Request for an Incidental Harassment Authorization under the Marine Mammal Protection Act for

St. George Island, Alaska

Submitted to:
National Marine Fisheries Service
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ACRONYMS AND ABBREVIATIONS

4MP	*Marine Mammal Monitoring and Mitigation Plan*
ADFG	*Alaska Department of Fish and Game*
CFR	*Code of Federal Regulations*
CV	*Coefficient of Variation*
dB	*Decibel*
DPS	*Distinct Population Segment*
ESA	*Endangered Species Act*
FR	*Federal Register*
Hz	*Hertz*
IHA	*Incidental Harassment Authorization*
kHz	*Kilohertz*
LOA	*Letter of Authorization*
LPT	*Large Penetration Test*
MMPA	*Marine Mammal Protection Act*
N	*Population*
NMFS	*National Marine Fisheries Service*
N_{min}	*Minimum Population Estimate*
NOAA	*National Oceanic and Atmospheric Administration*
PBR	*Potential Biological Removal*
PED	*Preconstruction Engineering and Design*
PSO	*Protected Species Observer*
PSO	*Protected Species Observer*
PTS	*Permanent Threshold Shift*
RMS	*Root Mean Square*
SE	*Standard Error*
SEL	*Sound Exposure Level*
SELCUM	*Cumulative Sound Exposure Level*
SPLPEAK	*Peak Sound Pressure Level*
SPLRMS	*Root-Mean-Square Sound Pressure Level*
SPT	*Small Penetration Test*
TTS	*Temporary Threshold Shift*
USACE	*United States Army Corps of Engineers*
USFWS	*United States Fish and Wildlife Service*
WSDOT	*Washington Department of Transportation*
µPa	*Micropascal*

1.0 Description of Specified Activity

1.1 Project Description

The U.S. Army Corps of Engineers (USACE) is in the preconstruction, engineering, and design (PED) phase for constructing a small boat harbor on St. George Island, Alaska (Figure 1-1). PED activities, such as geotechnical surveys, have the potential to take marine mammals. Borehole drilling may result in take of marine mammals under Level B harassment (behavioral harassment). This Incidental Harassment Authorization (IHA) would authorize take for the geotechnical surveys, which are scheduled from 15 April 2025 to 15 June 2025. In-water work would occur during daylight hours plus periods of nautical twilight for up to approximately 16 hours per day. The intent is to complete the survey as early as possible in this time window to minimize potential impacts to northern fur seal (*Callorhinus ursinus*), as their abundance on St. George Island increases as the summer progresses. Only 15 days of actual drilling is anticipated to occur during this 60-day work window.

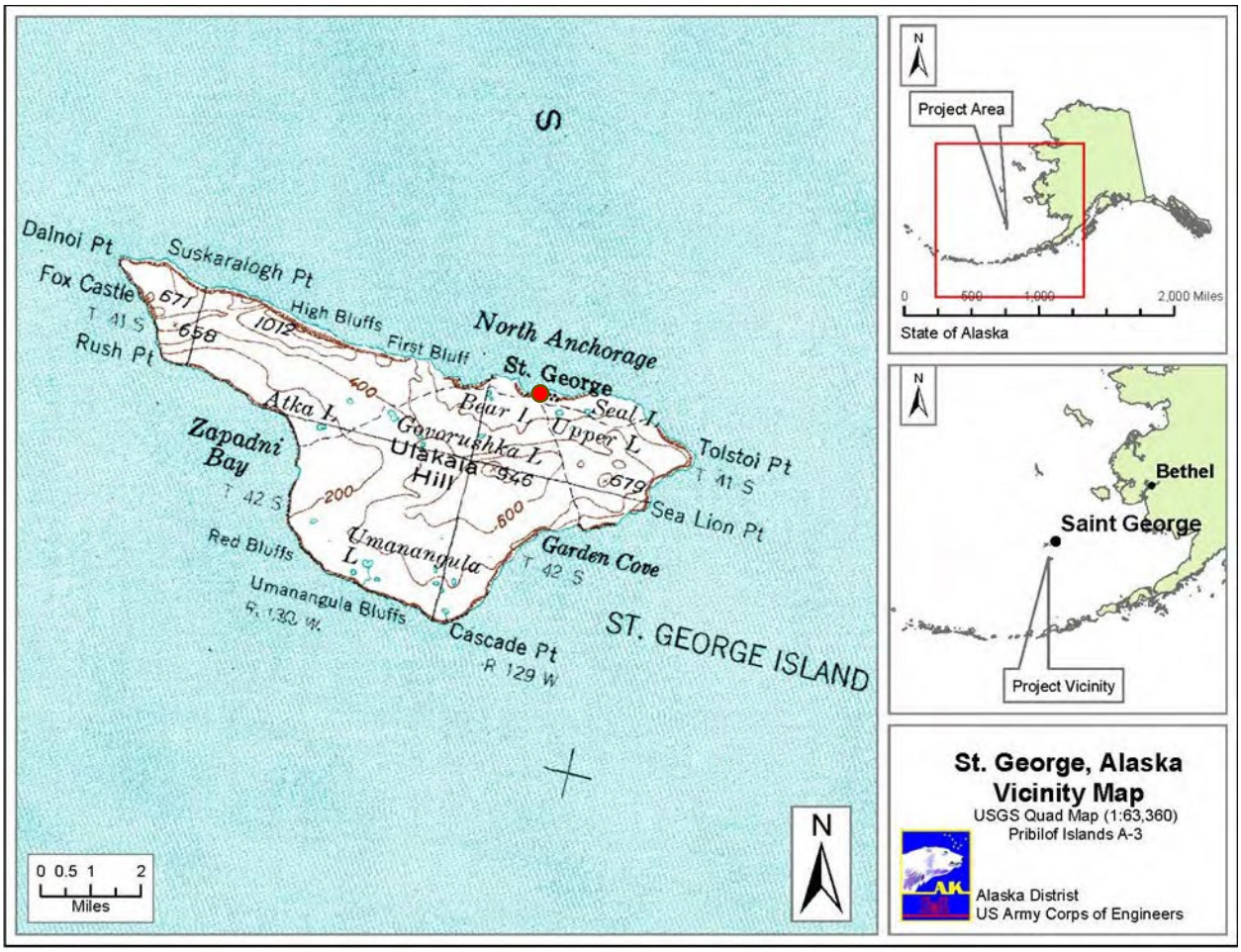

Figure 1-1. Location of the project (red dot), on St. George Island, Alaska.

