIE DOWN 6: BEAVER - TAIL
19	1911519.08	2348120.15	19.00	TIE DOWN 7: 206 - LEFT WING
20	1911540.08	2348119.99	19.00	TIE DOWN 7: 206 - RIGHT WING
21	1911529.71	2348136.07	19.00	TIE DOWN 7: 206 - TAIL
22	1911565.40	2348120.47	19.00	TIE DOWN 8: 206 - LEFT WING
23	1911586.40	2348120.31	19.00	TIE DOWN 8: 206 - RIGHT WING
24	1911576.02	2348136.39	19.00	TIE DOWN 8: 206 - TAIL
25	1911585.55	2348051.66	19.00	TIE DOWN 9: 206 - LEFT WING
26	1911570.44	2348037.08	19.00	TIE DOWN 9: 206 - RIGHT WING
27	1911589.80	2348032.13	19.00	TIE DOWN 9: 206 - TAIL
28	1911547.74	2348012.52	19.00	TIE DOWN 10: BEAVER - LEFT WING
29	1911526.43	2347991.41	19.00	TIE DOWN 10: BEAVER - RIGHT WING
30	1911551.16	2347987.75	19.00	TIE DOWN 10: BEAVER - TAIL
31	1911505.87	2347970.83	19.00	TIE DOWN 11: BEAVER - LEFT WING
32	1911484.75	2347949.53	19.00	TIE DOWN 11: BEAVER - RIGHT WING
33	1911509.51	2347946.10	19.00	TIE DOWN 11: BEAVER - TAIL

NOTES:  
 1. SECURITY GATE SHALL EXTEND TO THE EDGE OF SLOPE OF ARMOR ROCK. SEE DETAIL X, SHEET C5.04 FOR FENCE POST INSTALLMENT.

REV	DATE	DESCRIPTION	BY

65%  
 SUBMITTAL  
 REVIEW

**DOWL**  
 4041 B Street  
 Anchorage, Alaska 99503  
 907-562-2000

NEW SITKA SEAPLANE BASE  
 SEWARD AVENUE, JAPONSKI ISLAND  
 UPLANDS SITE PLAN - PHASE 2

PROJECT 2023.15127.01  
 DATE 6/5/2023

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## **Appendix B: Sitka Seaplane Base Project Threshold Calculation Spreadsheets**

**Sitka Seaplane Base Project  
Proxy Summary**

Project Pile Size	Installation method	Proxy Pile Size	RMS/SPL	SEL	PK	Weighting Factor	# of piles in 24-hour	Duration (mins)	Strikes	TLC	Distance of Measurement	Reference
16, 24	Vibratory (perm, and temp - install and removal)	24	161	-	-	2.5	6	10		15	10	For installation of 16" and 24" permanent piles and installation and removal of 16" temporary piles, the vibratory source level is proxy from 24" steel piles driven at the Naval Base Kitsap in Bangor, Washington (Naval Facilities Engineering Systems Command [NAVFAC] 2013) and from acoustic modeling of nearshore marine pile driving at Navy installations in Puget Sound (NAVFAC 2015).
16 (Phs I)	DTH	24	166 (173 Northern sea otters)	159	184	2	2	60	36,000 per pile	15	10	For 16" piles, DTH source level is proxy from the sound source verification of 24" piles DTH drilled during the Tenakee Ferry Terminal Improvements Project (Heyvaert and Reyff 2021).
24 (Phs I & II)	DTH	24	167 (173 Northern sea otters)	159	184	2	2	90	54,000 per pile	15	10	For 24" pile, DTH source level is proxy from the sound source verification of 24" piles DTH drilled during the Tenakee Ferry Terminal Improvements Project (Heyvaert and Reyff 2021).
16	Impact	16	185	175	200	2	4	5	175 per pile	15	10	For 16" piles, impacting source levels are proxy from agreed upon values within NMFS Alaska Region (NMFS 2023).
24	Impact	24	190	177	203	2	4	5	175 per pile	15	10	For 24" piles, impacting source levels are proxy from agreed upon values within NMFS Alaska Region (NMFS 2023).
All Piles	In-air Vibratory	30	103.2 @15m				10	15		15	10	In-air vibrating sound source is proxy from the Washington State Department of Transportation has documented un-weighted rms levels for a vibratory hammer (30-inch pile) to an average 96.5 dB and a maximum of 103.2 dB at 15 meters (Laughlin 2010). Maximum levels were used to extrapolate distances for the projects.
All Piles	In-air Impact	48	106 @15m				10	15		15	10	In-air impacting sound source level is 106 dB rms at 15 m, the median value during impact installation of 24 to 48-inch-diameter steel piles at Naval Base Kitsap Bangor (Illingworth and Rodkin, Inc. 2012).

USER SPREADSHEET INTRODUCTION

VERSION: 2.2 (2020)



Companion User Spreadsheet to:

National Marine Fisheries Service (NMFS): 2018 Revision to: Technical Guidance For Assessing the Effects of Anthropogenic Noise on Marine Mammal Hearing: Underwater Thresholds for Onset of Permanent and Temporary Threshold Shifts (Version 2.0)

2018 Revised Technical Guidance web page

\*For more information on the optional methodology provided within this User Spreadsheet, see Appendix D of Technical Guidance (2018)

DISCLAIMER: NMFS has provided this spreadsheet as an optional tool to provide estimated effect distances (i.e., isopleths) where PTS onset thresholds may be exceeded. Results provided by this spreadsheet do not represent the entirety of the comprehensive effects analysis, but rather serve as one tool to help evaluate the effects of a proposed action on marine mammal hearing and make findings required by NOAA's various statutes. Input values are the responsibility of the individual user.

NOTE: The User Spreadsheet tool provides a means to estimate distances associated with the Technical Guidance's PTS onset thresholds. Mitigation and monitoring requirements associated with a Marine Mammal Protection Act (MMPA) authorization or an Endangered Species Act (ESA) consultation or permit are independent management decisions made in the context of the proposed activity and comprehensive effects analysis, and are beyond the scope of the Technical Guidance.

INSTRUCTIONS

STEP 1: Determine what spreadsheet is appropriate for activity

HOW TO DETERMINE WHICH TAB TO USE

1) Is the sound source NON-IMPULSIVE or IMPULSIVE? (If it is unclear which category describes your source, consult NOAA)

- a) NON-IMPULSIVE (e.g., drilling, vibratory pile driving, tactical sonar): Go to Question 2
b) IMPULSIVE (e.g., explosives, impact pile driving, DTH pile driving, seismic): Go to Question 5

2) Is the NON-IMPULSIVE sound source STATIONARY or MOBILE?

- a) STATIONARY: Go to Question 3
b) MOBILE: Go to Question 4

3) Is the NON-IMPULSIVE, STATIONARY source CONTINUOUS or INTERMITTENT?

- a) CONTINUOUS: Use Tab A\*
b) INTERMITTENT: Use Tab B
\* A key distinction between continuous and intermittent sound sources is that intermittent sounds have a more regular (predictable) pattern of bursts of sounds and silent periods (i.e., duty cycle), which continuous sounds do not.

4) Is the NON-IMPULSIVE, MOBILE source CONTINUOUS or INTERMITTENT?

- a) CONTINUOUS: Use Tab C ("safe distance" methodology from Sive et al. 2014)
b) INTERMITTENT: Use Tab D ("safe distance" methodology from Sive et al. 2014)

5) Is the IMPULSIVE sound source STATIONARY or MOBILE?

- a) STATIONARY: Use Tab E\*
b) MOBILE: Use Tab F ("safe distance" methodology from Sive et al. 2014)

STEP 2: Within the appropriate tab, fill in the SAGE CELLS specific to the activity

- a) Please provide information used to support values in provided in sage boxes (e.g., surrogate data, direct measurements, etc.)
b) If information is unavailable to fill-out one or more of the sage boxes, please consult NMFS

STEP 3: Estimated PTS isopleths (meter) will be provided in SKY BLUE CELLS by marine mammal hearing group

STEP 4: When using this spreadsheet to estimate marine mammal takes, please provide a copy of completed tab used to estimate isopleths

ASSUMPTIONS & ADDITIONAL INFORMATION

- 1) Marine mammals remain stationary during activity
2) Currently, recovery between intermittent sounds is not considered regardless of time between sounds (i.e., all sounds within the accumulation period are counted)

Suggested (Default\*) Weighting Factor Adjustments (WFA) for Broadband Sources:

Table with 3 columns: Source, WFA, Example Supporting Sources. Rows include Seismic airguns, Impact pile driving hammers, Vibratory pile driving hammers, DTH pile driving/installation, Drill vessels/platforms.

Table titled 'Marine Mammal Hearing Group' listing various groups like Low-frequency (LF) cetaceans, Mid-frequency (MF) cetaceans, High-frequency (HF) cetaceans, etc.

\* NMFS acknowledges default WFAs are likely conservative

Literature Cited

List of references including Blackwell, S.B. 2005; Blackwell, S.B., C.K. Greene, Jr., and W.J. Richardson, 2004; Breitzke, M., O. Boebel, S. El Naggar, W. Jokat, and B. Werner, 2008; Dahl, P.H., D.R. Dall'Osto, and D.M. Farrell, 2015; Dames, S. L., G.J. Warner, M.E. Austin, and A.O. MacGillivray, 2018; Dames, S., J. Vallarta, and D. Zeddes 2019; Greene, K. 1987; Madsen, P.T. 2005; Reinhall, P.G., and P.H. Dahl, 2011; Reyff, J., and C. Heyvaert, 2019; Sive, L.D., P.H. Kvadshem, and M.A. Arisale, 2014; Tashmukhambatov, A.M., G.E. Ioup, J.W. Ioup, N.A. Sidorovskaya, and J.J. Newcomb, 2008; Tolstoy, M., J. Diebold, L. Doermann, S. Nooner, S.C. Webb, D.R. Bohnerstein, T.J. Crone, and R.C. Holmes, 2009.

Technical questions or suggestion on User Spreadsheet: Please contact Amy Scholik-Schlomer (amy.scholik@noaa.gov)

UPDATES (will be posted when change results in the need to recalculate an isopleth; other non-substantive changes may be made periodically but will not result in a version number change)

Table with 4 columns: Original Version, Updated Version, Change, Date posted. Shows updates from 1.0 to 2.2.

A.1: Vibratory Pile Driving (STATIONARY SOURCE: Non-Impulsive, Continuous)						
VERSION 2.2: 2020						
KEY						
Action Proponent Provided Information						
NMFS Provided Information (Technical Guidance)						
Resultant Isoleth						
STEP 1: GENERAL PROJECT INFORMATION						
PROJECT TITLE	Sitka Seaplane Base Project					
PROJECT/SOURCE INFORMATION	For installation and removal of 16 pile and installation of 24" permanent pile, vibratory source level is proxy from 24" steel piles driven at the Naval Base Kitsap in Bangor, Washington (Naval Facilities Engineering Systems Command [NAVFAC] 2013) and from acoustic modeling of nearshore marine pile driving at					
Please include any assumptions						
PROJECT CONTACT	Natalie Kiley-Bergen, natalie@solsticeak.com					
STEP 2: WEIGHTING FACTOR ADJUSTMENT						
Weighting Factor Adjustment (kHz)*	2.5					
* Broadband: 95% frequency contour percentile (kHz) OR Narrowband: frequency (kHz); For appropriate default WFA: See INTRODUCTION tab						
† If a user relies on alternative weighting/dB adjustment rather than relying upon the WFA (source-specific or default), they may override the Adjustment (dB) (row 48), and enter the new value directly. However, they must provide additional support and documentation supporting this modification.						
STEP 3: SOURCE-SPECIFIC INFORMATION						
Sound Pressure Level (L <sub>rms</sub> ), specified at "x" meters (Cell B30)	161					
Number of piles within 24-h period	6					
Duration to drive a single pile (minutes)	10					
Duration of Sound Production within 24-h period (seconds)	3600					
10 Log (duration of sound production)	35.56					
Transmission loss coefficient	15					
Distance of sound pressure level (L <sub>rms</sub> ) measurement (meters)	10					
NOTE: The User Spreadsheet tool provides a means to estimates distances associated with the Technical Guidance's PTS onset thresholds. Mitigation and monitoring requirements associated with a Marine Mammal Protection Act (MMPA) authorization or an Endangered Species Act (ESA) consultation or permit are independent management decisions made in the context of the proposed activity and comprehensive effects analysis, and are beyond the scope of the Technical Guidance and the User Spreadsheet tool.						
RESULTANT ISOPLETHS						
	Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otarid Pinnipeds
	SEL <sub>cum</sub> Threshold	199	198	173	201	219
	PTS Isoleth to threshold (meters)	6.8	0.6	10.1	4.2	0.3
WEIGHTING FUNCTION CALCULATIONS						
	Weighting Function Parameters	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otarid Pinnipeds
	a	1	1.6	1.8	1	2
	b	2	2	2	2	2
	f <sub>1</sub>	0.2	8.8	12	1.9	0.94
	f <sub>2</sub>	19	110	140	30	25
	C	0.13	1.2	1.36	0.75	0.64
	Adjustment (-dB)†	-0.05	-16.83	-23.50	-1.29	-0.60
NOTE: If user decided to override these Adjustment values, they need to make sure to download another copy to ensure the built-in calculations function properly.						
$W(f) = C + 10 \log_{10} \left\{ \frac{(f/f_1)^{2a}}{[1 + (f/f_1)^2]^a [1 + (f/f_2)^2]^b} \right\}$						

## E.2: DTH PILE DRIVING/INSTALLATION (STATIONARY SOURCE: Impulsive, Intermittent)

VERSION 2.2: 2020

KEY

	Action Proponent Provided Information
	NMFS Provided Information (Technical Guidance)
	Resultant Isoleth

### STEP 1: GENERAL PROJECT INFORMATION

PROJECT TITLE	Sitka Seaplane Base Project
PROJECT/SOURCE INFORMATION	For 16" pile, DTH source level is proxy from the sound source verification of 24" piles DTH drilled during the Tenakee Ferry Terminal Improvements Project (Heywert and Reyff 2021).
Please include any assumptions	
PROJECT CONTACT	Natalie Kiley-Bergen, natalie@solsticeak.com

specify if relying on source-specific WFA, alternative weighting/dB adjustment, or if using default value

### STEP 2: WEIGHTING FACTOR ADJUSTMENT

Weighting Factor Adjustment (kHz) <sup>†</sup>	2	
--	---	--

<sup>†</sup> Broadband: 95% frequency contour percentile (kHz); For appropriate default WFA: See INTRODUCTION tab

<sup>†</sup> If a user relies on alternative weighting/dB adjustment rather than relying upon the WFA (source-specific or default), they may override the Adjustment (dB) (row 50), and enter the new value directly. However, they must provide additional support and documentation supporting this modification.

### STEP 3: SOURCE-SPECIFIC INFORMATION

Unweighted SEL <sub>cum</sub> (at measured distance) = SEL <sub>ss</sub> + 10 Log (# strikes)	194.6
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SEL<sub>cum</sub>

Single Strike SEL <sub>ss</sub> (L <sub>E, p</sub> , single strike) specified at "x" meters (Cell B30)	146
Strike rate (average strikes per second)	10
Duration to drive pile (minutes)	60
Number of piles per day	2
Transmission loss coefficient	15
Distance of single strike SEL <sub>ss</sub> (L <sub>E, p</sub> , single strike) measurement (meters)	10
Total number of strikes in a 24-h period	72000

PK

L <sub>p,0-pk</sub> specified at "x" meters (Cell G26)	172
Distance of L <sub>p,0-pk</sub> measurement (meters) <sup>*</sup>	10
L <sub>p,0-pk</sub> Source level	187.0

### RESULTANT ISOPLETHS\*

\*Impulsive sounds have dual metric thresholds (SEL<sub>cum</sub> & PK). Metric producing largest isopleth should be used.

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otarid Pinnipeds
SEL <sub>cum</sub> Threshold	183	185	155	185	203
PTS Isoleth to threshold (meters)	59.0	2.1	70.3	31.6	2.3
PK Threshold	219	230	202	218	232
PTS PK Isoleth to threshold (meters)	NA	NA	NA	NA	NA

\*NA: PK source level is  $\leq$  to the threshold for that marine mammal hearing group.