The geotechnical survey includes drilling 15 boreholes within the harbor footprint (Figure 1-2). Two additional boreholes would be drilled on land to the east of the in-water footprint. The two boreholes on land are not part of this application. The 15 in-water boreholes would be drilled from a barge and would involve drilling holes from between 20 to 75 feet into the substrate. Water depth at the project site ranges from about 3 feet deep nearshore to approximately 20 feet deep at the borehole near the entrance channel. While drilling would ideally occur during daylight hours, work may continue between all hours of nautical twilight. This provides the longest workday possible to exploit weather windows, while also ensuring that the Level B area can be monitored for any species that would necessitate shutdowns.

It is expected that one borehole can be drilled in a day. This would result in 15 days of drilling. Much of the time is spent repositioning the barge, so actual drilling would take place for approximately 10 hours per day. Given the exposed nature of the project site, it is anticipated that these 15 workdays will be spread over approximately 20 to 30 days on site as a conservative estimate. Strong northerly winds and swell will limit the available work windows, and there could be several days of shutdowns between some boreholes.

Drilling involves two components. The first is a Large Penetration Test (LPT). LPT split barrel or grab samples must be obtained at the surface for all boreholes, followed by LPT drive samples at 2.5 feet, 5 feet, 7.5 feet, 10 feet, and at intervals of 5 feet to refusal depth (typically when bedrock is encountered). LPTs must be performed with a 3.0 inch outside diameter by 2.5 inch inside diameter split-barrel sampler, and impact hammer weighing 340 pounds falling 30 inches. This is an impulsive sampling method that is analogous to pile driving, albeit with a very small diameter sampling device.

Upon refusal, the LPT equipment will be removed and then drilling will continue in the same hole as the LPT to obtain rock core samples. Bedrock is expected to be encountered in all boreholes. For planning purposes, bedrock shall be assumed to be encountered between 0 feet and 15 feet below ground surface in all boreholes. Rock core samples must be obtained to the borehole termination depth indicated in Figure 1-2. The drill will be mounted on the barge, then the barge will be positioned by a tugboat and held in position with a 4-point anchoring system or spuds.

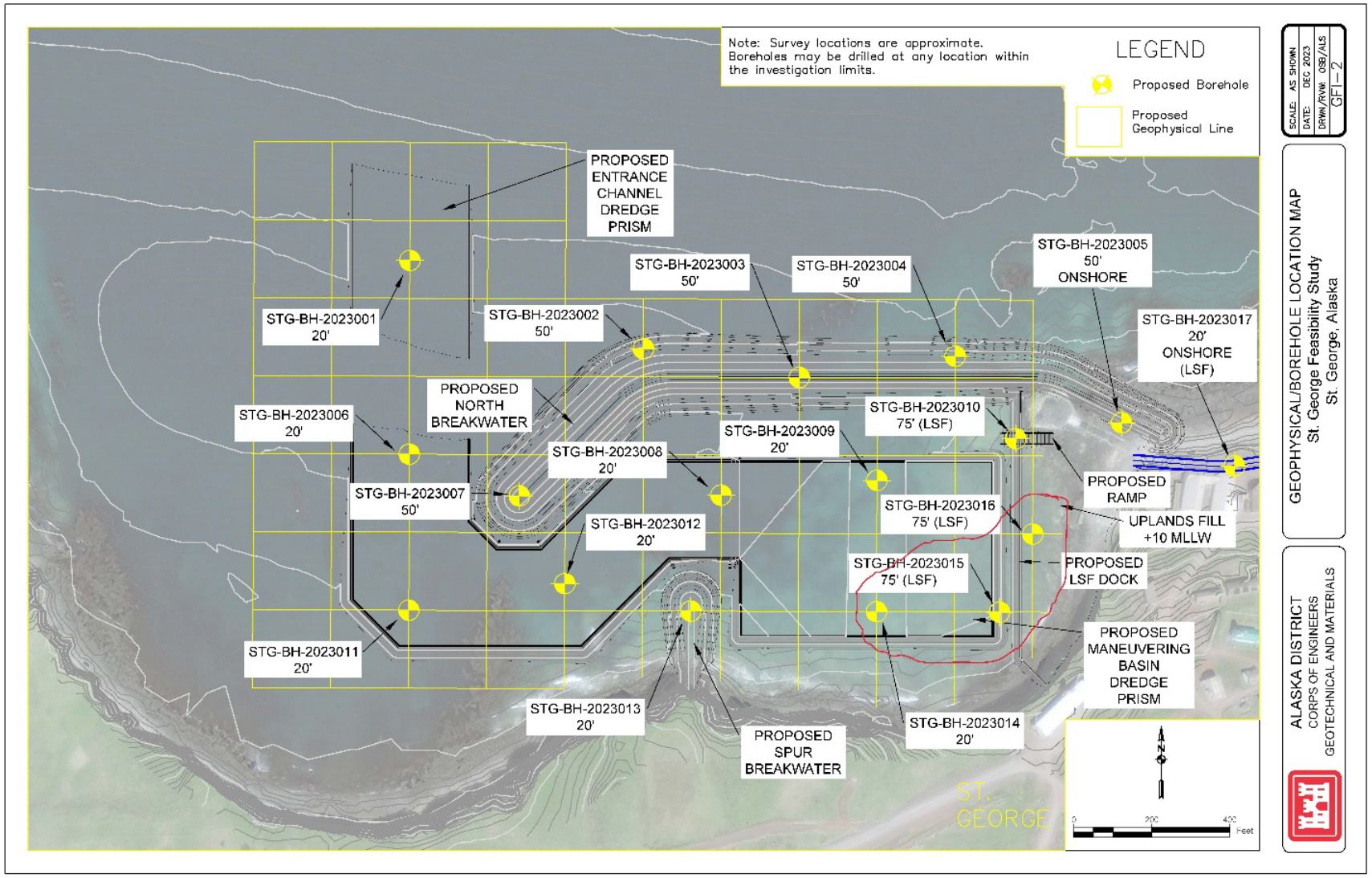

Figure 1-2. Proposed harbor footprint with geotechnical survey locations.

The Marine Mammal Protection Act of 1972 (MMPA) prohibits the taking of marine mammals; to take is defined as to “harass, hunt, capture or kill, or attempt to harass, hunt, capture or kill”, except under certain situations. Section 101 (a)(5)(D) of the MMPA allows for the issuance of an IHA provided an activity results in negligible impacts on marine mammals and would not adversely affect subsistence use of these animals.

2.0 Dates, Duration, and Specified Geographic Region

2.1 Dates

The geotechnical survey is expected to be conducted between 15 April 2025 and 15 June 2025. The intent is to conduct the survey as early as possible in this timeframe.

2.2 Duration

Work is expected to last 15 days during the two-month time window. It is essential to maximize work during periods of good weather, so drilling during this time would take place between all daylight hours. The daily construction window for geotechnical drilling will begin no sooner than 30 minutes after morning civil twilight to allow for initial marine mammal monitoring to take place and will end 30 minutes before the end of evening civil twilight to allow for post-activity monitoring. During the April 2025 to June 2025 timeframe, the sunrise and sunset predictions allow for 14–18 hour work window per day.

2.3 Specified Geographic Region

St. George Island is the southernmost and second largest of a group of five inactive volcanic islands that compose the Pribilof Archipelago located in the southern Bering Sea, approximately 760 miles west of Anchorage and 220 miles north-northwest of Unalaska Island. St. George’s position at the western margin of Alaska’s continental shelf puts it in close proximity to the much deeper waters of the Bering Sea’s abyssal plain. The abrupt change in seafloor elevation occurring at the continental slope facilitates natural upwelling processes; as a result, surface waters in the region are some of the most productive on the planet. St. George Island falls within the boundary of the Alaska Maritime National Wildlife Refuge; portions of its surface landmass are owned and managed by the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS).

3.0 Species and Number of Marine Mammals

The geotechnical survey area on St. George Island is within known distribution ranges of two marine mammal species: northern fur seal (*Callorhinus ursinus*) and harbor seal (*Phoca vitulina*). Table 3-1 and Table 3-2 list the species along with their stock or population, MMPA and Endangered Species Act (ESA) status, occurrence in the project area, seasonality, and estimated abundance as a minimum population size estimate (N_{MIN}). All the marine mammal species listed fall under the jurisdiction of NMFS. See *Appendix B: Summary of Marine Mammals Sighting Data* for further information.

Steller sea lion (*Eumetopias jubatus*), within the western distinct population segment (DPS) are sometimes observed near the project site (Appendix B). However, given their small numbers, infrequent occurrence, relatively small Level B isopleths, and the inability to employ multiple protected species observers (PSOs) from ideal vantage points; take is not requested for this species.

Table 3-1. List of eared seal species with ranges that extend into the project site.

Eared Seals (Otariidae)

Species	Population / Stock	MMPA Status	ESA Status	Occurrence	Seasonality	Abundance (N_{min})
Northern fur seal (*Callorhinus ursinus*)	Eastern Pacific	Protected, Depleted	-	Common	Spring, Summer, Fall	626,618

[a](Muto et al., 2022)

Table 3-2. List of true seal species with ranges that extend into the project site.

True Seals (Phocidae)

Species	Population / Stock	MMPA Status	ESA Status	Occurrence	Seasonality	Abundance (N_{min})
Harbor seal (*Phoca vitulina*)	Pribilof Island	Protected	-	Common	Year-round	229

[a](Muto et al., 2020)

4.0 Affected Species Status and Distribution

In this section, the general distribution and status of each species listed in *Section 3.0 Species and Number of Marine Mammals* will be discussed in order of taxonomic classification. For each species relevant critical habitat, hearing ability, and survey information applicable to the proposed action area will be discussed.

4.1 Eared Seals (Otariidae)

4.1.1 Northern Fur Seal (*Callorhinus ursinus*)

Northern fur seals have a stocky body, small head, very short snout, and extremely dense fur (46,500 fibers/cm²) that ends at the wrist lines of their flippers (Figure 4-1). Adult males are dark brown to black, and adult females are dark gray or brown on their backs and light gray, silver, or cream on their throat, chest, and stomach. Northern fur seals exhibit sexual dimorphism in body size, where adult males are much larger (up to 370 percent) than adult females.

Figure 4-1. Northern fur seal (*Callorhinus ursinus*).

Illustration obtained from NOAA Fisheries Species Directory.

In 1787, Russian fur companies established seasonal sealing camps along the coasts of St. George Island and St. Paul Island, and conscripted labor from the Unangax̂ population from a number of islands in the Aleutian chain and relocated them to the Pribilof Islands. The United States purchased the Pribilof Islands from Russia in 1867, after which the fur seal industry was managed by the Alaska Commercial Company under the authority of the United States Treasury. In 1911, the Fur Seal Treaty created an international prohibition on pelagic sealing and shared responsibility among the treaty nations for commercial harvests on land. In 1984, the United States ended commercial harvest of northern fur seals on the Pribilof Islands. Subsistence use is currently co-managed by NMFS and the Tribal Government of St. Paul Island and the Traditional Council of St. George Island.

4.1.1.1 Status

Northern fur seals are protected under the MMPA throughout their range. There are two stocks of northern fur recognized in waters of the United States: an Eastern Pacific stock and a California stock. The Eastern Pacific stock is designated as depleted under the MMPA, which includes populations that breed on the Pribilof Islands (St. George Island and St. Paul Island) and Bogoslof Island. No critical habitat has been designated for this species.