### WEIGHTING FUNCTION CALCULATIONS

Weighting Function Parameters	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otarid Pinnipeds
a	1	1.6	1.8	1	2
b	2	2	2	2	2
f <sub>1</sub>	0.2	8.8	12	1.9	0.94
f <sub>2</sub>	19	110	140	30	25
C	0.13	1.2	1.36	0.75	0.64
Adjustment (-dB) <sup>†</sup>	-0.01	-19.74	-26.87	-2.08	-1.15

NOTE: If user decided to override these Adjustment values, they need to make sure to download another copy to ensure the built-in calculations function properly.

$$W(f) = C + 10 \log_{10} \left\{ \frac{(f/f_1)^{2a}}{[1 + (f/f_1)^2]^a [1 + (f/f_2)^2]^b} \right\}$$

## E.2: DTH PILE DRIVING/INSTALLATION (STATIONARY SOURCE: Impulsive, Intermittent)

VERSION 2.2: 2020

KEY

	Action Proponent Provided Information
	NMFS Provided Information (Technical Guidance)
	Resultant Isoleth

### STEP 1: GENERAL PROJECT INFORMATION

PROJECT TITLE	Sitka Seaplane Base Project
PROJECT/SOURCE INFORMATION	For 24" pile, DTH source level is proxy from the sound source verification of 24" piles DTH drilled during the Tenakee Ferry Terminal Improvements Project (Heyvaert and Reyff 2021).
Please include any assumptions	
PROJECT CONTACT	Natalie Kiley-Bergen, natalie@solsticeak.com

Specify if relying on source-specific WFA, alternative weighting/dB adjustment, or if using default value

### STEP 2: WEIGHTING FACTOR ADJUSTMENT

Weighting Factor Adjustment (kHz)*	2	
------------------------------------	---	--

\* Broadband: 95% frequency contour percentile (kHz); For appropriate default WFA: See INTRODUCTION tab

† If a user relies on alternative weighting/dB adjustment rather than relying upon the WFA (source-specific or default), they may override the Adjustment (dB) (row 50), and enter the new value directly. However, they must provide additional support and documentation supporting this modification.

### STEP 3: SOURCE-SPECIFIC INFORMATION

Unweighted SEL <sub>cum</sub> (at measured distance) = SEL <sub>ss</sub> + 10 Log (# strikes)	209.3
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SEL<sub>cum</sub>

Single Strike SEL <sub>ss</sub> (L <sub>E,p, single strike</sub> ) specified at "x" meters (Cell B30)	159
Strike rate (average strikes per second)	10
Duration to drive pile (minutes)	90
Number of piles per day	2
Transmission loss coefficient	15
Distance of single strike SEL <sub>ss</sub> (L <sub>E,p, single strike</sub> ) measurement (meters)	10
Total number of strikes in a 24-h period	108000

PK

L <sub>p,0-pk</sub> specified at "x" meters (Cell G26)	184
Distance of L <sub>p,0-pk</sub> measurement (meters)*	10
L <sub>p,0-pk</sub> Source level	199.0

### RESULTANT ISOPLETHS\*

\* Impulsive sounds have dual metric thresholds (SEL<sub>cum</sub> & PK). Metric producing largest isopleth should be used.

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL <sub>cum</sub> Threshold	183	185	155	185	203
PTS Isoleth to threshold (meters)	568.9	20.2	677.6	304.4	22.2
PK Threshold	219	230	202	218	232
PTS PK Isoleth to threshold (meters)	NA	NA	NA	NA	NA

\*NA\*: PK source level is ≤ to the threshold for that marine mammal hearing group.

### WEIGHTING FUNCTION CALCULATIONS

Weighting Function Parameters	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
a	1	1.6	1.5	1	2
b	2	2	2	2	2
f <sub>1</sub>	0.2	8.8	12	1.9	0.94
f <sub>2</sub>	19	110	140	30	25
C	0.13	1.2	1.36	0.75	0.64
Adjustment (-dB)†	-0.01	-19.74	-26.87	-2.08	-1.15

NOTE: If user decided to override these Adjustment values, they need to make sure to download another copy to ensure the built-in calculations function properly.

$$W(f) = C + 10 \log_{10} \left\{ \frac{(f/f_1)^{2a}}{[1 + (f/f_1)^2]^a [1 + (f/f_2)^2]^b} \right\}$$

## E.1: IMPACT PILE DRIVING (STATIONARY SOURCE: Impulsive, Intermittent)

VERSION 2.2: 2020

KEY

	Action Proponent Provided Information
	NMFS Provided Information (Technical Guidance)
	Resultant Isoleth

### STEP 1: GENERAL PROJECT INFORMATION

PROJECT TITLE	Sitka Seaplane Base Project
PROJECT/SOURCE INFORMATION	For 16" piles, impacting source levels are proxy from agreed upon values within NMFS Alaska Region (NMFS 2023).
PROJECT CONTACT	Natalie Kiley-Bergen, natalie@solsticeak.com

Please include any assumptions

Specify if relying on source-specific WFA, alternative weighting/dB adjustment, or if using default value

### STEP 2: WEIGHTING FACTOR ADJUSTMENT

Weighting Factor Adjustment (kHz) <sup>‡</sup>	2	
--	---	--

<sup>‡</sup> Broadband: 95% frequency contour percentile (kHz); For appropriate default WFA: See INTRODUCTION tab

† If a user relies on alternative weighting/dB adjustment rather than relying upon the WFA (source-specific or default), they may override the Adjustment (dB) (row 73), and enter the new value directly. However, they must provide additional support and documentation supporting this modification.

### STEP 3: SOURCE-SPECIFIC INFORMATION

**NOTE: METHOD E.1-1 is PREFERRED method when SEL-based source levels are available (because pulse duration is not required). Only use method E.1-2 if SEL-based source levels are not available.**

E.1-1: METHOD TO CALCULATE PK AND SEL <sub>cum</sub> (SINGLE STRIKE EQUIVALENT) PREFERRED METHOD (pulse duration not needed)	
Unweighted SEL <sub>cum</sub> (at measured distance) = SEL <sub>ss</sub> + 10 Log (# strikes)	203.5

SEL <sub>cum</sub>	
Single Strike SEL <sub>ss</sub> (L <sub>E,p</sub> , single strike) specified at "x" meters (Cell B32)	175
Number of strikes per pile	175
Number of piles per day	4
Transmission loss coefficient	15
Distance of single strike SEL <sub>ss</sub> (L <sub>E,p</sub> , single strike) measurement (meters)	10

PK	
L <sub>p,0-pk</sub> specified at "x" meters (Cell G29)	200
Distance of L <sub>p,0-pk</sub> measurement (meters) <sup>*</sup>	10
L <sub>p,0-pk</sub> Source level	215.0

### RESULTANT ISOPLETHS\*

\*Impulsive sounds have dual metric thresholds (SEL<sub>cum</sub> & PK). Metric producing largest isopleth should be used.

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL <sub>cum</sub> Threshold	183	185	155	185	203
PTS Isoleth to threshold (meters)	230.6	8.2	274.6	123.4	9.0
PK Threshold	219	230	202	218	232
PTS PK Isoleth to threshold (meters)	NA	NA	7.4	NA	NA

\*NA: PK source level is ≤ to the threshold for that marine mammal hearing group.

## E.1: IMPACT PILE DRIVING (STATIONARY SOURCE: Impulsive, Intermittent)

VERSION 2.2: 2020

KEY

	Action Proponent Provided Information
	NMFS Provided Information (Technical Guidance)
	Resultant Isoleth

### STEP 1: GENERAL PROJECT INFORMATION

PROJECT TITLE	Sitka Seaplane Base Project
PROJECT/SOURCE INFORMATION	For 24" piles, impacting source levels are proxy from agreed upon values within NMFS Alaska Region (NMFS 2023).
PROJECT CONTACT	Natalie Kiley-Bergen, natalie@solsticeak.com

Please include any assumptions

Specify if relying on source-specific WFA, alternative weighting/dB adjustment, or if using default value

### STEP 2: WEIGHTING FACTOR ADJUSTMENT

Weighting Factor Adjustment (kHz) <sup>*</sup>	2	
--	---	--

<sup>\*</sup> Broadband: 95% frequency contour percentile (kHz); For appropriate default WFA: See INTRODUCTION tab

† If a user relies on alternative weighting/dB adjustment rather than relying upon the WFA (source-specific or default), they may override the Adjustment (dB) (row 73), and enter the new value directly. However, they must provide additional support and documentation supporting this modification.

### STEP 3: SOURCE-SPECIFIC INFORMATION

**NOTE: METHOD E.1-1 is PREFERRED method when SEL-based source levels are available (because pulse duration is not required). Only use method E.1-2 if SEL-based source levels are not available.**

#### E.1-1: METHOD TO CALCULATE PK AND SEL<sub>cum</sub> (SINGLE STRIKE EQUIVALENT) PREFERRED METHOD (pulse duration not needed)

Unweighted SEL <sub>cum</sub> (at measured distance) = SEL <sub>ss</sub> + 10 Log (# strikes)	205.5
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SEL<sub>cum</sub>

Single Strike SEL <sub>ss</sub> (L <sub>E,p</sub> , single strike) specified at "x" meters (Cell B32)	177
Number of strikes per pile	175
Number of piles per day	4
Transmission loss coefficient	15
Distance of single strike SEL <sub>ss</sub> (L <sub>E,p</sub> , single strike) measurement (meters)	10

PK

L <sub>p,0-pk</sub> specified at "x" meters (Cell G29)	203
Distance of L <sub>p,0-pk</sub> measurement (meters) <sup>*</sup>	10
L <sub>p,0-pk</sub> Source level	218.0

### RESULTANT ISOPLETHS\*

\*Impulsive sounds have dual metric thresholds (SEL<sub>cum</sub> & PK). Metric producing largest isopleth should be used.

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL <sub>cum</sub> Threshold	183	185	155	185	203
PTS Isoleth to threshold (meters)	313.4	11.1	373.3	167.7	12.2
PK Threshold	219	230	202	218	232
PTS PK Isoleth to threshold (meters)	NA	NA	11.7	NA	NA

\*NA: PK source level is ≤ to the threshold for that marine mammal hearing group.

<b>PROJECT TITLE</b>	Sitka Seaplane Base Project
<b>PROJECT/SOURCE INFORMATION</b> Please include any assumptions	For installation of 24" permanent piles and installation and removal of 16" temporary piles, the vibratory source level is proxy from 24" steel piles driven at the Naval Base Kitsap in Bangor, Washington (Naval Facilities Engineering Systems Command [NAVFAC] 2013) and from acoustic modeling of nearshore marine pile driving at Navy installations in Puget Sound (NAVFAC 2015).
<b>PROJECT CONTACT</b>	Natalie Kiley-Bergen (natalie@solsticeak.com)

Fill in SPL and distances for peak and rms pressures, and read distance to threshold for appropriate model

Measured pressure	Peak	RMS
SPL =		161
Distance =		10

Spreading Model	Fish Meters to Threshold		Spreading Model	MarMam Meters to Threshold		
	Peak(180 dB)	RMS (150 dB)		RMS 180 dB	RMS 160 dB	RMS 120 dB
Spherical spreading	0	35	$dB = 20 \cdot \log(R1/R2)$	1	11	1122
Cylindrical spreading	0	126	$dB = 10 \cdot \log(R1/R2)$	0	13	125893
Practical spreading	0	54	$dB = 15 \cdot \log(R1/R2)$	1	12	5411.7

<b>PROJECT TITLE</b>	Sitka Seaplane Base Project
<b>PROJECT/SOURCE INFORMATION</b> Please include any assumptions	For 16" and 24" piles, DTH source level is proxy from the sound source verification of 24" piles DTH drilled during the Tenakee Ferry Terminal Improvements Project (Heyvaert and Reyff 2021).
<b>PROJECT CONTACT</b>	Natalie Kiley-Bergen (natalie@solsticeak.com)

Fill in SPL and distances for peak and rms pressures, and read distance to threshold for appropriate model

Measured pressure	Peak	RMS
SPL =		167
Distance =		10

Spreading Model	Fish Meters to Threshold		Spreading Model	MarMam Meters to Threshold		
	Peak(180 dB)	RMS (150 dB)		RMS 180 dB	RMS 160 dB	RMS 120 dB
Spherical spreading	0	71	$dB = 20 \cdot \log(R1/R2)$	2	22	2239
Cylindrical spreading	0	501	$dB = 10 \cdot \log(R1/R2)$	1	50	501187
Practical spreading	0	136	$dB = 15 \cdot \log(R1/R2)$	1	29	13594

<b>PROJECT TITLE</b>	Sitka Seaplane Base Project
<b>PROJECT/SOURCE INFORMATION</b> Please include any assumptions	For 16" and 24" piles, DTH source level is proxy from the sound source verification of 24" piles DTH drilled during the Tenakee Ferry Terminal Improvements Project (Heyvaert and Reyff 2021). A different RMS is used for Northern sea otters per USFWS request.
<b>PROJECT CONTACT</b>	Natalie Kiley-Bergen (natalie@solsticeak.com)

Fill in SPL and distances for peak and rms pressures, and read distance to threshold for appropriate model

Measured pressure	Peak	RMS
SPL =		173
Distance =		10

Spreading Model	Fish Meters to Threshold		Spreading Model	MarMam Meters to Threshold		
	Peak(180 dB)	RMS (150 dB)		RMS 180 dB	RMS 160 dB	RMS 120 dB
Spherical spreading	0	141	$dB = 20 \cdot \log(R1/R2)$	4	45	4467
Cylindrical spreading	0	1995	$dB = 10 \cdot \log(R1/R2)$	2	200	1995262
Practical spreading	0	341	$dB = 15 \cdot \log(R1/R2)$	3	74	34145

<b>PROJECT TITLE</b>	Sitka Seaplane Base Project
<b>PROJECT/SOURCE INFORMATION</b> Please include any assumptions	For 16" piles, impacting source level is proxy from median measured source levels from NMFS guidance (NMFS 2023).
<b>PROJECT CONTACT</b>	Natalie Kiley-Bergen (natalie@solsticeak.com)

Fill in SPL and distances for peak and rms pressures, and read distance to threshold for appropriate model

Measured pressure	Peak	RMS
SPL =	200	185
Distance =	10	10

Spreading Model	Fish Meters to Threshold		Spreading Model	MarMam Meters to Threshold		
	Peak(180 dB)	RMS (150 dB)		RMS 180 dB	RMS 160 dB	RMS 120 dB
Spherical spreading	100	562	$dB = 20 \cdot \log(R1/R2)$	18	178	17783
Cylindrical spreading	1000	31623	$dB = 10 \cdot \log(R1/R2)$	32	3162	31622777
Practical spreading	215	2154	$dB = 15 \cdot \log(R1/R2)$	22	464.2	215443

<b>PROJECT TITLE</b>	Sitka Seaplane Base Project
<b>PROJECT/SOURCE INFORMATION</b> Please include any assumptions	For 24" piles, impacting source level is proxy from median measured source levels from NMFS guidance (NMFS 2023).
<b>PROJECT CONTACT</b>	Natalie Kiley-Bergen (natalie@solsticeak.com)

Fill in SPL and distances for peak and rms pressures, and read distance to threshold for appropriate model

Measured pressure	Peak	RMS
SPL =	203	190
Distance =	10	10

Spreading Model	Fish Meters to Threshold		Spreading Model	MarMam Meters to Threshold		
	Peak(180 dB)	RMS (150 dB)		RMS 180 dB	RMS 160 dB	RMS 120 dB
Spherical spreading	141	1000	$dB = 20 \cdot \log(R1/R2)$	32	316	31623
Cylindrical spreading	1995	100000	$dB = 10 \cdot \log(R1/R2)$	100	10000	100000000
Practical spreading	341	4642	$dB = 15 \cdot \log(R1/R2)$	46	1000.0	464159

**GENERAL PROJECT INFORMATION**

<b>PROJECT TITLE</b>	Sitka Seaplane Base Project
<b>PROJECT/SOURCE INFORMATION</b> Please include any assumptions	In-air vibrating sound source is proxy from the Washington State Department of Transportation has documented un-weighted rms levels for a vibratory hammer (30-inch pile) to an average 96.5 dB and a maximum of 103.2 dB at 15 meters (Laughlin 2010). Maximum levels were used to extrapolate distances for the projects.
<b>PROJECT CONTACT</b>	Natalie Kiley-Bergen (natalie@solsticeak.com)

Fill in SPL and distances for peak and rms pressures, and read distance to threshold for appropriate model

Measured pressure	Peak	RMS
SPL =		103.2
Distance =		15

Spreading Model	Fish Meters to Threshold		Spreading Model	MarMam Meters to Threshold		RMS 120 dB	RMS 90dB- harbor seal in air	RMS 100dB - sea lion in air
	Peak(180 dB)	RMS (150 dB)		RMS 180 dB	RMS 160 dB			
Spherical spreading	0	0	$dB = 20 \cdot \log(R1/R2)$	0	0	2	68.56323	21.6816
Cylindrical spreading	0	0	$dB = 10 \cdot \log(R1/R2)$	0	0	0		
Practical spreading	0	0	$dB = 15 \cdot \log(R1/R2)$	0	0	1		