4.1.1.2 Distribution

Northern fur seals occur from southern California north to the Bering Sea and west to the Sea of Okhotsk and Honshu Island, Japan. Northern fur seals considered pelagic and spend the majority of their time in open ocean. In the spring, most northern fur seals migrate to breeding colonies in the southern Bering Sea. During the breeding season, most of the worldwide population is found in the Pribilof Islands, specifically on St. Paul Island and St. George Island (Figure 4-2), with the remaining animals on rookeries in Russia, on Bogoslof Island in the southern Bering Sea, on San Miguel Island off southern California (NMFS, 2021a), and on the Farallon Islands off the coast of central California.

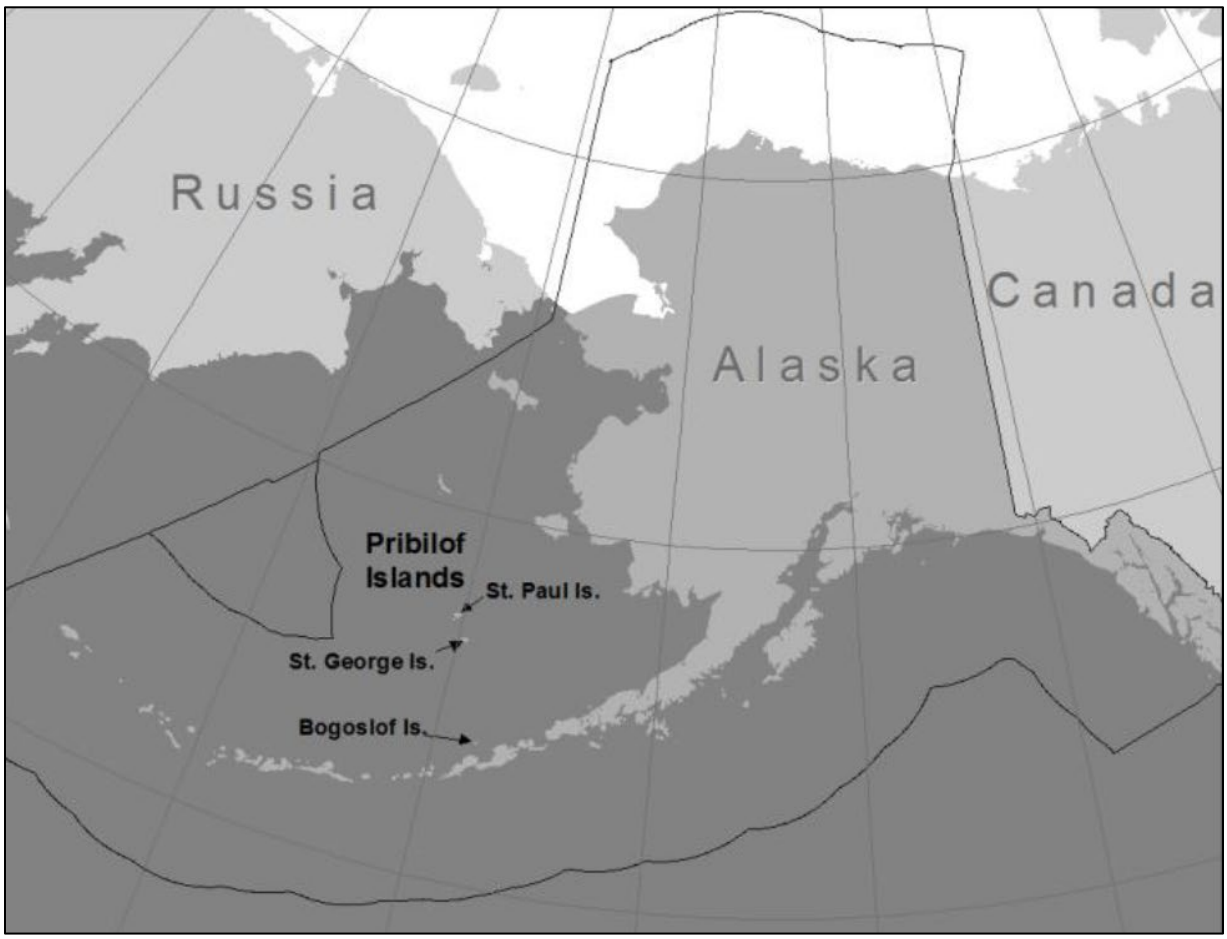

Figure 4-2. Approximate distribution of northern fur seals in the North Pacific.

Breeding colonies of the Eastern Pacific stock are located on the Pribilof Islands of St. George and St. Paul, and Bogoslof Island. Figure obtained from NORTHERN FUR SEAL (*Callorhinus ursinus*): Eastern Pacific stock (NOAA-TM-AFSC-441; Muto et al., 2022).

4.1.1.3 Presence in the St. George Area

About half of the world's population of northern fur seals breeds on St. Paul Island, St. George Island, and Sea Lion Rock in the Pribilofs. Non-breeding northern fur seals also haul out on Walrus Island and Otter Island in the Pribilofs. There are 13 rookeries on St. Paul Island, and 6 rookeries on St. George Island (Figure 4-3).

Figure 4-3. Northern fur seal rookeries on St. George Island.

As the majority of pups are born on St. Paul Island and St. George Island, pup surveys are conducted biennially on these islands. Pup production estimates are available less frequently on Sea Lion Rock (adjacent to St. Paul Island) and Bogoslof Island (Muto et al., 2022; Table 4-1). Annual variation in female reproductive rates is reflected in the respective pup production estimates. Because the estimation of stock population size relies on these estimates of pup production, means of recent pup production estimates are used to account for variability in the reproductive rates over time. The most recent estimate for the number of northern fur seals in the Eastern Pacific stock, based on pup

production estimates on Sea Lion Rock (year 2014), on St. Paul and St. George Islands (mean of years 2014, 2016, and 2018), and on Bogoslof Island (mean of years 2015 and 2019) is 626,618 northern fur seals (4.47 × 140,183). A coefficient of variation (CV) that incorporates the variance of the correction factor is not available. Using the population estimate (N) of 626,618 and the default CV of 0.2, N_{MIN} for the Eastern Pacific stock is 530,376 northern fur seals.