Fill in SPL and distance at which SPL was measured

Conversion	meters	feet	miles
	1	3.733157477	7E-04

**GENERAL PROJECT INFORMATION**

<b>PROJECT TITLE</b>	Sitka Seaplane Base Project
<b>PROJECT/SOURCE INFORMATION</b> Please include any assumptions	In-air impacting sound source level is 106 dB rms at 15 m, the median value during impact installation of 24 to 48-inch-diameter steel piles at Naval Base Kitsap Bangor (Illingworth and Rodkin, Inc. 2012).
<b>PROJECT CONTACT</b>	Natalie Kiley-Bergen (natalie@solsticeak.com)

Fill in SPL and distances for peak and rms pressures, and read distance to threshold for appropriate model

Measured pressure	Peak	RMS
SPL =		106
Distance =		15

Spreading Model	Fish Meters to Threshold		Spreading Model	MarMam Meters to Threshold		RMS 120 dB	RMS 90dB- harbor seal in air	RMS 100dB - sea lion in air
	Peak(180 dB)	RMS (150 dB)		RMS 180 dB	RMS 160 dB			
Spherical spreading	0	0	$dB = 20 \cdot \log(R1/R2)$	0	0	3	94.6436	29.92893
Cylindrical spreading	0	0	$dB = 10 \cdot \log(R1/R2)$	0	0	1		
Practical spreading	0	0	$dB = 15 \cdot \log(R1/R2)$	0	0.0038	2		

Fill in SPL and distance at which SPL was measured

Conversion	meters	feet	miles
	2	5.737767906	0.001

## **Appendix C: Sitka Seaplane Base Project Protected Species Monitoring and Mitigation Plan**

# **Protected Species Monitoring and Mitigation Plan**

**City and Borough of Sitka**

**Sitka Seaplane Base**

**Sitka Channel, Sitka, Alaska**

August 2023

Revised November 2023

Prepared for:  
City and Borough of Sitka  
6100 Lincoln St.  
Sitka, AK 99835

Prepared by:



2607 Fairbanks Street Suite B  
Anchorage, Alaska 99503

Submitted to:  
National Marine Fisheries Service and U.S. Fish and Wildlife Service

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Appendix A: List of Species with Ranges in the Project Action Area
Appendix B: Construction Activity and Communication Log
Appendix C: Marine Mammal Sighting Forms
Appendix D: Grid Maps
Appendix E: Sunflower Sea Star Sighting Forms

## **ACRONYMS AND ABBREVIATIONS**

3M	Marine Mammal Management
DPS	distinct population segment
DTH	down the hole
ESA	Endangered Species Act
FAA	Federal Aviation Administration
HF	high-frequency
HTL	high tide line
IHA	Incidental Harassment Authorization
LF	low-frequency
MF	mid-frequency
MMPA	Marine Mammal Protection Act
NMFS	National Marine Fisheries Service
OW	otariid
PSMMP	Protected Species Monitoring and Mitigation Plan
PSO	protected species observer
PW	phocid
ROV	remote operated vehicle
rms	root mean square
SPB	seaplane base
SPL	sound pressure level

USACE  
USFWS  
WDPS

U.S. Army Corps of Engineers  
U.S. Fish and Wildlife Service  
Western Distinct Population Segment

# 1 INTRODUCTION

The City and Borough of Sitka (CBS) proposes the following Protected Species Monitoring and Mitigation Plan (PSMMP) for use during in-water work for the Sitka Seaplane Base (SPB) Project in Sitka, Alaska (Figure 1 and Figure 2). The project is in waters of the U.S., within the ranges of marine mammals listed in the Endangered Species Act (ESA) and the Marine Mammal Protection Act (MMPA), and has the potential to generate noise that could exceed Level A and B harassment thresholds established by the National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS). This PSMMP supports the Biological Assessment, in accordance with the ESA, and the Incidental Harassment Authorization (IHA) applications, in accordance with the MMPA (Section 101(a)(5)(D) permitting). Monitoring and shutdown zones will be implemented to minimize Level A and Level B harassment of marine mammals.

The sunflower sea star (*Pycnopodia helianthoides*) was proposed to be listed as threatened under the ESA on March 16, 2023 (88 FR 16212). The sunflower sea star is included in this PSMMP as a proposed listed species because it may occur in the project area. If the species is listed under the ESA prior or during the construction period, mitigation measures prescribed here will be completed.

The goal of this PSMMP is to ensure compliance with the ESA and the MMPA when implemented by the protected species observers (PSOs) at the project site. The project will comply with the terms and conditions outlined in the following requested permits and authorizations:

- U.S. Army Corps of Engineers (USACE), Sitka Channel, for activities in Waters of the U.S. (forthcoming)
- NMFS Alaska Region, ESA Section 7(a)(2) Biological Opinion (requested)
- NMFS Office of Protected Resources Permits and Conservation Division IHA (requested)
- USFWS Alaska Region Marine Mammal Management (3M) IHA (requested)

Figure 1. Sitka SPB Project Location and Vicinity



Figure 2. Sitka SPB Project Location



## 2 PROJECT DESCRIPTION

CBS is proposing to construct a new SPB in Sitka Channel on the northern shore of Japonski Island in Sitka, Alaska. The new SPB would replace the existing SPB (Federal Aviation Administration [FAA] identifier A29) currently located on the eastern shore of Sitka Channel, near Eliason Harbor and downtown Sitka. The new SPB would address existing capacity, safety, and condition deficiencies for critical seaplane operations, and allow seaplanes to transit Sitka Channel more safely.

The project would consist of several components, completed over two phases:

The following components are proposed for Phase I (construction from May 2024 to May 2025):

- Seaplane ramp float
- Drive-down float
- Pedestrian and vehicle transfer bridge
- Approach dock
- Uplands approach, storage area, and parking

The following components are proposed for Phase II (construction from May 2025 to May 2026):

- Transient seaplane float
- Turnaround float
- Expanded uplands approach, storage area, and parking
- Drive-down launch ramp

Sound would extend approximately 6.0 kilometers (3.7 miles) from the western opening in the Channel Rock Breakwaters, 7.0 kilometers (4.3 miles) from the eastern opening in the Channel Rock Breakwaters, and 13.6 kilometers (8.5 miles) from the south end of Sitka Channel. Construction for Phase I would begin in May 2024 and be completed in March 2025 and construction for Phase II would begin in May 2025 and be completed in March 2026. During Phase I, pile removal and installation activities is expected to occur for a total of approximately 46 hours over 31 days (not necessarily consecutive days). Most of the in-water pile driving time would be spent down-the-hole (DTH) drilling (34 hours). Construction of Phase II would follow a similar sequence with in-water work (pile driving) occurring for approximately 13 hours over 9 days (not necessarily consecutive). Most of the in-water work time would be spent DTH drilling (12 hours). Table 1 and Table 2 provide a more detailed overview of the project components.

**Table 1. Sitka SPB Project Groundwork Summary – Phase I and II**

Phase	Total Area (acre)	Volume (cubic yards)	Time (hours)	Days
Phase I	<b>Blasting</b>			
	1.3	9,500	564	47.0
	<b>Excavating</b>			
	1.4	5,925	178	14.8
	<b>Entire Footprint (includes areas above HTL)</b>			
	2.6	34,650	1,041	86.7
	<b>Fill in intertidal waters (area between mean high water [MHW] and HTL)</b>			
	0.03	21,340	641	53.4
	<b>Fill in marine waters (area below MHW)</b>			
1.3	360	11	0.9	
Phase II	<b>Entire Footprint (includes areas above HTL)</b>			
	1.3	22,000	661	55.1
	<b>Fill in intertidal waters (area between MHW and HTL)</b>			
	0.5	1,690	51	4.2
	<b>Fill in marine waters (area below MHW)</b>			
0.8	7,810	235	19.5	

**Table 2. Sitka SPB Project Pile Size, Quantity, and Installation Method -Phase I and II**

Project Component	Temp Install	Temp Remove	Perm Install	Perm Install	Total	Temp Install	Temp Remove	Perm Install	Total	Total
	Phase I					Phase II				I & II
Diameter of Steel Pipe Piles (inches)	16	16	16	24	--	16	16	24	--	--
Total # of Piles	12	12	10	16	--	6	6	6	--	--
<b>Vibratory Pile Driving</b>										
Total Quantity	12	12	10	16	--	6	6	6	--	--
Max # Piles Vibrated Per Day	6	6	6	6	--	6	6	6	--	--
Vibratory Time Per Pile (minutes)	10	10	10	10	--	10	10	10	--	--
Vibratory Time Per Day (minutes)	60	60	60	60	--	60	60	60	--	--
Number of Days	2.0	2.0	1.7	2.7	<b>8.4</b>	1.0	1.0	1.0	<b>3.0</b>	<b>11.4</b>
Vibratory Time Total (hours)	2.0	2.0	1.7	2.7	<b>8.4</b>	1.0	1.0	1.0	<b>3.0</b>	<b>11.4</b>
<b>DTH Pile Drilling</b>										
Total Quantity	--	--	10	16	--	--	--	6	--	--
Max # of Piles Installed per Day	--	--	2	2	--	--	--	2	--	--
# of Strikes Per Pile	--	--	36,000	54,000	--	--	--	54,000	--	--
# of Strikes Per Second	--	--	10	10	--	--	--	10	--	--
Actual Drilling Time Per Pile (minutes)	--	--	60	90	--	--	--	90	--	--
Time per Day (minutes)	--	--	120	180	--	--	--	180	--	--
Number of Days	--	--	5.0	8.0	<b>13.0</b>	--	--	3.0	<b>3.0</b>	<b>16.0</b>
DTH Drilling Time Total (hours)	--	--	10.0	24.0	<b>34.0</b>	--	--	9.0	<b>9.0</b>	<b>43.0</b>

Project Component	Temp Install	Temp Remove	Perm Install	Perm Install	Total	Temp Install	Temp Remove	Perm Install	Total	Total
	Phase I					Phase II				I & II
<b>Impact Pile Driving</b>										
Total Quantity	12	--	10	16	--	6	--	6	--	--
Max # Piles Impacted Per Day	4	--	4	4	--	4	--	4	--	--
# of Strikes Per Pile	175	--	175	175	--	175	--	175	--	--
Impact Time Per Pile (minutes)	5	--	5	5	--	5	--	5	--	--
Impact Time Per Day (minutes)	20	--	20	20	--	20	--	20	--	--
Number of Days	3.0	--	2.5	4.0	<b>9.5</b>	1.5	--	1.5	<b>3.0</b>	<b>12.5</b>
Impact Time Total (hours)	1.0	--	0.8	1.3	<b>3.1</b>	0.5	--	0.5	<b>1.0</b>	<b>4.1</b>

### 3 SPECIES COVERED UNDER THE IHA

There are five ESA-listed marine mammal species under NMFS jurisdiction that have ranges that extend into the project area (humpback, fin, North Pacific right, and sperm whales and Steller sea lions). However, take has only been requested for the Mexico distinct population segment (DPS) humpback whale and Western DPS (WDPS) Steller sea lions that are known to frequent the area (Table 3). Take has also been requested for gray whales, minke whales, killer whales, harbor porpoise, harbor seals, and northern sea otters which are not listed under the ESA. Additionally, take by Level B harassment is also requested for Northern sea otters which are under USFWS jurisdiction. For additional information about marine mammal species with ranges in the project action area, see Appendix A.

There are various ESA-listed and MMPA-listed marine mammal species with habitat ranges that overlap with the ensonified area of the project; however, these species have not been observed in the project area. No Level A or B take is requested for the following species: fin whale (ESA-listed, *Balaenoptera physalus*), North Pacific right whale (ESA-listed, *Eubalaena japonica*), sperm whale (*Physeter macrocephalus*), northern fur seals (*Callorhinus ursinus*), pacific white-sided dolphin (*Lagenorhynchus obliquidens*), and Dall's porpoise (*Phocoenoides dalli*). In-water project construction activities will be shut down if any individuals of these species or any other species not listed in Table 3 are observed approaching the Level B shutdown zone to ensure there is no Level A or B take of these species.

ESA candidate species sunflower sea stars are also included in this PSMMP because they may occur in the project area. If they are listed at the time of construction, sunflower sea stars monitoring and mitigation measures described in this PSMMP will be implemented.

**Table 3. Species Known to Occur in Project Area and Requested Take Types and Numbers (may be updated following issuance of IHAs)**

Species	Hearing Group	Phase I		Phase II	
		Level A	Level B	Level A	Level B
Gray Whale ( <i>Eschrichtius robustus</i> )	Low-Frequency (LF) Cetacean	0	6	0	4
Minke Whale ( <i>Balaenoptera acutorostrata</i> )	LF Cetacean	0	6	0	4
Humpback Whale ( <i>Megaptera novaeangliae</i> )	LF Cetacean	0	11	0	4
Killer Whale ( <i>Orcinus orca</i> )	Mid-Frequency (MF) Cetacean	0	30	0	7
Harbor Porpoise ( <i>Phocoenoides dalli</i> )	High-Frequency (HF) Cetacean	5	8	5	5
Harbor Seal ( <i>Phoca vitulina</i> )	Phocid Pinniped (PW)	48	130	13	38
Northern Sea Otter ( <i>Enhydra lutris kenyoni</i> )	Otariid Pinniped (OW)	0	36	0	14

Steller Sea Lion (WDPS; <i>Eumetopias jubatus</i> )	OW	16	124	6	36
Sunflower Sea Star ( <i>Pycnopodia helianthoides</i> )	N/A	TBD	TBD	TBD	TBD

## 4 MONITORING AND SHUTDOWN ZONES

PSOs will observe for, document, and track marine mammals and monitor for the presence of sunflower sea stars. The harassment zones will be monitored throughout the permitted in-water construction activity to minimize potential impacts to marine mammals. The following mitigation measures will be applied based on species, in-water activity, and distance of the species from the project location:

- If a permitted marine mammal enters a Level B monitoring zone, a Level B take will be recorded and animal behaviors documented. Permitted construction activities would continue without cessation unless the animal approaches or enters the shutdown zone.
- If a marine mammal approaches or appears in a Level A shutdown zone without permitted take, all permitted construction activities will immediately halt until the marine mammal has left the shutdown zone or has not been sighted for 15 minutes (pinnipeds and small cetaceans) or 30 minutes (large cetaceans and sea otters).
- If a non-permitted marine mammal approaches or appears in a Level B zone, all permitted construction activities will immediately halt until the marine mammal has left the Level B zone or has not been sighted for 15 minutes (pinnipeds, small cetaceans, and sea otters) or 30 minutes (large cetaceans).

Takes, in the form of Level A or Level B harassment, of marine mammals other than permitted species are not authorized and will be avoided by shutting down construction activities before these species enter the Level B monitoring zone.

Because species are impacted differently by noise, species-specific monitoring and shutdown zones have been calculated for this project. These monitoring and shutdown zones are summarized in Table 4 and Figure 3 through Figure 8.

As the piles are removed from the water, a PSO will be responsible for monitoring pile removals for the presence of sunflower sea stars attached to piles. Prior to the placement of fill each day, surveys will be conducted to check for the presence of sunflower sea stars.

## 4.1 Level A Harassment Zones

Level A harassment zones for marine mammals are defined as areas where sound pressure levels (SPLs) meet or exceed the level that would cause auditory injury to marine mammals. Level A shutdown zones are intended to protect marine mammals from auditory injury. In-water activities would be halted upon the sighting of a marine mammal that is in (or anticipated to enter) the shutdown zone. For select species where Level A take has been requested, the Level A zone will function as a monitoring zone to observe and record if Level A take occurs.

Further, there will be a nominal 10-meter shutdown zone for construction activity where acoustic injury is not the primary concern. This type of work could include (but is not limited to) the following activities: movement of the barge to the pile location; positioning of the pile on the substrate via a crane (i.e., stabbing the pile); and removal of the pile from the water column/substrate via a crane (i.e., deadpull). For these activities, monitoring would take place starting 15 minutes before initiation and ending when the action is complete. This can be monitored by the vessel operator or construction personnel when a PSO is not present. Radial distances to Level A shutdown zone boundaries are defined in Table 4 for Phase I and Table 5 for Phase II and shown by hearing group in Figures 3 through Figure 7 below.

A PSO will visually inspect all pile removals. In addition, surveys will occur prior to construction and bi-weekly within a grid in pile removal and pile placement areas. In areas where fill is to be placed below MHW, surveys for sunflower sea stars will occur within a 24-hour window prior to when fill is to be placed along transects within the specific area to be filled.

**Table 4. Sitka SPB Level A and Level B Harassment Zones – Phase I**

Source	Distance (meters)							
	Level A					Level B		
	NMFS					USFWS	NMFS	USFWS
	LF	MF	HF	PW (shutdown)	Steller Sea Lion	Northern Sea Otter	All Marine Mammals	Northern Sea Otter
<b>In-water Activities</b>								
Barge movements, pile positioning, etc. <sup>a</sup>	10	10	10	10	10	20	10	10
<b>Vibratory Pile Driving/Removal</b>								
16-inch steel temporary installation (12 piles, 60 minutes/day, 2.0 days)	10	10	20	10	10	20	5,415	20
16-inch steel temporary removal (12 piles, 60 minutes/day, 2.0 days)	10	10	20	10	10	20	5,415	20
16-inch steel permanent installation (10 piles, 60 minutes/day, 1.7 days)	10	10	20	10	10	20	5,415	20
24-inch steel permanent installation (16 piles, 60 minutes/day, 2.7 days)	10	10	20	10	10	20	5,415	20
<b>DTH Drilling</b>								
16-inch steel permanent installation (10 piles, 2.0 hours/day, 5.0 days)	60	10	75	35	10	30	13,600 <sup>b</sup> (Stopped at 8,500)	30
24-inch steel permanent installation (16 piles, 3.0 hours/day, 8.0 days)	570	30	680	305 (125)	30	30	13,600 <sup>b</sup> (Stopped at 8,500)	75
<b>Impact Pile Driving</b>								
16-inch steel temporary installation (12 piles, 20 minutes/day, 3.0 days)	235	10	275	125	10	20	465	465
16-inch steel permanent installation (10 piles, 20 minutes/day, 2.5 days)	235	10	275	125	10	20	465	465
24-inch steel permanent installation (16 piles, 20 minutes/day, 4.0 days)	315	20	375	170	20	20	1,000	1,000

Harassment zone distances refer to the maximum radius of the zone and are rounded.

<sup>a</sup> Although acoustic injury is not the primary concern with these activities, shutdowns will be implemented to avoid impacts to species.

<sup>b</sup> These sound zones are blocked by landforms at 8,500 meters.

**Table 5. Sitka SPB Level A and Level B Harassment Zones – Phase II**

Source	Distance (meters)							
	Level A						Level B	
	NMFS					USFWS	NMFS	USFWS
	LF	MF	HF	PW (shutdown)	Steller Sea Lion	Northern Sea Otter	All Marine Mammals	Northern Sea Otter
<b>In-water Activities</b>								
Barge movements, pile positioning, etc. <sup>a</sup>	10	10	10	10	10	20	10	10
<b>Vibratory Pile Driving/Removal</b>								
16-inch steel temporary installation (6 piles, 60 minutes/day, 1.0 days)	10	10	20	10	10	20	5,415	20
16-inch steel temporary removal (6 piles, 60 minutes/day, 1.0 days)	10	10	20	10	10	20	5,415	20
24-inch steel permanent installation (6 piles, 60 minutes/day, 1.0 days)	10	10	20	10	10	20	5,415	20
<b>DTH Drilling</b>								
24-inch steel permanent installation (6 piles, 4.0 hours/day, 3.0 days)	570	30	680	305 (125)	30	30	13,600 <sup>b</sup> (Stopped at 8,500)	75
<b>Impact Pile Driving</b>								
16-inch steel temporary installation (6 piles, 20 minutes/day, 1.5 days)	235	10	275	125	10	20	465	465
24-inch steel permanent installation (6 piles, 20 minutes/day, 1.5 days)	315	20	375	170 (125)	20	20	1,000	1,000

Harassment zone distances refer to the maximum radius of the zone and are rounded.

<sup>a</sup> Although acoustic injury is not the primary concern with these activities, shutdowns will be implemented to avoid impacts to species.

<sup>b</sup> These sound zones are blocked by landforms at 8,500 meters.

<sup>c</sup> CBS is requesting a 125-meter minimum shutdown zone for large Level A distances for PW pinnipeds.

Figure 3. Sitka SPB Project Distances to LF Cetaceans Level A Harassment Zones – Phase I and II

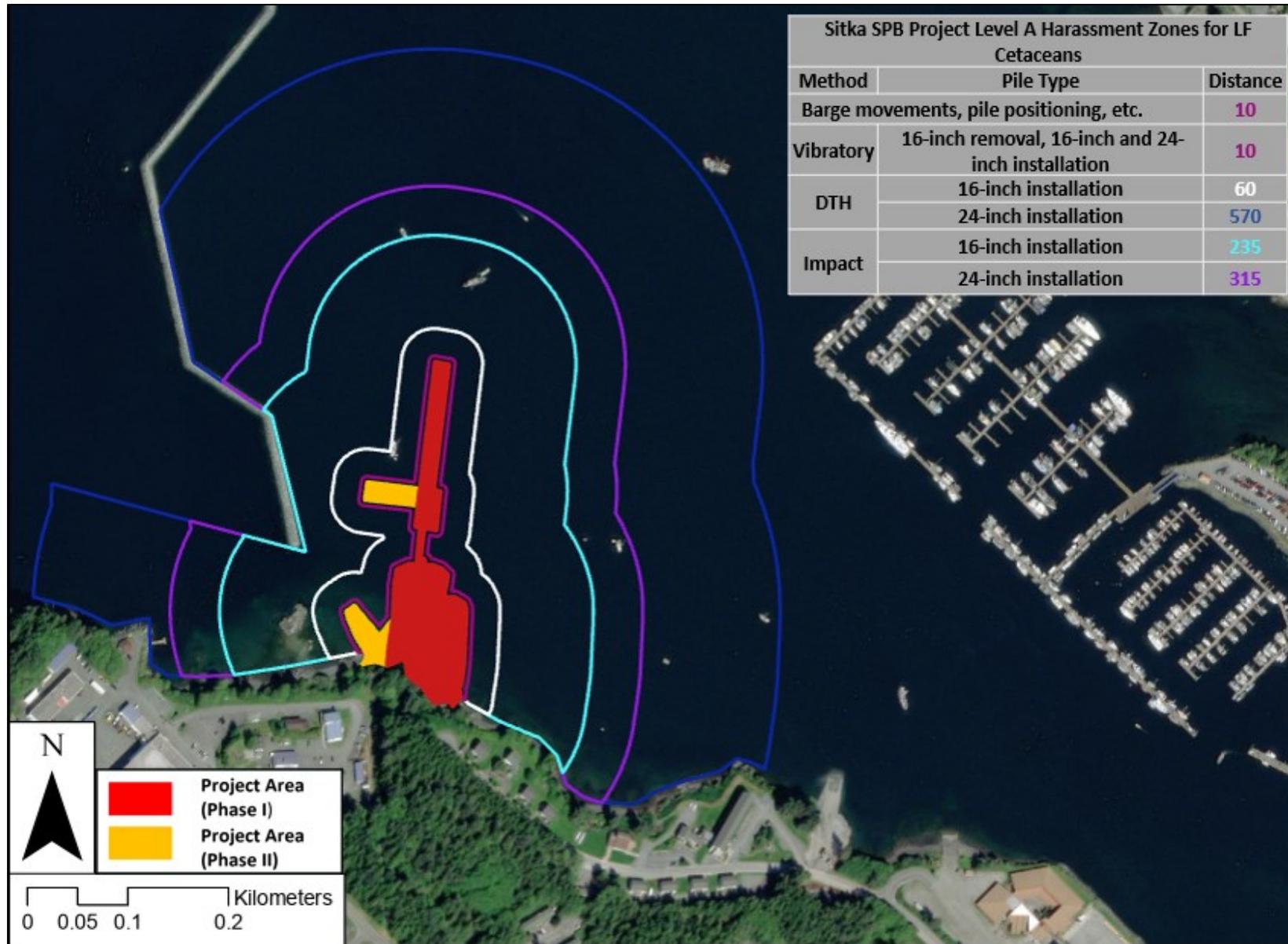


Figure 4. Sitka SPB Project Distances to MF Cetaceans Level A Harassment Zones – Phase I and II

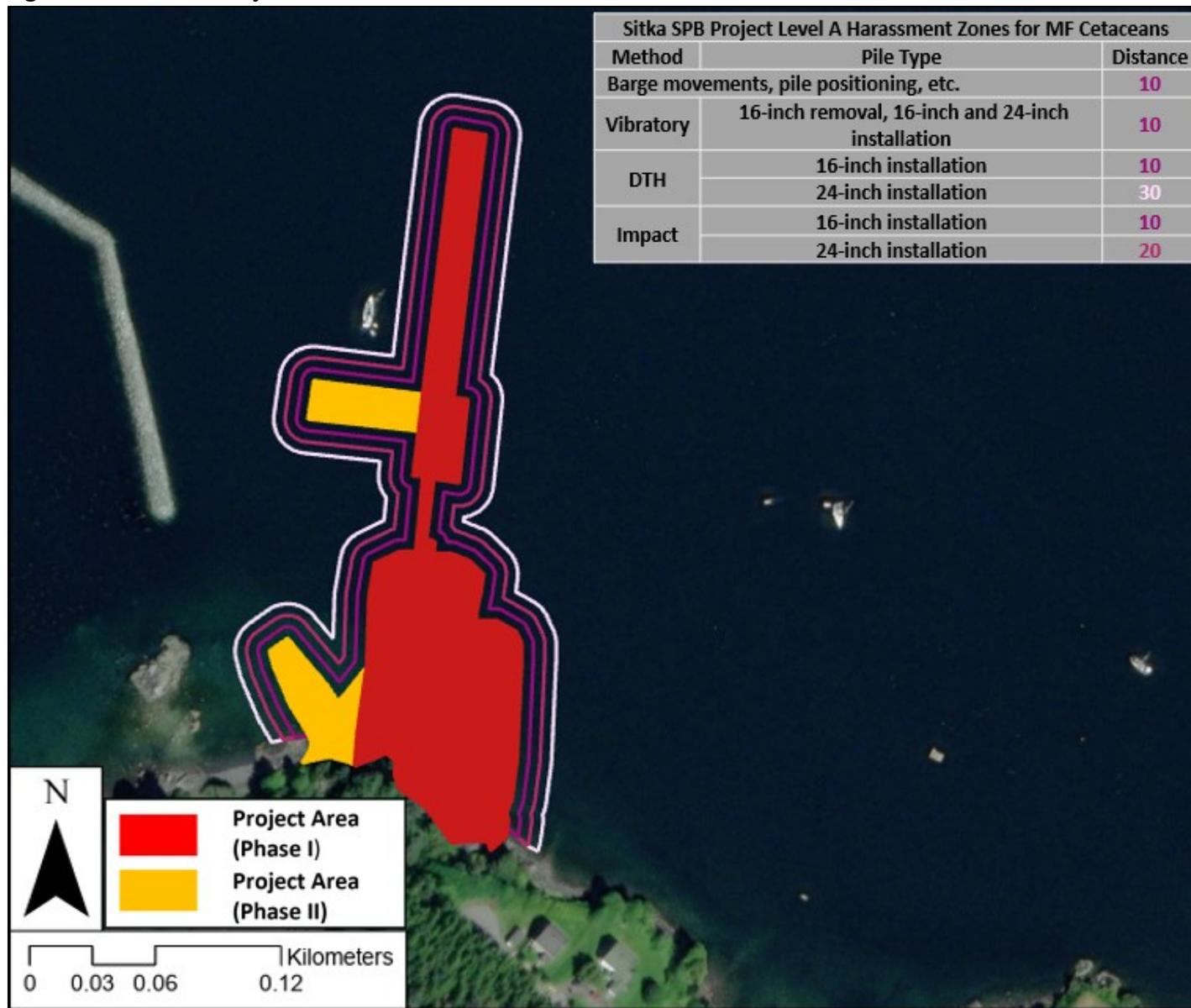


Figure 5. Sitka SPB Project Distances to HF Cetaceans Level A Harassment Zones – Phase I and II

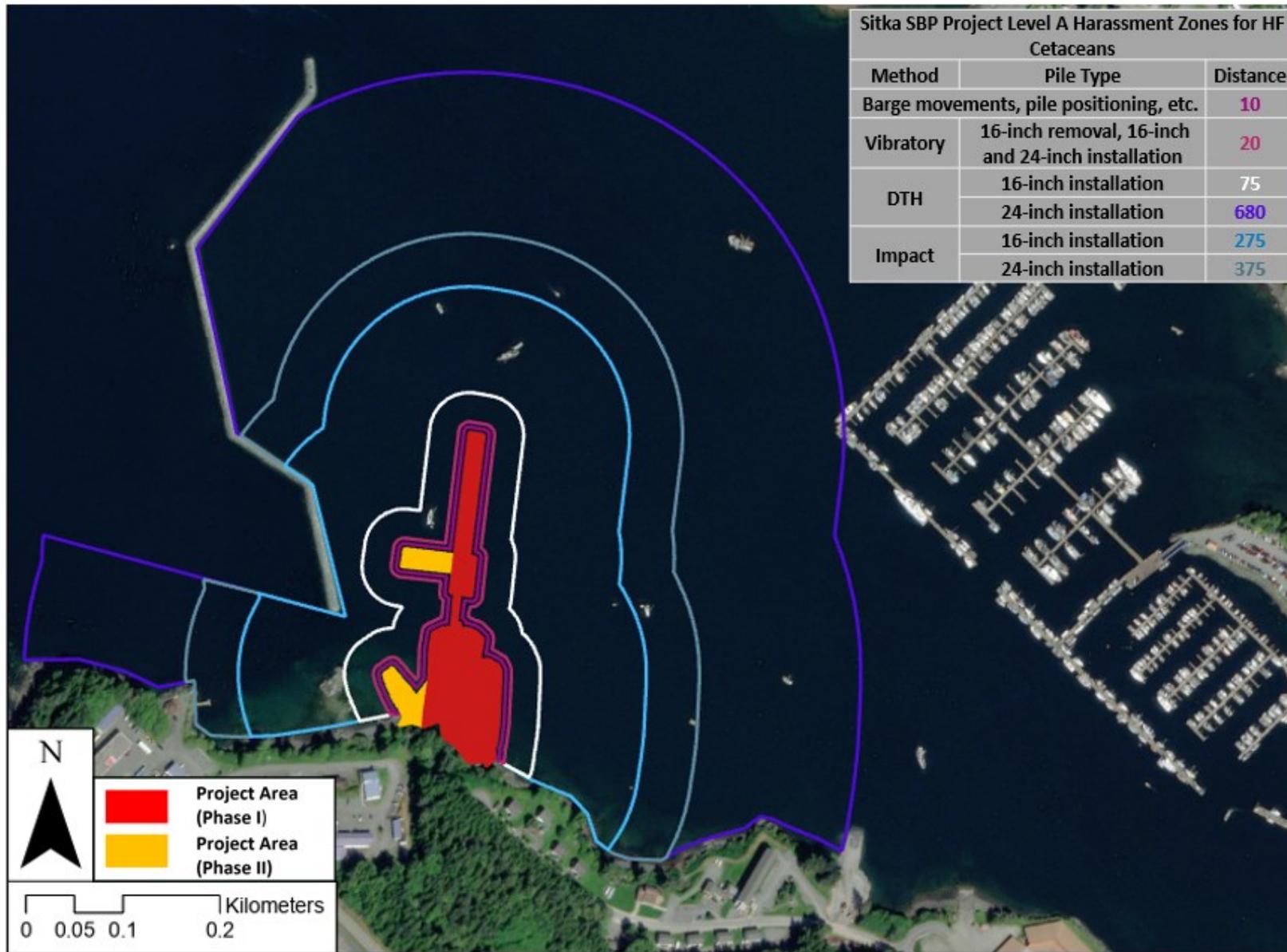


Figure 6. Sitka SPB Project Distances to PW Level A Harassment Zones – Phase I and II