Estimates of the size of the Alaska population of northern fur seals increased to approximately 1.25 million in 1974. The population began to decrease in the mid-1970s, with pup production declining at a rate of 6.5%–7.8% per year into the 1980s (York, 1987). By 1983, the total stock estimate was 877,000 northern fur seals (Briggs and Fowler, 1984). Pup production at St. George Island had a less pronounced period of stabilization, beginning in the late 1980s, that was similarly followed by a decline. However, pup production stabilized again on St. George Island beginning around 2002. From 1998 to 2018, pup production declined 4.09% per year on St. Paul Island (SE = 0.34; P < 0.01), and showed no significant trend on St. George Island (Standard Error [SE] = 0.58; P = 0.59). The estimated pup production in 2018 was below the 1919 level (Bower, 1920) on both St. Paul Island and St. George Island. Northern fur seal pup production at Bogoslof Island has grown at an exponential rate since the 1990s (Figure 4 in Ream et al., 2005). Despite continued growth at Bogoslof Island, recent estimates of pup production indicate that the rate of increase may be slowing. Since the first pups were observed on Bogoslof Island in 1980, pup production increased at an annual rate of 30.0% (SE = 2.41), but has slowed to an annual rate of 9.2% (SE = 0.91) since 1997. Temporary increases in the overall stock size are observed when opportunistic estimates are conducted at Bogoslof, but declines at the larger Pribilof colonies (specifically on St. Paul Island) continue to drive the overall stock estimate down over time.

There are key uncertainties in the assessment of the Eastern Pacific stock of northern fur seals. The abundance estimate is based on pup counts multiplied by a constant. This constant was based on northern fur seal demographic information, which is now dated and unknown whether the constant is still optimum for this population. Because an estimate of variance cannot be determined, the N_{MIN} calculation uses a default CV of 0.2. At this time, the cause of the decline of this stock is unknown.

Table 4-1. Estimates and/or counts of northern fur seal pups born on the Pribilof Islands and Bogoslof Island.

Standard errors (SE) for pup estimates at Pribilof rookery locations. The CV for total pup production estimates is provided in parentheses (direct counts do not have standard errors). The quotation (“) symbol indicates that no new data are available for that year and, thus, the most recent prior estimate/count was used in determining total annual estimates.

	Rookery Location				
Year	***St. Paul***	***Sea Lion Rock***	***St. George***	***Bogoslof***	***Total***
1994	192,104 (8,180)	12,891 (989)	22,244 (410)	1,472 (N/A)	228,711 (0.036)
1995	“	“	“	1,272 (N/A)	228,511 (0.036)
1996	170,125 (21,244)	“	27,385 (294)		211,673 (0.10)
1997	“	“	“	5,096 (33)	215,497 (0.029)
1998	179,149 (6,193)	“	22,090 (222)	“	219,226 (0.029)
2000	158,736 (17,284)	“	20,176 (271)	“	196,899 (0.089)
2002	145,716 (1,629)	8,262 (191)	17,593 (527)	“	176,667 (0.01)
2004	122,825 (1,290)	“	16,876 (239)	“	153,059 (0.01)
2005	“	“	“	12,631 (335)	160,594 (0.01)
2006	109,961 (1,520)	“	17,072 (144)	“	147,900 (0.011)
2007	“	“	“	17,574 (843)	152,867 (0.011)
2008	102,674 (1,084)	6,741 (80)	18,160 (288)	“	145,149 (0.009)
2010	94,502 (1,259)	“	17,973 (323)	“	136,790 (0.011)
2011	“	“	“	22,905 (921.5)	142,121 (0.011)
2012	96,828 (1,260)	“	16,184 (155)	“	142,658 (0.011)
2014	91,737 (769)	5,250 (293)	18,937 (308)	“	138,829 (0.009)
2015	“	“	“	27,750 (228)	143,674 (0.006)
2016	80,641 (717)	“	20,490 (460)	“	134,131 (0.007)
2018	75,719 (1,008)	“	21,625 (345)	“	130,344 (0.009)
2019	“	“	“	36,015 (1,098)	138,609 (0.011)

In 2024, USACE biologists were able to complete two brief surveys in April and June. See Figure 4-3 for landmarks used in the observation notes. Direct counts were made of northern fur seals in the water and estimates were made of fur seals hauled out along the beach. A few general observations were made:

- Northern fur seals were observed most frequently and in the greatest number in the water in late evening. This was especially true in the eastern portion of the bay (i.e., between the old jetty in the east and the tip of the North Rookery to the west).
- In April, most in-water observations occurred after 8:30 PM. In June, most in-water observations occurred after 10:00 PM.
- Very little movement of fur seals from the beach to the water was observed in April and June, although there is likely some movement throughout the day and more in the evening. This observation does not apply to late summer and fall which is outside the planned work window for this project.
- The beach area used by fur seals in April and June was focused on the area around the “access ramp” and onwards to the north point of the rookery. This contrasts with late summer and fall when beach use extends along the southern portion of the shoreline and along the old jetty to the east.