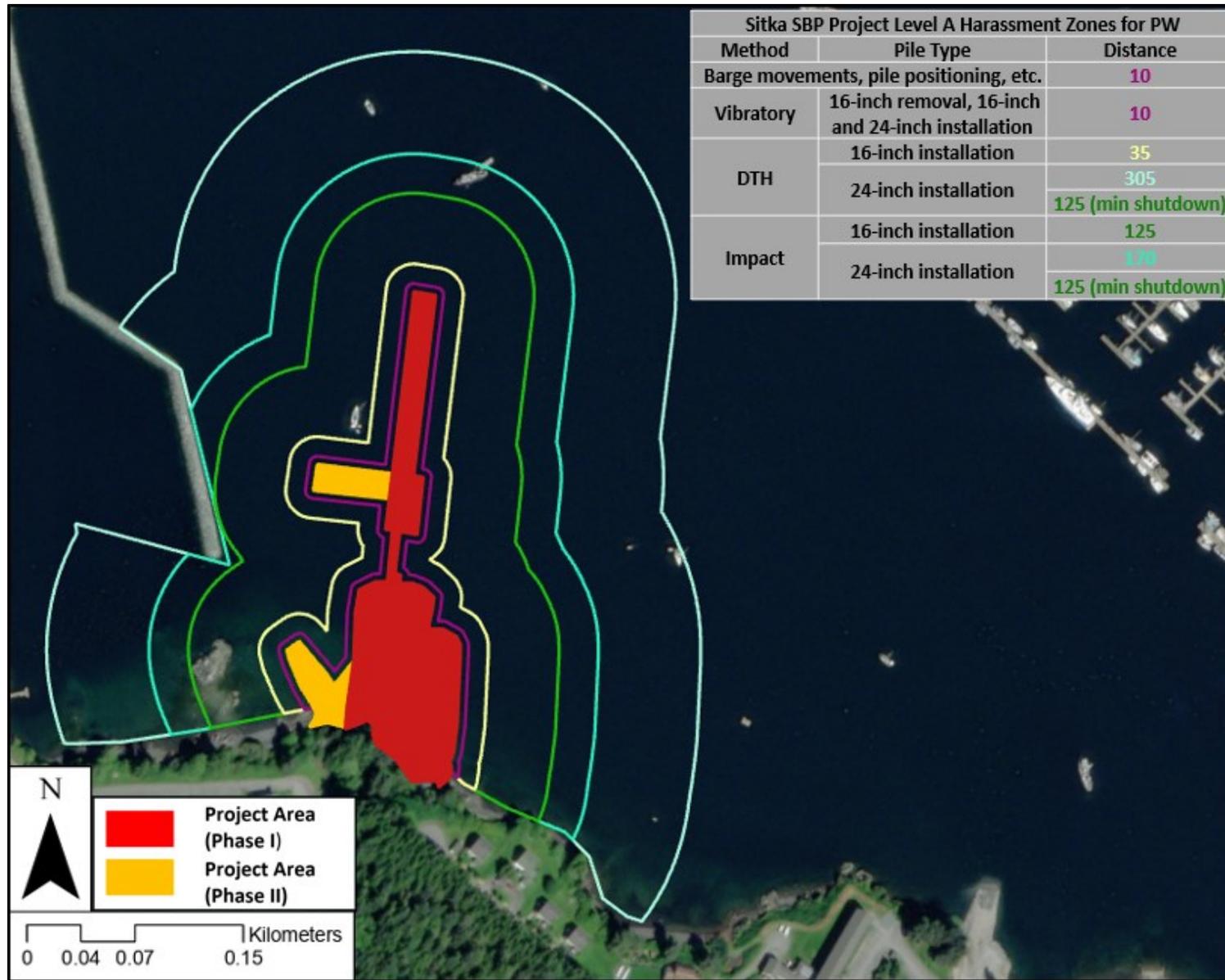
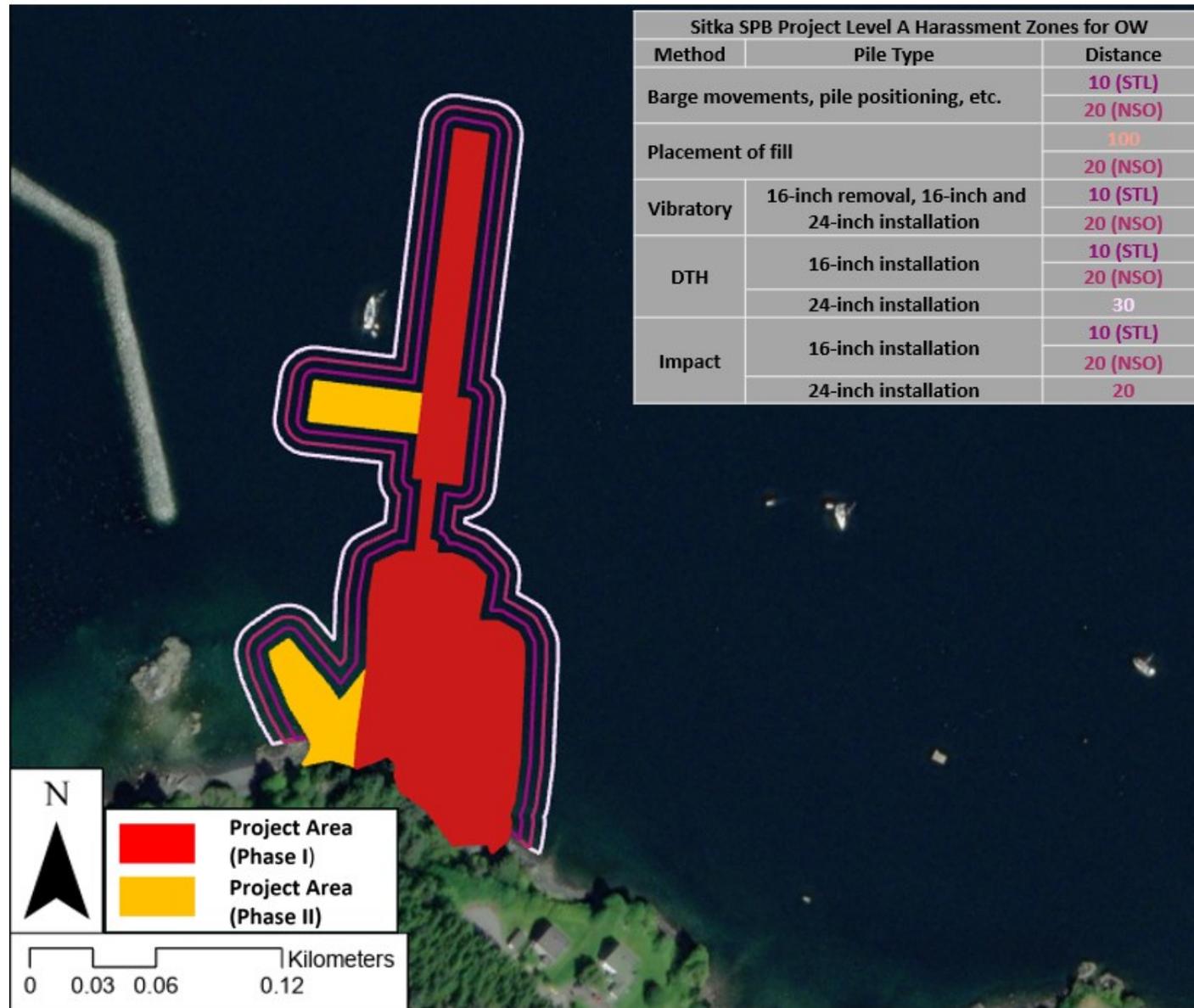


Figure 7. Sitka SPB Project Distances to OW Level A Harassment Zones – Phase I and II

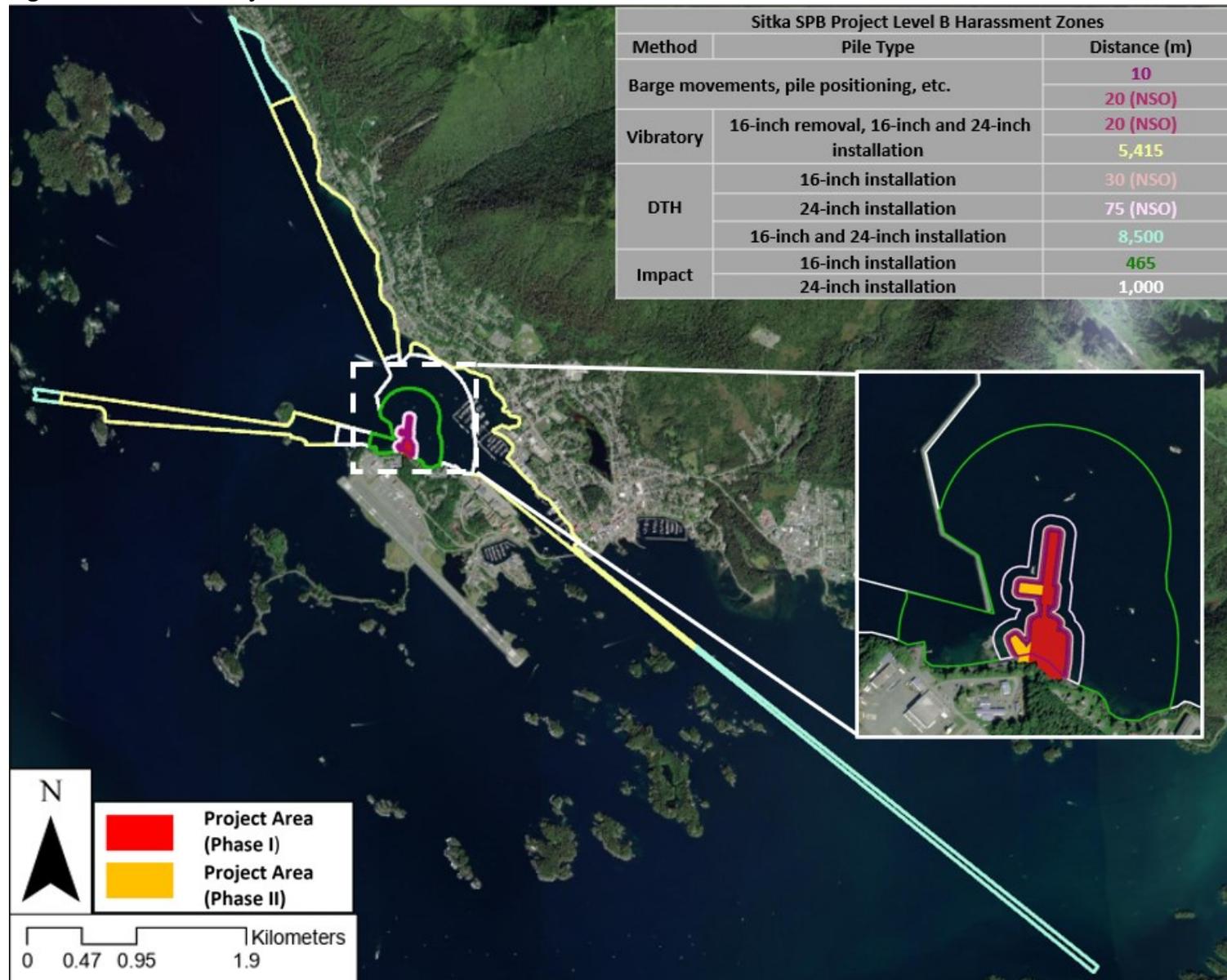


## 4.2 Level B Harassment Zones

Level B harassment zones have been determined based on in-water activity type and represent areas where the SPLs generated from pile driving activities meet or exceed 120 decibels (dB) root mean square (rms) during vibratory pile driving and DTH drilling and 160 dB rms during impact pile driving for NMFS-jurisdiction species (all applicable marine mammals except northern sea otters). Level B harassment zones represent areas where the SPLs generated from pile driving activities meet or exceed 160 dB rms for USFWS-jurisdiction species (northern sea otters).

For permitted marine mammals, these harassment zones serve as monitoring areas within which instances of permitted marine mammal harassment (Level B Take) will be documented, if in-water work is actively occurring. Alternatively, for non-permitted marine mammals, it acts as a shutdown area in which in-water work should cease if they approach or appear likely to enter. These Level B zones also allow PSOs to be aware of the presence of permitted marine mammals as they near the shutdown zone and prepare for shutdowns if required. Level B monitoring/shutdown zones are presented in in Table 4 for Phase I and Table 5 for Phase II and Figure 8 below.

Figure 8. Sitka SPB Project Level B Harassment Zones – Phase I and II



## 5 MITIGATION MEASURES

The following mitigation measures will be implemented during in-water activities to limit impacts to marine mammals and sunflower sea stars.

### 5.1 General Conditions and Requirements

- A sediment curtain will be employed during all DTH-drilling activities to contain drill spoils as much as possible to allow them to settle to the sea floor in the immediate area rather than increasing turbidity over a wider area.
- The contractor is required to conduct briefings for construction supervisors and crews and the monitoring team prior to the initiation of pile driving activity and upon hiring new personnel to explain responsibilities, communication procedures, the monitoring protocols, and operational procedures.
- The contractor is required to employ PSOs during all in-water construction activities.
- Marine mammal monitoring must take place starting 30 minutes prior to initiation of in-water work and ending 30 minutes after completion of in-water work. In-water work may commence when observers have declared the appropriate zones clear of marine mammals. In the event of a delay or shutdown of activity resulting from marine mammals in the shutdown zone (Table 4 and Table 5), their behavior must be monitored and documented until they leave of their own volition, at which point the activity may begin or resume.
- In-water work must be halted or delayed if a marine mammal is observed entering or within an established shutdown zone (Table 4 and Table 5). Pile driving may not commence or resume until either: the animal has voluntarily left and has been visually confirmed beyond the shutdown zone; 15 minutes have passed without subsequent observations of small cetaceans and pinnipeds; or 30 minutes have passed without subsequent observations of large cetaceans or sea otters.
- The contractor must use soft start techniques when impact pile driving.
- In-water work must be delayed or halted immediately if a species for which authorization has not been granted, or a species for which authorization has been granted but the authorized takes are met, is observed approaching or within the monitoring zone (Table 4 and Table 5). Activities must not start or resume until the animal has been confirmed to have left the area or the observation time period, as indicated in the conditions above, has elapsed.
- Should light or environmental conditions deteriorate such that marine mammals within the entire largest Level A shutdown zone would not be visible (e.g., fog, heavy rain), pile driving and removal must be delayed until the PSOs are confident marine mammals within the shutdown zone could be detected.
- Monitoring for in-water work, including pre-watch and post-watch can only occur between civil twilight and dusk.
- PSOs will work in shifts lasting no longer than 4 hours with at least a 1-hour break between shifts, and will not perform PSO duties for more than 12 hours in a 24-hour period (to reduce PSO fatigue).
- Project-associated staff will cut all materials that form closed loops (e.g., plastic packing

bands, rubber bands, and all other loops) prior to proper disposal in a closed and secured trash bin. Trash bins will be properly secured with locked or secured lids that cannot blow open, preventing trash from entering into the environment, thus reducing the risk of entanglement in the event that waste enters marine waters. Trash bins will be emptied on a regular schedule to ensure they do not overflow (making covers ineffective and causing debris to enter the environment).

- Project-associated staff will properly secure all ropes, nets, and other materials that could blow or wash overboard.
- Underwater surveys and removed piles visual inspections will be conducted for sunflower sea stars.

## 5.2 Observer Qualifications and Requirements

- Visual acuity in both eyes (correction is permissible) sufficient to discern moving targets at the water's surface and ability to estimate target size and distance. Use of binoculars and/or spotting scope may be necessary to correctly identify the target.
- Advanced education in biological science, wildlife management, mammalogy or related fields (Bachelor's degree or higher is preferred), or equivalent Alaska Native traditional knowledge. PSOs may substitute education or training for experience.
- Experience and ability to conduct field observations and collect data according to assigned protocols (this may include academic experience).
- Experience or training in field identification of marine mammals (cetaceans and pinnipeds) and sunflower sea stars.
- Training, knowledge of or experience with vessel operation and pile driving operations sufficient to provide personal safety during observations.
- Writing skills sufficient to prepare a report of observations. Reports should include: the number, type, and location of marine mammals observed; the behavior of marine mammals in the area of potential sound effects during construction; dates and times when observations and in-water construction activities were conducted; dates and times when in-water construction activities were suspended because of marine mammals; etc.
- Ability to communicate orally as needed, by radio or in person, with project personnel to provide real time information about marine mammals observed in the area.
- PSOs must be independent (i.e., not construction personnel) and have no other assigned tasks during monitoring periods.
- A lead observer or monitoring coordinator must be designated if a team of three or more PSOs are required. The lead observer must have prior experience working as a marine mammal observer during construction.
- The contractor must submit PSO resumes for approval by NMFS and USFWS at least 2 weeks prior to the onset of pile driving.

## 5.3 Data Collection

### 5.3.1 *Environmental Conditions and Construction Activities*

PSOs will use the construction activities and communications log to document the following (Appendix B):

- Environmental Conditions
  - Environmental conditions will be recorded at the beginning and end of every monitoring period and as conditions change.
  - Recordings will include PSO names, location of the observation station, time and date of the observation, weather conditions, air temperature, sea state, cloud cover, visibility, glare, tide, and ice coverage (if applicable).
- Construction Activities:
  - PSOs will record the time that observations begin and end as well as the durations of shutdowns.
  - PSOs will document the reason for stopping work, time of shutdown, and type of pile installation or other in-water work taking place.
  - PSOs will document other, non-project-related activities that could disturb marine mammals in the area, such as the presence of large and small vessels.

PSOs will record all communications with the construction crew. The environmental conditions and construction activities log will be checked for quality assurance and quality control by the lead PSO for submission at the end of every monitoring day. Upon request, the data will be submitted to NMFS and USFWS along with the final report.

### 5.3.2 *Sightings*

Observers will use an approved Marine Mammal Sighting Form and Grid Maps (Appendices C and D) which will be completed by each observer for each survey day and location. Sighting forms will be used by observers to record the following:

- Date and time that permitted construction activity begins or ends
- Weather parameters (e.g., percent cloud cover, percent glare, visibility) and sea state (determined by the Beaufort Wind Force Scale)
- Species, numbers, and, if possible, sex and age class of observed marine mammals
- Construction activities occurring during each sighting
- Behavioral patterns observed, including bearing and direction of travel
- Behavioral reactions just prior to, or during, soft-start and shutdown procedures
- The marine mammal's location, distance from the observer, and distance from pile removal activities
- Whether mitigation measures, including shutdown procedures, were required by an observation, including the duration of each shutdown
- Observer rotations including the time of rotation and the initials of the incoming observer

The observation record forms will be checked for quality assurance and quality control by the lead PSO for submission at the end of every monitoring day. Upon request, the data will be submitted to NMFS and USFWS, and it will be included with the final report.

Observations of sunflower sea stars will be documented. Signs of sea star wasting syndrome and associated screen-captures or photos will be reported to NMFS AKR within two business days of the sighting. Sunflower sea star removals and relocations from a pile by the lead PSO or a crew delegate during pile removal operations will be documented in the final or annual report.

## 5.4 Equipment

The following equipment will be required to conduct observations for this project:

- Appropriate Personal Protective Equipment;
- Portable VHF radios for the observers to communicate with other observers and the pile driving supervisor
- Cellular phone as backup for radio communication
- Contact information for the other observers, the pile driving supervisor, and the NMFS and USFWS points of contact
- Daily tide tables for the project area
- Binoculars (quality 7 x 50 or better) and a rangefinder
- Hand-held GPS unit, map and compass, or grid map to record locations of marine mammals
- Copies of the PSMMP, IHA, and other relevant permit requirement specifications in a sealed, clear, plastic cover
- Notebook with pre-standardized monitoring Observation Record forms and Grid Maps (Appendices C and D)

Specific to sunflower sea star surveys, a remote operated vehicle (ROV) may be used to survey deeper waters. The ROV must be capable of:

- Live video transmittal to surface observers,
- Monitoring videos or still images to include in reports to NMFS, and
- Being deployed in low light conditions using on-board lighting as needed.

## 5.5 Number and Location of PSOs

The number of locations of observers are determined to ensure that there is full coverage of the entire action area during all in-water activities. Locations are chosen based on site accessibility and field of vision.

One to four PSOs will be onsite during in-water activities for the Sitka SPB Project, stationed in the following locations (Figure 9):

- PSO 1: stationed along the project site
- PSO 2: stationed at Sandy Beach Day Use Site
- PSO 3: stationed on the O'Connell Lightering Float

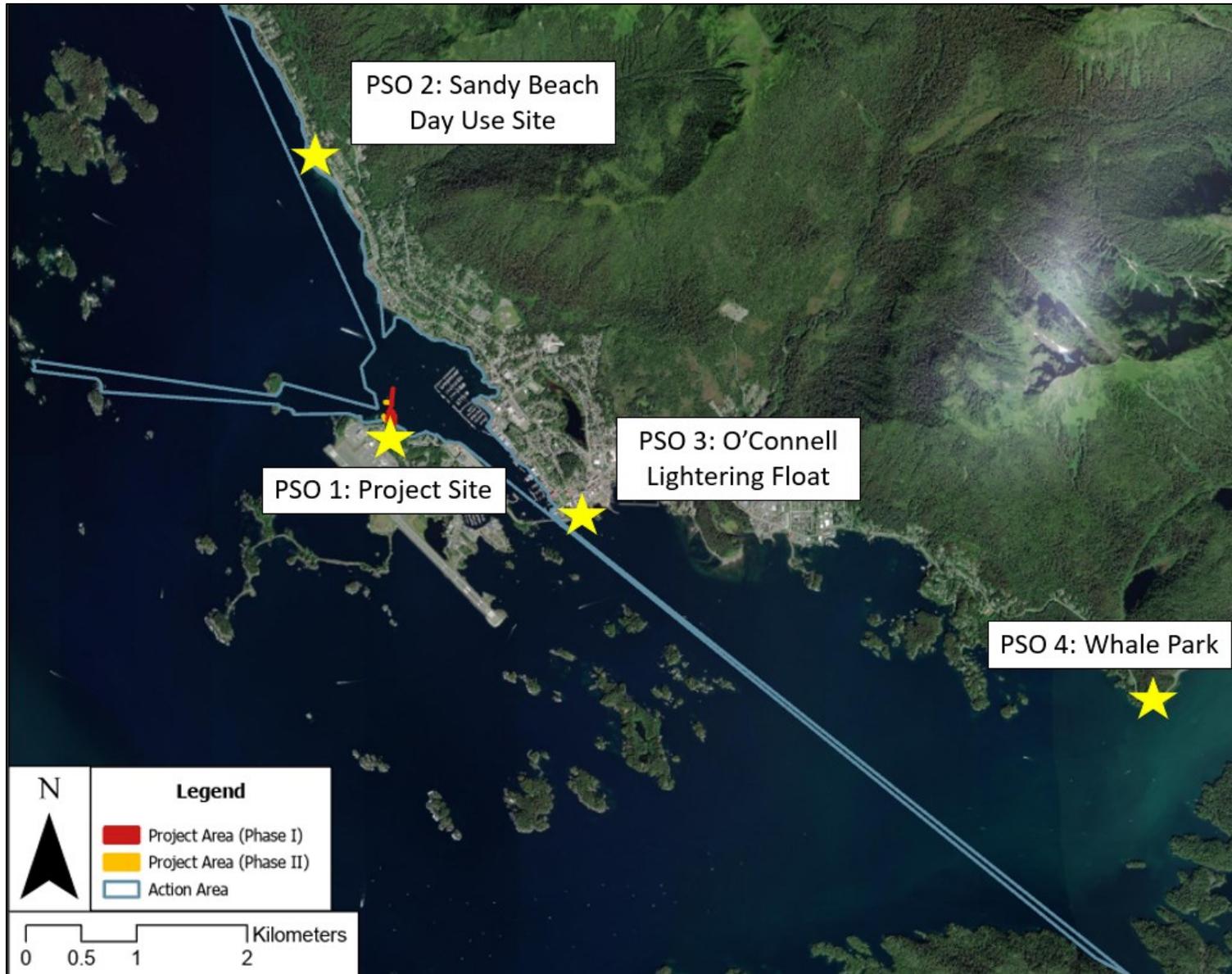
- PSO 4: stationed at Whale Park

The number and locations of monitors will be based on the following in-water work scenarios presented in Table 6.

**Table 6. Sitka SPB Project PSO Scenarios**

<b>Construction</b>	<b>Piles</b>	<b>PSO Locations</b>
Vibratory	16-inch pile removal, and 16-inch and 24-inch pile installation	PSO 1, PSO 2, PSO 3
DTH	16-inch and 24-inch pile installation	PSO 1, PSO 2, PSO 3, PSO 4
Impact	16-inch and 24-inch pile installation	PSO 1

Figure 9. Sitka SPB Project PSO Locations



## 5.6 Strike Avoidance

Vessels will adhere to the Alaska Humpback Whale Approach Regulations when transiting to and from the project site (see 50 CFR §§ 216.18, 223.214, and 224.103(b)). These regulations require that all vessels:

- Do not approach, or cause a vessel or object to approach, within 100 yards of a humpback whale;
- Do not obstruct the path of oncoming humpback whales causing them to surface within 100 yards of the vessel;
- Do not disrupt the normal behavior or prior activity of a whale; and Operate at a slow, safe speed when near a humpback whale (safe speed is defined in regulation 33 CFR § 83.06).

Vessels will follow the NMFS Marine Mammal Code of Conduct for other species of marine mammals, which recommend: maintaining a minimum distance of 100 yards; not encircling or trapping marine mammals between boats, or between boats and the shore; and putting engines in neutral if approached by a whale or other marine mammal to allow the animals to pass.

Vessels will also adhere to the following USFWS guidance developed to avoid the risk of skiff operators disturbing or striking sea otters:

- While operating skiffs in near shore areas, operators will scan the water surface ahead of the boat vigilantly for otters and limit cruising speed to 10 knots. In choppy water conditions when sea otters may be difficult to spot and if boating with another person, the second person will be located at the boat's bow to help search. Otters as individuals, a mother and a pup, or rafts of 10 or more have been encountered.
- Vessel operators shall use established navigation channels or commonly recognized vessel traffic corridors during transit, and they shall avoid alongshore travel in shallow water (<20 meters or 66 feet depth) when safe and practicable.
- If an otter(s) is seen, the boat's course will be altered and the speed will be slowed to avoid disturbance and collision. Once an otter(s) is sighted, it will not be assumed that the otter(s) will dive and get out of the way. Even if sea otters are alert, capable, and do dive, your action of knowingly staying the course would be considered harassment.
- A skiff will not be operated at any rate of speed heading directly at the otter(s). A buffer will be maintained that allows ample room for the otter(s) to swim away without startling them. The boat operator will understand that it is their responsibility to minimize the stimulus and threat of a loud boat approaching quickly.
- If vessel operators observe sea otters consistently flushing in response to the vessel transiting at the minimum distance, then the vessel operator shall increase the minimum distance until sea otters are no longer flushing in response to the vessel.
- Vessels shall maintain maximum distance practicable from areas of surface kelp.
- The more otters that are seen, the wider the berth will be given. The boat operator will not pass between otters, but rather go around the outside perimeter, plus add a buffer.

- To further reduce the risk of impacts to sea otters, we request the skiff always maintain a minimum distance of 20 meters (not 10) from any sea otters, and a greater distance whenever safe and practicable: 100 meters (328 feet) from single

## 5.7 Marine Mammal Monitoring Techniques

### 5.7.1 *Pre-Activity Monitoring*

The following monitoring methods will be implemented before permitted construction begins:

- The lead PSO and Contractor Superintendent will meet at the start of each day to discuss planned construction activities for the day and to conduct a radio/phone check.
- Prior to the start of permitted activities, observers will conduct a 30-minute pre-watch of the shutdown and monitoring zones. They will ensure that no marine mammals are present within the shutdown zone before permitted activities begin.
- The shutdown zone will be cleared when marine mammals have not been observed within the zone for the 30-minute pre-watch period. If a marine mammal is observed within the shutdown zone, a soft-start cannot proceed until the animal has left the zone or has not been observed for 15 minutes (for pinnipeds) or 30 minutes (for cetaceans and sea otters).
- When all applicable exclusion zones are clear, the observers will radio the pile driving supervisor. Permitted activities will not commence until the pile driving supervisor receives verbal confirmation that the zones are clear.
- If permitted species are present within the monitoring zone, work will not be delayed, but observers will monitor and document the behavior of individuals that remain in the monitoring zone.
- In case of fog or reduced visibility, observers must be able to see all of the shutdown zones before permitted activities can begin.

### 5.7.2 *Soft Start Procedures*

Soft start procedures will be used prior to periods of vibratory and impact driving to allow marine mammals to leave the area prior to exposure to maximum noise levels.

- For vibratory hammers, the contractor shall run the vibratory hammer for no more than 30 seconds followed by a quiet period of at least 60 seconds without vibratory removal of piles. This process shall be repeated twice more within 10 minutes before beginning vibratory removal operations that last longer than 30 seconds.
- For impact hammers, the contractor will initiate approximately three strikes at a reduced energy level, followed by a 30-second waiting period. This procedure would be repeated twice more.
- If work ceases for more than 30 minutes, soft start procedures must be used prior to continuing work.

### 5.7.3 *During Activity Monitoring*

If permitted species are observed within the monitoring zone during permitted activities, a Level B takes will be recorded and behaviors will be documented. Work will not stop unless an animal enters or appears likely to enter the shutdown zone.

### 5.7.4 *Inclement Weather*

Sitka Channel and Sitka Sound occasionally experience increased sea states and inclement weather. If inclement weather, limited visibility, or increased sea state restricts the observers' ability to make observations, in-water activities will not be initiated or continued until the largest Level A shutdown zone for the activity is visible.

If visibility is diminished, but the parameters for initiating or continuing work, referenced above, are met the following should occur:

- All appropriate PSO locations for the planned in-water activities should be occupied for the entirety of the monitoring period regardless of visibility.
- All PSO locations should collectively determine what percentage of the Level B zone is visible for use in calculating extrapolations. The lead PSO should document this with time stamps as conditions change and this percentage should be adopted by all PSO locations.
- Extrapolate takes for ESA-listed species with authorized take using the equation below.

$$\text{Percentage of visible Level B zone} \div \text{Number of individuals sighted in the visible portion of the Level B zone} = \text{extrapolated takes for species}$$

### 5.7.5 *Shutdowns*

If a marine mammal enters or appears likely to enter its respective shutdown zone:

- The observers will immediately alert the pile driving supervisor.
- All permitted activities will immediately halt.
- In the event of a shutdown, permitted pile installation or removal activities may resume only when the animal(s) within or approaching the shutdown zone has been visually confirmed beyond or heading away from the shutdown zone, or 15 minutes (for pinnipeds) or 30 minutes (for cetaceans and sea otters) have passed without observation of the animal. Observers will contact the pile driving supervisor and inform them that activities can re-commence.

### 5.7.6 *Breaks in Work*

Shutdown and monitoring zones will continue to be monitored during an in-water construction delay. No exposures will be recorded for permitted species in the monitoring zone if there are no concurrent permitted construction activities.

If permitted activities cease for more than 30 minutes and monitoring has not continued, pre-activity monitoring and soft start procedures must recommence. This includes breaks due to scheduled or unforeseen construction practices or breaks due to permit-required shutdown. Work can begin following the 30-minute pre-watch monitoring protocols. Work cannot begin if

an animal is within the shutdown zone or if visibility is not clear throughout the Level A shutdown zones.

### 5.7.7 *Post Activity Monitoring*

Monitoring of the shutdown and monitoring zones will continue for 30 minutes following completion of in-water activities. PSOs will continue to record observations during this post-watch period, with a focus on observing and reporting unusual or abnormal behaviors.

If construction were to resume during the post-watch period, PSOs will follow pre-watch protocols to ensure that the shutdown and monitoring zones are clear prior to work resuming.

## 5.8 Sunflower Sea Star Monitoring Techniques

- Prior to, but no more than 24 hours prior to, beginning in-water construction, a pre-construction survey of the project area and its immediate vicinity will be conducted using a ROV, snorkelers, divers, or other equally effective methods.
  - Sunflower sea star presence will be recorded, and if present may require more frequent (once a week) surveys to prevent direct placement of piles or fill materials on sea stars.
- If no sunflower sea stars are documented during the pre-construction survey, additional surveys will be completed bi-weekly (every other week) for the duration of in-water work.
- As feasible, the Contractor may elect to monitor the placement of each pile with a video system or ROV in lieu of the preconstruction or biweekly surveys.
- Removed piles will be surveyed for the presences of sunflower sea stars. If a sunflower sea star is attached to a pile being removed from the water, the sunflower sea star will be gently removed from the pile by the Lead PSO, or a crew delegate due to possible safety concerns, and immediately released into an intertidal location nearby. The sea star will not be placed in a container nor transported any significant distance away from the project location. The number of sunflower sea stars moved will be recorded, noting the diameter of each individual, and reported to NMFS.
- Each day prior to fill operations below MHW along the sides of the dock, sunflower sea star surveyors will systematically examine all intertidal and subtidal areas that may be impacted by fill operations during that day.
  - Survey transects will run roughly parallel to shore, with two-meter separation between each transect line, until the area that will be covered with fill that day is surveyed (see example transect diagrams, Appendix E). Surveys may be done on foot at low tide or by snorkelers in areas where the substrate is not visible by foot during low tide. During surveys, bathymetry must be sufficiently visible so that surveyors can accurately assess for the presence of sunflower sea stars of all size classes. In areas that are not visible to snorkelers, surveys may be done by a diver or ROV equipped with a camera.

- As feasible and safe, sunflower sea stars that are found in fill areas will be gently moved into a container of water collected at the site, and taken to a location at least 100 meters away from the project area and gently released onto the substrate. The number and approximate diameter of sunflower sea stars moved will be recorded and reported to NMFS.
- If it appears that a sunflower sea star has sea star wasting syndrome or if any dead sunflower sea stars are observed, pictures of the individuals will be taken and infected individuals will be counted. The infected sunflower sea stars will not be touched or moved. All sunflower sea star findings will be reported to NMFS, including latitude/longitude and transect line, at [akr.section7@noaa.gov](mailto:akr.section7@noaa.gov) (see fact sheet, Appendix D).

## 6 REPORTING

### 6.1 Notification of Intent to Commence Construction

The contractor will inform NMFS Alaska Region Permits Division and USFWS Alaska Region 3M one week prior to commencing construction activities.