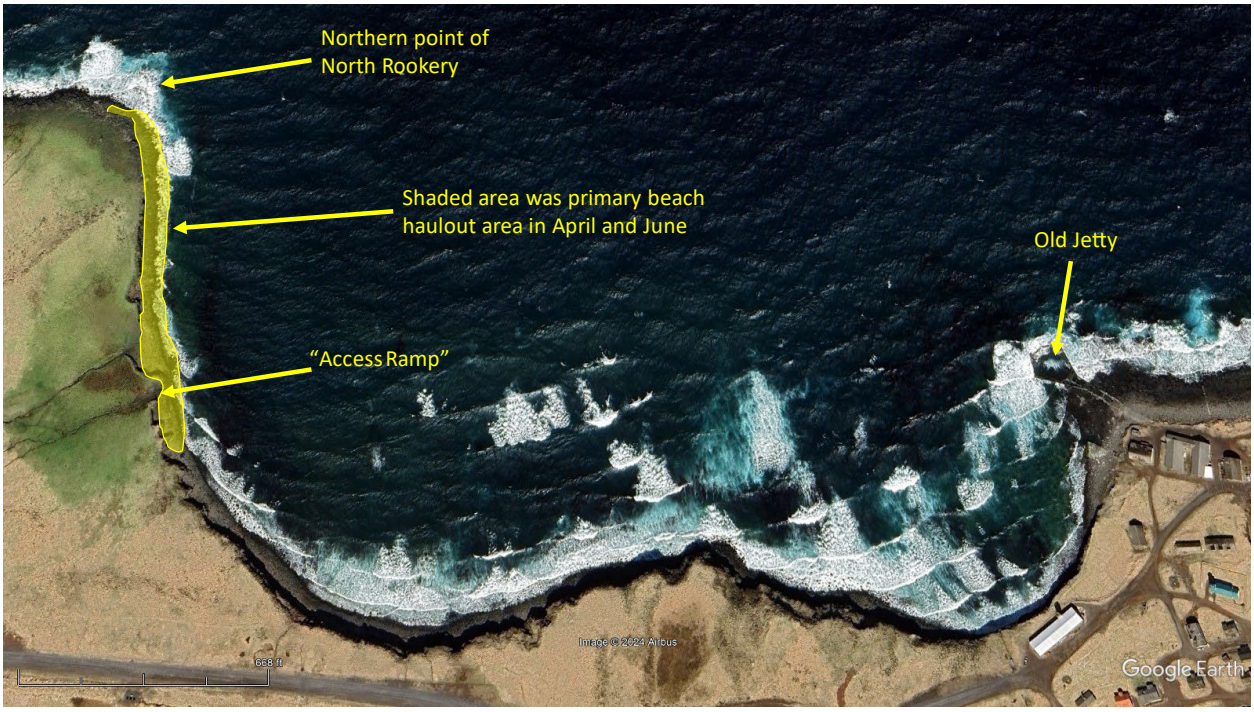

Figure 4-3. Local features referenced in site discussion.

4.1.1.1 Hearing Ability

Northern fur seals are pinnipeds within the family Otariidae, with a generalized hearing range of 60 hertz (Hz) to 39 kilohertz (kHz) (NMFS, 2018).

4.2 True Seals (Phocidae)

4.2.1 Harbor Seal (*Phoca vitulina*)

Harbor seals are a true seal (family Phocidae) and lack external ear flaps and instead have a small hole (opening to the ear canal) on either side of their head (Figure 4-4). Harbor seals have short, dog-like snouts. The color of each seal's fur varies but there are two basic patterns: light tan, silver, or blue gray with dark speckling or spots, and a dark background with light rings. The "earless" harbor seal fur has a variety of colors that can range from light tan, blue-gray, or even silver. Adult harbor seals average weight is about 82 kg (Kinkhart et al., 2008). Male harbor seals tend to be larger than females and weigh up to 129 kg.

Figure 4-4. Harbor seal (*Phoca vitulina*).

Illustration obtained from NOAA Fisheries Species Directory.

4.2.1.1 Status

Harbor seals are protected under the MMPA throughout their range. No harbor seal stocks in Alaska are designated as depleted under the MMPA or listed as threatened or endangered under the ESA.

4.2.1.2 Distribution

In Alaska, the 12 distinct stocks currently identified (Muto et al., 2020; Figure 4-5). These are designated as 1) the Aleutian Islands stock – occurring along the entire Aleutian chain from Attu Island to Ugamak Island; 2) the Pribilof Islands stock – occurring on Saint Paul and Saint George Islands, as well as on Otter and Walrus Islands; 3) the Bristol Bay stock; 4) the North Kodiak stock; 5) the South Kodiak stock; 6) the Prince William Sound stock; 7) the Cook Inlet/Shelikof Strait stock; 8) the Glacier Bay/Icy Strait stock; 9) the Lynn Canal/Stephens Passage stock; 10) the Sitka/Chatham Strait stock; 11) the Dixon/Cape Decision stock; and 12) the Clarence Strait stock.