### 6.2 Weekly Sighting Counts

A summary of the following will be submitted to the construction project manager at the conclusion of each week of construction activity (Friday evening):

- Completed monitoring forms for the week
- Completed environmental conditions and construction activity logs for the week
- Preliminary counts of sightings and takes per species

### 6.3 Interim Monthly Reports

The contractor will submit brief, monthly reports to the NMFS Alaska Region Permits Division and USFWS Alaska Region 3M summarizing PSO observations and recorded takes during construction. Monthly reporting will allow NMFS to track takes (including extrapolated takes) and reinstate consultation in a timely manner, if necessary. Monthly reports will be submitted by email to NMFS at [akr.section7@noaa.gov](mailto:akr.section7@noaa.gov) and to USFWS at [fw7\\_mmm\\_reports@fws.gov](mailto:fw7_mmm_reports@fws.gov).

The reporting period for each monthly PSO report will be the entire calendar month, and reports will be submitted by the end of business hours on the tenth day of the month following the end of the reporting period (e.g., the monthly report covering May 1–31, 2024, would be submitted to the NMFS and USFWS by close of business on June 10, 2024).

### 6.4 Final Report

The contractor will submit a draft final report by email to NMFS at [akr.section7@noaa.gov](mailto:akr.section7@noaa.gov) and to USFWS at [fw7\\_mmm\\_reports@fws.gov](mailto:fw7_mmm_reports@fws.gov) no later than 90 days following the end of construction activities. The contractor will provide a final report within 30 days following resolution of NMFS's and USFWS's comments on the draft report. If no comments are received from the agencies within 30 days, the draft final report will be considered the final report.

The final reports will contain, at minimum, the following information:

- A summary of construction activities, including start and end dates.
- A description of any deviation from the initially proposed pile numbers, pile types, average driving times, etc.
- A table summarizing all marine mammal sightings during the construction period, including:
  - dates, times, species, numbers, locations, and behaviors of any observed ESA-listed marine mammals, including all observed humpback whales and Steller sea lions;
  - daily average number of individuals of each species (differentiated by month as appropriate) detected within the Level A and Level B zones, and whether estimated as taken, if appropriate; and
  - the number of shut-downs throughout all monitoring activities.
- A brief description of any impediments to obtaining reliable observations during construction period.
- A description of any impediments to complying with these mitigation measures.
- Appendices containing all PSO daily logs and marine mammal sighting forms.

## 6.5 Reporting Injured or Dead Marine Mammals

If it is clear that project activity has caused the take of a marine mammal in a manner prohibited by the (requested) IHA, such as unauthorized Level A harassment, serious injury, or mortality, the contractor shall immediately cease the specified activities and report the incident to the NMFS Alaska Region Permits Division and the NMFS statewide 24-hour Stranding Hotline (877) 925-7773. If a sea otter, report to the USFWS Marine Mammal Management Office at (800) 362-5148, or the Alaska SeaLife Center in Seward (888) 774-7325, or both.

The report must include the following:

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

Activities will not resume until NMFS or USFWS is able to review the circumstances of the unauthorized take. NMFS or USFWS would work with the contractor to determine what measures are necessary to minimize the likelihood of further unauthorized take and ensure ESA and MMPA compliance. The contractor may not resume their activities until notified by NMFS or USFWS.

In the event that the contractor discovers an injured or dead marine mammal within the action area, and the lead PSO determines that the cause of the injury or death is unknown and the death is relatively recent (e.g., in less than a moderate state of decomposition), the contractor

will immediately report the incident to the NMFS Permits Division or USFWS Alaska Region 3M, and the NMFS Alaska Regional Stranding Coordinator or Hotline.

The report must include the same information identified in the paragraph above. Activities may continue while NMFS or USFWS reviews the circumstances of the incident. NMFS or USFWS will work with the contractor to determine whether additional mitigation measures or modifications to the activities are appropriate.

In the event that the contractor discovers an injured or dead marine mammal and the lead PSO determines that the injury or death is not associated with or related to the activities authorized in the IHA (e.g., previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), the contractor must report the incident to the NMFS Permits Division and the NMFS Alaska Regional Stranding Coordinator or Hotline within 24 hours of the discovery. If a sea otter, it must be reported to USFWS within 24 hours of the discovery to either the USFWS Marine Mammal Management Office at (800) 362-5148 (business hours), or the Alaska SeaLife Center in Seward (888) 774-7325 (24 hours a day), or both. The contractor will provide photographs, video footage (if available), or other documentation of the stranded animal sighting to NMFS or USFWS.

## **Appendix A: List of Species with Ranges in the Project Action Area**

**Table A-1. Species that May Occur in the Project Vicinity**

<b>Species</b>	<b>Status Listing</b>	<b>Jurisdiction</b>	<b>Occurrence</b>	<b>Link to Species Profile</b>
North Pacific Right Whale ( <i>Eubalaena japonica</i> )	ESA Endangered	NMFS	Rare	<a href="https://www.fisheries.noaa.gov/species/north-pacific-right-whale">https://www.fisheries.noaa.gov/species/north-pacific-right-whale</a>
Gray Whale ( <i>Eschrichtius robustus</i> )	MMPA	NMFS	Infrequent	<a href="https://www.fisheries.noaa.gov/species/gray-whale">https://www.fisheries.noaa.gov/species/gray-whale</a>
Minke Whale ( <i>Balaenoptera acutorostrata</i> )	MMPA	NMFS	Rare	<a href="https://www.fisheries.noaa.gov/species/minke-whale">https://www.fisheries.noaa.gov/species/minke-whale</a>
Fin Whale ( <i>Balaenoptera physalus</i> )	ESA Endangered	NMFS	Rare	<a href="https://www.fisheries.noaa.gov/species/fin-whale">https://www.fisheries.noaa.gov/species/fin-whale</a>
Humpback Whale ( <i>Megaptera novaeangliae</i> )	ESA Threatened Mexico DPS/ North Pacific DPS	NMFS	Infrequent	<a href="https://www.fisheries.noaa.gov/species/humpback-whale">https://www.fisheries.noaa.gov/species/humpback-whale</a>
Sperm Whale ( <i>Physeter macrocephalus</i> )	ESA Endangered	NMFS	Rare	<a href="https://www.fisheries.noaa.gov/species/sperm-whale">https://www.fisheries.noaa.gov/species/sperm-whale</a>
Cuvier's Beaked Whale ( <i>Ziphius cavirostris</i> )	MMPA	NMFS	Rare	<a href="https://www.fisheries.noaa.gov/species/cuiviers-beaked-whale">https://www.fisheries.noaa.gov/species/cuiviers-beaked-whale</a>
Pacific White-Sided Dolphin ( <i>Lagenorhynchus obliquidens</i> )	MMPA	NMFS	Rare	<a href="https://www.fisheries.noaa.gov/species/pacific-white-sided-dolphin">https://www.fisheries.noaa.gov/species/pacific-white-sided-dolphin</a>
Killer Whale ( <i>Orcinus orca</i> )	MMPA	NMFS	Frequent	<a href="https://www.fisheries.noaa.gov/species/killer-whale">https://www.fisheries.noaa.gov/species/killer-whale</a>
Harbor Porpoise ( <i>Phocoena phocoena</i> )	MMPA	NMFS	Infrequent	<a href="https://www.fisheries.noaa.gov/species/harbor-porpoise">https://www.fisheries.noaa.gov/species/harbor-porpoise</a>

Species	Status Listing	Jurisdiction	Occurrence	Link to Species Profile
Dall's Porpoise ( <i>Phocoenoides dalli</i> )	MMPA	NMFS	Rare	<a href="https://www.fisheries.noaa.gov/species/dalls-porpoise">https://www.fisheries.noaa.gov/species/dalls-porpoise</a>
Harbor Seal ( <i>Phoca vitulina</i> )	MMPA	NMFS	Common	<a href="https://www.fisheries.noaa.gov/species/harbor-seal">https://www.fisheries.noaa.gov/species/harbor-seal</a>
Northern Sea Otter ( <i>Enhydra lutris kenyoni</i> )	MMPA	USFWS	Common	<a href="https://www.fws.gov/species/northern-sea-otter-enhydra-lutris-kenyoni">https://www.fws.gov/species/northern-sea-otter-enhydra-lutris-kenyoni</a>
Northern Fur Seal ( <i>Callorhinus ursinus</i> )	MMPA	NMFS	Rare	<a href="https://www.fisheries.noaa.gov/species/northern-fur-seal">https://www.fisheries.noaa.gov/species/northern-fur-seal</a>
Steller Sea Lion ( <i>Eumatopia jubatus</i> )	ESA Endangered (WDPS)	NMFS	Common	<a href="https://www.fisheries.noaa.gov/species/steller-sea-lion">https://www.fisheries.noaa.gov/species/steller-sea-lion</a>
Sunflower Sea Star ( <i>Pycnopodia helianthoides</i> )	Proposed	NMFS	Unknown	<a href="https://www.fisheries.noaa.gov/species/sunflower-sea-star">https://www.fisheries.noaa.gov/species/sunflower-sea-star</a>

## **Appendix B: Construction Activity and Communication Log**



<b>Filling Out Construction Activity and Communication Logs</b>	
<b>Data Columns</b>	<b>Definition and How to Record</b>
<b>General Information (<i>top of form</i>)</b>	
Project	Time that monitoring by MMOs/PSOs began and ended, without interruption (military time)
Project Name	Sitka Seaplane Base Project
Monitoring Location	See PSMMP
Observer	Names of Observers at each location
Date	MM/DD/YYYY
<b>Construction and Communication Activities</b>	
Time of event	Time that construction activities and all communications between MMOs/PSOs and construction crews take place
Type of construction activity	Type of construction activity occurring, including ramp up, startup, shutdown, type of pile installation technique, pile size, and pile type (permanent or temporary)
Communication	Information communicated between MMOs/PSOs and construction crew

## **Appendix C: Marine Mammal Sighting Forms**

# MARINE MAMMAL OBSERVATION RECORD

Project Name: \_\_\_\_\_

Monitoring Location: \_\_\_\_\_

Date: \_\_\_\_\_

Time Effort Initiated: \_\_\_\_\_

Time Effort Completed: \_\_\_\_\_

Page \_\_\_\_\_ of \_\_\_\_\_

Time	Visibility	Glare	Weather Condition	Wave Height	BSS	Wind	Swell
:	B-P-M-G-E	%	S-PC-L-R-F-OC-SN-HR	Lt/Mod/Hvy		N S E W	N S E W
:	B-P-M-G-E	%	S-PC-L-R-F-OC-SN-HR	Lt/Mod/Hvy		N S E W	N S E W
:	B-P-M-G-E	%	S-PC-L-R-F-OC-SN-HR	Lt/Mod/Hvy		N S E W	N S E W
:	B-P-M-G-E	%	S-PC-L-R-F-OC-SN-HR	Lt/Mod/Hvy		N S E W	N S E W
:	B-P-M-G-E	%	S-PC-L-R-F-OC-SN-HR	Lt/Mod/Hvy		N S E W	N S E W
:	B-P-M-G-E	%	S-PC-L-R-F-OC-SN-HR	Lt/Mod/Hvy		N S E W	N S E W

Event Code	Sight # (1 or 1.1 if re- sight)	Time/Dur (Start/End time if cont.)	WP/ Grid #/ DIR of travel	Distance from Pile	Obs.	Sighting Cue	Species	Group Size	Behavior Code (see code sheet)	Construction Type	Mitigation Type	Exposure (Y/N)	Behavior Change/ Response to Activity/Comments/Human Activity/Vessel Hull # or Name/ Visibility Notes
E ON PRE/POST CON S M OR E OFF		:	Grid N or S W or E			BL BO BR DF SA OTHER		Min: Max: Best:		V I DR FL OWC NOWC NONE	DE SD None		
E ON PRE/POST CON S M OR E OFF		:	Grid N or S W or E			BL BO BR DF SA OTHER		Min: Max: Best:		V I DR FL OWC NOWC NONE	DE SD None		
E ON PRE/POST CON S M OR E OFF		:	Grid N or S W or E			BL BO BR DF SA OTHER		Min: Max: Best:		V I DR FL OWC NOWC NONE	DE SD None		
E ON PRE/POST CON S M OR E OFF		:	Grid N or S W or E			BL BO BR DF SA OTHER		Min: Max: Best:		V I DR FL OWC NOWC NONE	DE SD None		
E ON PRE/POST CON S M OR E OFF		:	Grid N or S W or E			BL BO BR DF SA OTHER		Min: Max: Best:		V I DR FL OWC NOWC NONE	DE SD None		
E ON PRE/POST CON S M OR E OFF		:	Grid N or S W or E			BL BO BR DF SA OTHER		Min: Max: Best:		V I DR FL OWC NOWC NONE	DE SD None		
E ON PRE/POST CON S M OR E OFF		:	Grid N or S W or E			BL BO BR DF SA OTHER		Min: Max: Best:		V I DR FL OWC NOWC NONE	DE SD None		
E ON PRE/POST CON S M OR E OFF		:	Grid N or S W or E			BL BO BR DF SA OTHER		Min: Max: Best:		V I DR FL OWC NOWC NONE	DE SD None		
E ON PRE/POST CON S M OR E OFF		:	Grid N or S W or E			BL BO BR DF SA OTHER		Min: Max: Best:		V I DR FL OWC NOWC NONE	DE SD None		

## Marine Mammal Observation Record – Sighting Codes

### Behavior Codes

Code	Behavior	Definition
BR	Breaching	Leaps clear of water
CD	Change Direction	Suddenly changes direction of travel
CH	Chuff	Makes loud, forceful exhalation of air at surface
DI	Dive	Forward dives below surface
DE	Dead	Shows decomposition or is confirmed as dead by investigation
DS	Disorientation	An individual displaying multiple behaviors that have no clear direction or purpose
FI	Fight	Agonistic interactions between two or more individuals
FO	Foraging	Confirmed by food seen in mouth
MI	Milling	Moving slowly at surface, changing direction often, not moving in any particular direction
PL	Play	Behavior that does not seem to be directed towards a particular goal; may involve one, two or more individuals
PO	Porpoising	Moving rapidly with body breaking surface of water
SL	Slap	Vigorously slaps surface of water with body, flippers, tail etc.
SP	Spyhopping	Rises vertically in the water to "look" above the water
SW	Swimming	General progress in a direction. Note general direction of travel when last seen [Example: "SW (N)" for swimming north]
TR	Traveling	Traveling in an obvious direction. Note direction of travel when last seen [Example: "TR (N)" for traveling north]
UN	Unknown	Behavior of animal undetermined, does not fit into another behavior
AWA	Approach Work	
LWA	Leave Work Area	
<b>Pinniped only</b>		
EW	Enter Water (from haul out)	Enters water from a haul-out for no obvious reason
FL	Flush (from haul out)	Enters water in response to disturbance
HO	Haul out (from water)	Hauls out on land
RE	Resting	Resting onshore or on surface of water
LO	Look	Is upright in water "looking" in several directions or at a single focus
SI	Sink	Sinks out of sight below surface without obvious effort (usually from an upright position)
VO	Vocalizing	Animal emits barks, squeals, etc.
<b>Cetacean only</b>		
LG	Logging	Resting on surface of water with no obvious signs of movement

**Sea State and Wave Height:** Use Beaufort Sea State Scale for Sea State. This refers to the surface layer and whether it is glassy in appearance or full of white caps. In the open ocean, it also considers the wave height or swell, but in inland waters the wave height (swells) may never reach the levels that correspond to the correct surface white cap number. Therefore, include wave height for clarity.

**Glare:** Percent glare should be the total glare of observers' area of responsibility. Determine if observer coverage is covering 90 degrees or 180 degrees and document daily. Then assess total glare for that area. This will provide needed information on what percentage of the field of view was poor due to glare.

**Swell Direction:** Swell direction should be where the swell is coming from (S for coming from the south). If possible, record direction relative to fixed location (pier). Choose this location at beginning of monitoring project.