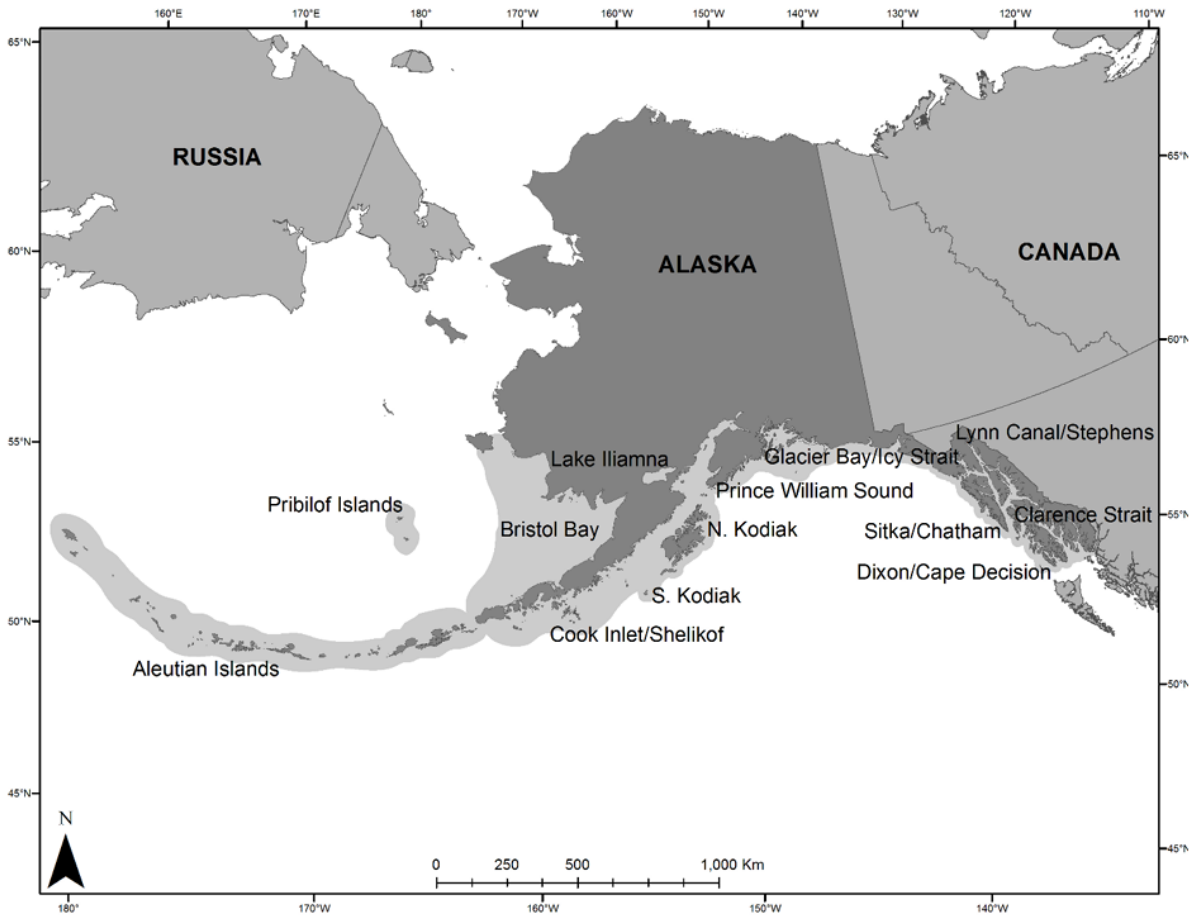

Figure 4-5. Approximate extent of harbor seals in Alaska (Muto et al., 2020; NOAA-TM-AFSC-404).

Local or regional trends in harbor seal numbers have been monitored at various time intervals since the 1970s, revealing diverse spatial patterns in apparent population trends. Where declines have been observed, they seem, generally, to have been strongest in the late 1970s or early 1980s to the 1990s.

The current statewide abundance estimate for Alaska harbor seals is 243,938 based on aerial survey data collected from 1996 to 2018 as reported Muto et al., 2020 (NOAA-

TM-AFSC-404; Table 4-2). The N_{MIN} for 11 of the 12 stocks of harbor seals in Alaska is calculated as the lower bound of the 80% credible interval obtained from the posterior distribution of abundance estimates. This approach is consistent with the definition of potential biological removal (PBR) in the current guidelines. The abundance estimates and N_{MIN} for the remaining stock, the Pribilof Islands stock, is simply the number counted in the most recent survey (2018) of this very small group.

Table 4-2. Estimated abundance and population trend of harbor seals in Alaska.

Abundance and 8-year trend (number of seals per year) estimates, by stock, for harbor seals in Alaska, along with respective estimates of standard error. The probability of decrease represents the proportion of the posterior probability distribution for the 8-year trend that fell below a value of 0 seals per year. N_{MIN} is the lower bound of the 80% credible interval obtained from the posterior distribution of the abundance estimates The Pribilof Islands stock abundance estimate (*) is simply the count of seals ashore during the survey and does not include a correction for seals in the water.

Stock	Year of last survey	Abundance estimate	SE	8-year trend estimate	SE	Probability of decrease	N_{MIN}
Aleutian Islands	2018	5,588	274	-131	86	0.932	5,366
Pribilof Islands	2018	229*	n/a	n/a	n/a	n/a	229
Bristol Bay	2017	44,781	7,278	1,127	1,196	0.218	38,254
North Kodiak	2017	8,677	1,335	53	236	0.409	7,609
South Kodiak	2017	26,448	5,282	1,234	1,062	0.076	22,351
Prince William Sound	2015	44,756	3,391	-200	555	0.648	41,776
Cook Inlet/Shelikof Strait	2018	28,411	1,839	-111	333	0.609	26,907
Glacier Bay/Icy Strait	2017	7,455	894	-216	147	0.904	6,680
Lynn Canal/Stephens Passage	2016	13,388	1,876	-114	262	0.73	11,867
Sitka/Chatham Strait	2015	13,289	1,734	71	277	0.41	11,883
Dixon/Cape Decision	2015	23,478	2,501	142	450	0.382	21,453
Clarence Strait	2015	27,659	3,030	138	485	0.413	24,854

4.2.1.3 Presence in the St. George Area

Counts of harbor seals in the Pribilof Islands ranged from 250 to 1,224 in the 1970s. Counts in the 1980s and 1990s ranged between 119 and 232 harbor seals. Prior to July 2010, the most recent count was 202 seals in 1995. In July 2010, approximately 185 adults and 27 pups were observed on Otter Island for a maximum count of 212 harbor seals. Counts from 2010 (all ages) are nearly identical to the 1995 counts (212 vs. 202), but 2010 pup numbers were slightly less (27 vs. 42). July 2015 was the first year that counts were conducted on both Otter Island and St. George Island, resulting in a total count of 235 seals (all ages). In 2018, the Aleut Community of St. Paul and MML collaborated on a comprehensive survey of harbor seals in the Pribilof Islands using small unoccupied aircraft. The survey was conducted on the islands of Otter, St. Paul, and St. George in early September, resulting in a total of 229 seals counted across all islands (Muto et al., 2020). For all other stocks in Alaska, the abundance and trend estimates account for the proportion of seals likely in the water during the survey. This is not done for the Pribilof Island stock because counts have typically been more opportunistic and information on environmental covariates is less standardized. It is also possible the isolated and unique nature of the habitat could lead to very different haul-out behaviors that are unknown without conducting a behavioral study. Analysis of the nearest two stocks (Aleutian Islands and Bristol Bay) estimated standardized correction factors of 1.5 and 3.0. Using the mean correction factor of 2.25 would result in approximately 515 harbor seals in the Pribilof Island region. The current population trend in the Pribilof Islands is unknown.

In 2024, USACE biologists were able to complete two brief surveys in April and June. See Figure 4-3 for landmarks used in the observation notes. Direct counts were made of harbor seals in the water. No fur seals were observed hauled out on land in the project area during any survey. A few general observations were made:

- Harbor seals were only observed near the old jetty during April surveys.
- A maximum of 8 harbor seals were observed at one time during April and these seals spent the entire day loafing near the old jetty.
- Local residents mentioned that it was uncommon to observe harbor seals in this area.

4.2.1.1 Hearing Ability

Harbor seals are pinnipeds within the family Phocidae, with a generalized hearing range of 50 Hz to 86 kHz (NMFS, 2018).