**Wind Direction:** Wind direction should also be where the wind is coming from.

**Event**

Code	Activity Type
E ON	Effort On
E OFF	Effort Off
PRE	Pre-Construction Watch
POST	Post-Construction Watch
CON	Construction (see types)
S	Sighting
M	Mitigation
OR	Observer Rotation

**Sighting Cues**

Code	Distance Visible
BL	Blow
BO	Body
BR	Breach
DF	Dorsal Fin
SA	Surface Activity
OTHR	Other

**Marine Mammal Species**

Code	Marine Mammal Species
HPBK	Humpback Whale
GR	Gray Whale
MK	Minke Whale
ORCA	Killer Whale
HAPO	Harbor Porpoise
HSEA	Harbor Seal
NFS	Northern Fur Seal
SO	Sea Otter
STSL	Steller Sea Lion

**Construction Type**

Code	Activity Type
OWC	Over-Water Construction
NOWC	No Over-Water Construction
V	Vibratory Hammer
I	Impact Hammer
DR	DTH Drilling
FL	Placement of Fill (below HTL)

NONE	No Construction
------	-----------------

**Mitigation Codes**

Code	Activity Type
DE	Delay onset of In-Water Work
SD	Shutdown In-Water Work

**Visibility**

Code	Distance Visible
B	Bad (<0.5km)
P	Poor (0.5-0.9km)
M	Moderate (0.9-3km)
G	Good (3-10km)
E	Excellent (>10km)

**Weather Conditions**

Code	Weather Condition
S	Sunny
PC	Partly Cloudy
L	Light Rain
R	Steady Rain
F	FOG
OC	Overcast
SN	Snow
HR	Heavy Rain

**Wave Height**

Code	Wave Height
Light	0-3 ft
Moderate	4-6 ft
Heavy	>6 ft

<b>Filling Out Sighting Forms</b>	
<b>Data Columns</b>	<b>Definition and How to Record Data</b>
<b>General Information (<i>Top of Form</i>)</b>	
Project Name	Sitka Seaplane Base Project
Monitoring Location	See PSMMP
Date	MM/DD/YYYY
Time effort initiated and completed	Time started pre-watch and time post-watch ended (military time). If there is more than one monitoring period in a day, start a new form for each period.
<b>Environmental Conditions</b>	
Environmental Conditions	Record at the start of monitoring period, when changes, and at the end of monitoring period.
Visibility	B-bad, P-poor, M-moderate, G-good, and E-excellent
Glare	Amount of water obstructed by glare (0–100%) and direction of glare (from south, north, or another direction)
Weather conditions	Dominant weather conditions: sunny (S), partly cloudy (PC), light rain (LR), steady rain (R), fog (F), overcast (OC), light snow (LS), snow (SN)
Wave Height	Lt-light, Mod-moderate, Hvy-heavy
Wind and Swell direction	From the north (N), northeast (NE), east (E), southeast (SE), south (S), southwest (SW), west (W), northwest (NW)
Beaufort Sea State	Scale 1-12. See BSS sheet.
<b>Sightings</b>	
Event Code	Indicates what events are happening at the time of the sighting, what events may have occurred due to the sighting, and observer rotations.
Time/Duration	Time first sighted and time of last sighting (military time).
Sighting Number	Chronological (1,2,3, etc.) If the same marine mammal is resighted at a distance greater than 25 meters from the original sighting location record as a resight (Ex. 1.1- same marine mammal as sighting 1, but sighted for a second time in different location)
Waypoint (WP)/Grid #/DIR of Travel	Grid number that marine mammal was sighted in and direction of travel. Format should be <b>grid map letter-grid</b> (Example: If a marine mammal is sighted in grid <b>2B</b> on <b>Grid Map N</b> this should be denoted by <b>N-2B</b> ).
Distance from Pile	Distance from pile driving site to the sighted marine mammal.

Observer (Obs.)	Initials of the Observer who sighted the marine mammal or who is coming on shift during a rotation
Sighting Cue	How was the marine mammal sighted
Species	Appropriate species abbreviation from code sheet
Group Size	Record the minimum and maximum number of individuals that were sighted. Then determine and record the best number of individuals.
Behavior	Behaviors observed using appropriate abbreviations from code sheet
Construction Type	Circle construction type that is actively occurring at the time and for the duration of the sighting.
Mitigation Type	Circle mitigation type, if any. Based upon monitoring and shutdown zones does a delay of work (pre-watch and post-watch) or a shutdown (monitoring period) need to occur.
Exposure	If a marine mammal enters its Level A or Level B distance and work is actively occurring it will be an exposure indicate yes (Y). If no work is actively occurring indicate no (N)

## Estimating Wind Speed and Sea State with Visual Clues

Beaufort number	Wind Description	Wind Speed	Wave Height	Visual Clues
<b>0</b>	Calm	0 knots	0 feet	Sea is like a mirror. Smoke rises vertically.
<b>1</b>	Light Air	1-3 kts	< 1/2	Ripples with the appearance of scales are formed, but without foam crests. Smoke drifts from funnel.
<b>2</b>	Light breeze	4-6 kts	1/2 ft (max 1)	Small wavelets, still short but more pronounced, crests have glassy appearance and do not break. Wind felt on face. Smoke rises at about 80 degrees.
<b>3</b>	Gentle Breeze	7-10 kts	2 ft (max 3)	Large wavelets, crests begin to break. Foam of glassy appearance. Perhaps scattered white horses (white caps). Wind extends light flag and pennants. Smoke rises at about 70 deg.
<b>4</b>	Moderate Breeze	11-16 kts	3 ft (max 5)	Small waves, becoming longer. Fairly frequent white horses (white caps). Wind raises dust and loose paper on deck. Smoke rises at about 50 deg. No noticeable sound in the rigging. Slack halyards curve and sway. Heavy flag flaps limply.
<b>5</b>	Fresh Breeze	17-21kts	6 ft (max 8)	Moderate waves, taking more pronounced long form. Many white horses (white caps) are formed (chance of some spray). Wind felt strongly on face. Smoke rises at about 30 deg. Slack halyards whip while bending continuously to leeward. Taut halyards maintain slightly bent position. Low whistle in the rigging. Heavy flag doesn't extended but flaps over entire length.
<b>6</b>	Strong Breeze	22-27 kts	9 ft (max 12)	Large waves begin to form. White foam crests are more extensive everywhere (probably some spray). Wind stings face in temperatures below 35 deg F (2C). Slight effort in maintaining balance against wind. Smoke rises at about 15 deg. Both slack and taut halyards whip slightly in bent position. Low moaning, rather than whistle, in the rigging. Heavy flag extends and flaps more vigorous.
<b>7</b>	Near Gale	28-33 kts	13 ft (max 19)	Sea heaps up and white foam from breaking waves begins to be blown in streaks along the direction of wind. Necessary to lean slightly into the wind to maintain balance. Smoke rises at about 5 to 10 deg. Higher pitched moaning and whistling heard from rigging. Halyards still whip slightly. Heavy flag extends fully and flaps only at the end. Oilskins and loose clothing inflate and pull against the body.
<b>8</b>	Gale	34-40 kts	18 ft (max 25)	Moderately high waves of greater length. Edges of crests begin to break into the spindrift. The foam is blown in well-marked streaks along the direction of the wind. Head pushed back by the force of the wind if allowed to relax. Oilskins and loose clothing inflate and pull strongly. Halyards rigidly bent. Loud whistle from rigging. Heavy flag straight out and whipping.
<b>9</b>	Strong Gale	41-47 kts	23 ft (max 32)	High waves. Dense streaks of foam along direction of wind. Crests of waves begin to topple, tumble and roll over. Spray may affect visibility.
<b>10</b>	Storm	48-55 kts	29 ft (max 41)	Very high waves with long overhanging crests. The resulting foam, in great patches is blown in dense streaks along the direction of the wind. On the whole, the sea takes on a whitish appearance. Tumbling of the sea becomes heavy and shock-like. Visibility affected.
<b>11</b>	Violent Storm	56-63 kts	37 ft (max 52)	Exceptionally high waves (small and medium-sized ships might be for time lost to view behind the waves). The sea is completely covered with long white patches of foam lying along the direction of the wind. Everywhere, the edges of the wave crests are blown into froth. Visibility greatly affected.
<b>12</b>	Hurricane	64+ kts	45+ ft	The air is filled with foam and spray. The sea is completely white with driving spray. Visibility is seriously affected.

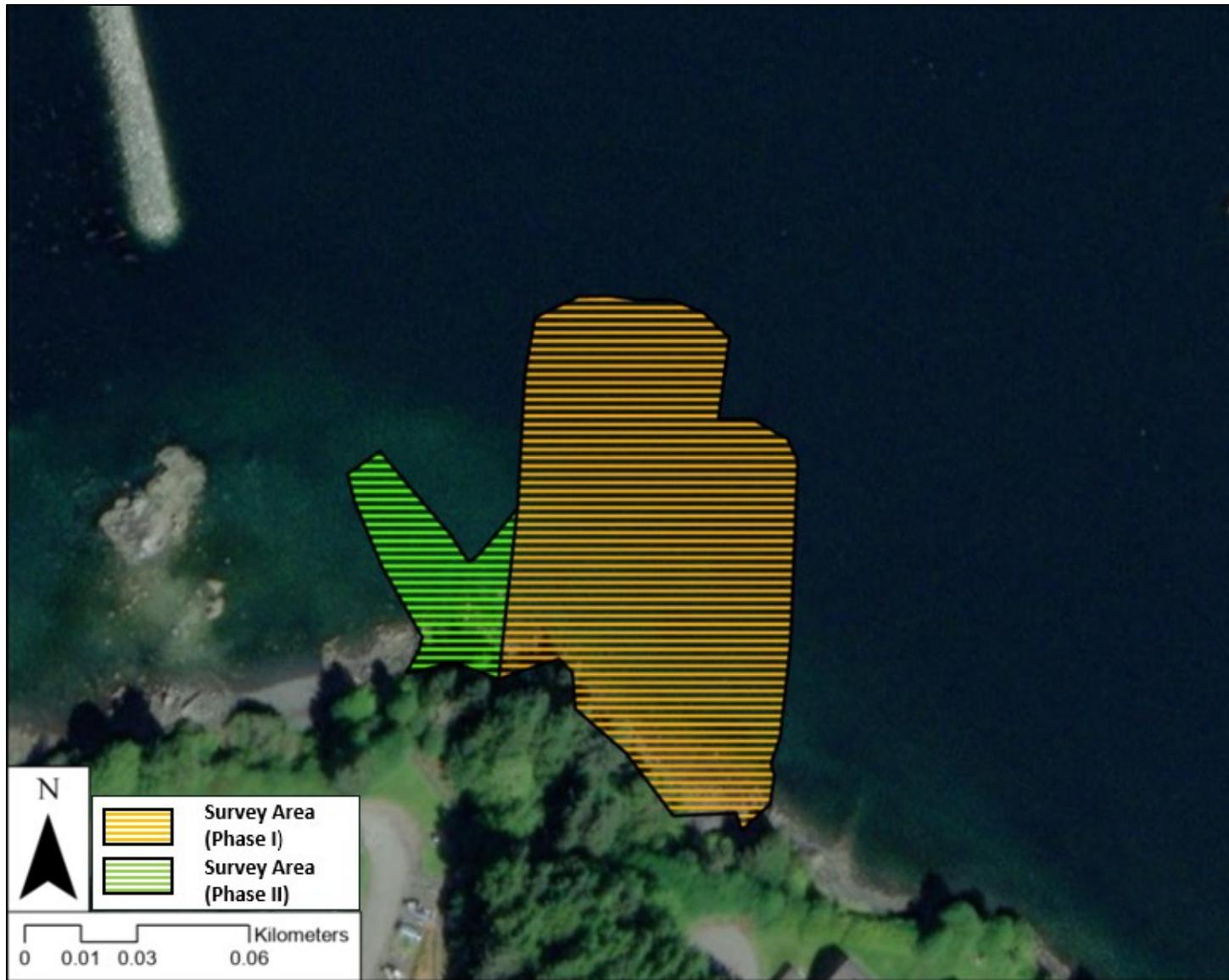
## **Appendix D: Grid Maps**





## **Appendix E: Sunflower Sea Star Sighting Forms**

Figure 1. Sunflower Sea Star Survey Transects



Ensure there are 2 meters between transect lines during surveys.

**Sunflower Sea Star  
Data Collection Form**

Date \_\_\_\_\_ NMFS project number AKRO- \_\_\_\_\_

Project Name \_\_\_\_\_ Project Location Lat \_\_\_\_\_ Long \_\_\_\_\_

Observer(s) name(s) \_\_\_\_\_

Project type: dredge  fill  heavy equipment  other

Length and width of area surveyed \_\_\_\_\_

How was survey conducted? walked  diver  combo

Total sunflower sea stars seen \_\_\_\_\_ Number of transects surveyed \_\_\_\_\_

Did any sunflower sea stars have SSWS? \_\_\_\_\_ % infected \_\_\_\_\_

From the shallowest (1) to deepest transect indicate the number of sunflower sea stars seen on each transect, their size class<sup>1</sup> and any interesting observations made

1 \_\_\_\_\_

2 \_\_\_\_\_

3 \_\_\_\_\_

4 \_\_\_\_\_

5 \_\_\_\_\_

6 \_\_\_\_\_

7 \_\_\_\_\_

8 \_\_\_\_\_

9 \_\_\_\_\_

10 \_\_\_\_\_

Notes \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

<sup>1</sup>Sunflower Sea Star Size Classes:

- Small (SM) less than 6 cm (~2.5 in).
- Medium (MD) greater than 7 cm (~2.7 in) and less than 20 cm (~8 in) (width of page).
- Large (LG) greater than 20 cm (bigger than 8.5 x 11 page).

Figure 2. Sunflower Sea Star Wasting Syndrome Fact Sheet

# Sunflower Sea Star Wasting Syndrome Pandemic

(2013 - 2017+)



**NOAA**  
FISHERIES

## Causes and impacts of Sea Star Wasting Syndrome

- An unknown, virus-sized pathogen, which research is ongoing to isolate and identify
- Transmitted through direct contact among stars and indirect contact via water
- Healthy individuals detect sick individuals, and actively flee away from them
- Many sea star species affected, but sunflower sea stars most severely impacted



1. A healthy sunflower sea star.



2. Initial symptoms of infection include lesions and arms that curl and break off.

## How does the syndrome progress?

- White lesions appear on the star
- Arm tips curl, bend, then break off – and may crawl away!
- Star dissolves into pile of gooey skeletal remains within days of first externally visible symptoms

## What triggered the pandemic?

### Is the syndrome still a concern?

- Ultimate cause remains unknown, but linked with known stressful conditions
- Stressors include rapid change in temperature, decreased pH, pollution, and other physical and chemical parameters
- Populations have not bounced back, showing stressors remain and Sea Star Wasting Syndrome is still a threat



3. The star may die within days and dissolve away.

Photos: Janna Nichols



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
National Marine Fisheries Service  
P.O. Box 21668  
Juneau, AK 99802-1668

May 1, 2024

Kerry B. Long, Alaska Region Regional Administrator  
U.S. Federal Aviation Administration  
222 West 7th Ave. #14  
Anchorage, AK 99513

AND

City and Borough of Sitka  
6100 Lincoln St.  
Sitka, AK 99835

RE: Sitka Seaplane Base Project, AKRO-2023-02513

Dear Mr. Long:

This letter transmits the National Marine Fisheries Service's (NMFS) biological opinion on construction of a new seaplane base to serve Sitka in the Sitka Channel. The activities being proposed will include construction of the seaplane base from July 2024 to July 2026 for authorization by the City and Borough of Sitka (CBS) on behalf of the Federal Aviation Administration, and its effects on threatened and endangered species in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.).

NMFS concludes the proposed action is not likely to jeopardize the continued existence of threatened Mexico Distinct Population Segment (DPS) humpback whales (*Megaptera novaeangliae*), endangered Western DPS Steller sea lion (*Eumetopias jubatus*), and sunflower sea star (*Pycnopodia helianthoides*). In addition, the proposed action is not likely to adversely affect the endangered North Pacific right whale (*Eubalaena japonica*), fin whale (*Balaenoptera physalus*), and sperm whale (*Physeter macrocephalus*). We also conclude that the proposed action is not likely to destroy or adversely modify designated critical habitat for North Pacific right whale, Mexico DPS humpback whale, or Steller sea lion. No critical habitat has been designated for fin or sperm whales, and none is currently proposed for sunflower sea stars, therefore none will be affected.

In formulating this opinion, NMFS used the best available scientific and commercial information, including the December 2023, Biological Assessment prepared by the applicant's non-federal designee (Solstice Alaska Consulting); sound source verification reports; updated project proposals, clarifying email and telephone conversations between NMFS, CBS, and Solstice Alaska Consulting staff, and other sources of information. A complete record of this consultation is on file at NMFS's Juneau Alaska Office.



Conservation recommendations are provided with the opinion, which are intended to improve our understanding of the impacts of oil and gas activities on these animals. This biological opinion is attached, and will also be posted our website at:  
<https://www.fisheries.noaa.gov/alaska/consultations/section-7-biological-opinions-issued-alaska-region>

Sincerely,



Jonathan M. Kurland  
Regional Administrator

cc: Kristi Ponozzo, [Kristi.M.Ponozzo@faa.gov](mailto:Kristi.M.Ponozzo@faa.gov)  
Joseph Bea, [Joseph.Bea@cityofsitka.org](mailto:Joseph.Bea@cityofsitka.org)