5.0 Type of Incidental Taking Authorization Requested

Under Section 101(a)(5)(D) of the MMPA, the USACE requests an IHA for the incidental taking of marine mammals by Level B harassment during geotechnical drilling and large penetration testing for two species: northern fur seal and harbor seal.

The activities outlined in *Section 1.0 Description of Specified Activity* have the potential to take marine mammals through exposure to in-water sound. Level B take of the marine mammal species listed above will result from noise associated geotechnical drilling and the large penetration testing. *Section 11.0 Mitigation Measures to Protect Marine Mammals and Their Habitat* describes mitigation measures including shutdown zones and procedures that will prevent Level A takes.

The applicant requests an IHA for incidental take of marine mammals described within this application for two months, beginning on 15 April 2025 and ending 15 June 2025 (or the issuance date, whichever is later). USACE is not requesting a Letter of Authorization (LOA) at this time because the activities described herein are expected to be completed within one year from the date of authorization and are not expected to rise to the level of serious injury or mortality, which would require an LOA.

5.1 Method of Incidental Taking

This project entails geotechnical surveys as described in *Section 1.0 Description of Specified Activity* wherein there is geotechnical drilling (boring) as well as LPT. The underwater noise will be temporarily increased in the project area due to these two activities. The increased noise may lead to Level B harassment of marine mammals within the construction project vicinity. Monitoring protocols, as described in the Marine Mammal Monitoring and Mitigation Plan (4MP) in Appendix A, are expected to prevent Level A harassment by reducing the potential exposure of marine mammals to underwater noise above the established NMFS thresholds.

5.1.1 Sound Threshold Guidance

For marine mammals, the distance that potentially disturbing sounds can carry underwater are an important component of the action area. Since 1997, NMFS has used generic sound exposure thresholds to determine whether an activity produces underwater sounds that might result in impacts to marine mammals. NMFS developed a 2018 revision to prior 2016 comprehensive guidance (81 FR 51694) on sound levels likely to cause injury to marine mammals through onset of permanent and temporary threshold shifts (PTS and TTS). PTS is considered Level A harassment, because it has the potential to injure a marine mammal in the wild; conversely, TTS is considered Level B harassment, because it has the potential to cause disruption of behavioral patterns (81 FR 51694).

The Level A harassment threshold caused by acoustic energy is first encountered at the onset of permanent threshold shift. Unless otherwise noted, the following notations will be used to express thresholds:

- Peak Sound Pressure Level (SPLPEAK): The largest absolute value of the instantaneous sound pressure expressed as a decibel (dB). Measured in micropascal (µPa): 1 µPa for underwater and 20 µPa for aerial or units of pressure.
- Root-Mean-Square Sound Pressure Level (SPLRMS): Decibel measure of the square root of mean square (RMS) pressure. For impulses, the average of the squared pressures over the time that comprise that portion of the waveform containing 90 percent of the sound energy of the impulse. Measured in 1 µPa for underwater, and 20 µPa for aerial.
- Sound Exposure Level (SEL): The time integral of frequency-weighted squared instantaneous sound pressures. Proportionally equivalent to the time integral of the pressure squared and can be described in terms of µPa2s over the duration of the impulse. Sound energy associated with a pile driving pulse, or series of pulses, is characterized by the SEL. SEL is the constant sound level in one second, which has the same amount of acoustic energy as the original time-varying sound (i.e., the total energy of an event). SEL is calculated by summing the cumulative pressure squared over the time of the event. Measured in dB re: 1 µPa2s.
- Cumulative Sound Exposure Level (SELCUM): Level of acoustic energy accumulated over a given period or event; or specifically, ten times the logarithm to the base ten of the ratio of a given time integral of squared instantaneous frequency-weighted sound pressure over a stated time interval or event to the reference sound exposure. Metric is weighted based on the marine mammal auditory weighting functions. Measured in re 1 µPa2s.

Regulatory thresholds for the onset of PTS, measured in one-day SELCUM, are shown in Table 5-1. These are the soon-to-be finalized 2024 PTS guidance levels, and these will be used in this IHA application as they will be finalized prior to issuance of and IHA and geotechnical studies in 2025.

Table 5-1. NMFS PTS onset acoustic thresholds (2024 guidance).

Underwater PTS Onset Acoustic Thresholds (dB re: µ1 Pa)					
Source	Low-Frequency Cetaceans	High-Frequency Cetaceans	Very-High Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
Non-Impulsive-Stationary-Continuous (Drilling/Coring)	197	201	181	195	199
Impulsive-Stationary-Intermittent (LPT)	183	193	159	183	185

5.1.2 Peak Sound Threshold Guidance

In addition to thresholds for cumulative noise exposure, a threshold for peak sound pressures must be considered for impulsive-stationary-intermittent activities like the LPT. These peak sound pressure thresholds are shown in Table 5-2. The draft 2024 noise guidance is provided in this table.

Table 5-2. NMFS peak sound pressure threshold (2024 guidance).

Underwater PTS Onset Acoustic Thresholds (dB re: µ1 Pa)					
Source	Low-Frequency Cetaceans	High-Frequency Cetaceans	Very-High Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
Impulsive-Stationary-Intermittent (LPT)	222	230	202	223	230

5.1.3 Underwater Noise and Harassment Zones

The geotechnical survey has the potential to increase underwater noise levels during drilling and LPT. The noise levels may result in disturbance within the Level B zone to pinnipeds and otariids, namely harbor seals and northern fur seals.

The geotechnical drilling/boring source levels are based on data from the Washington Department of Transportation (WSDOT, 2017) and have a source level of 143 dB at 10 meters. Using a transmission loss coefficient of 15 this results in a Level B zone of 341.5 meters. Level A calculations for drilling were obtained using the *2024 Draft User Spreadsheet, tab A*. The weighting factor adjustment was 2.0 kHz, the source level was 143 dB, the duration of sound production in 24 hours was 10 hours and the propagation loss coefficient was 15. This resulted in a Level A distance of 0.3 meters for phocid pinnipeds and 0.1 meters for otariid pinnipeds. The Level B isopleth is shown in Figure 5-1, where it is superimposed over both the inner-most and outer-most borehole locations. Level A isopleths are too small to display on a figure.

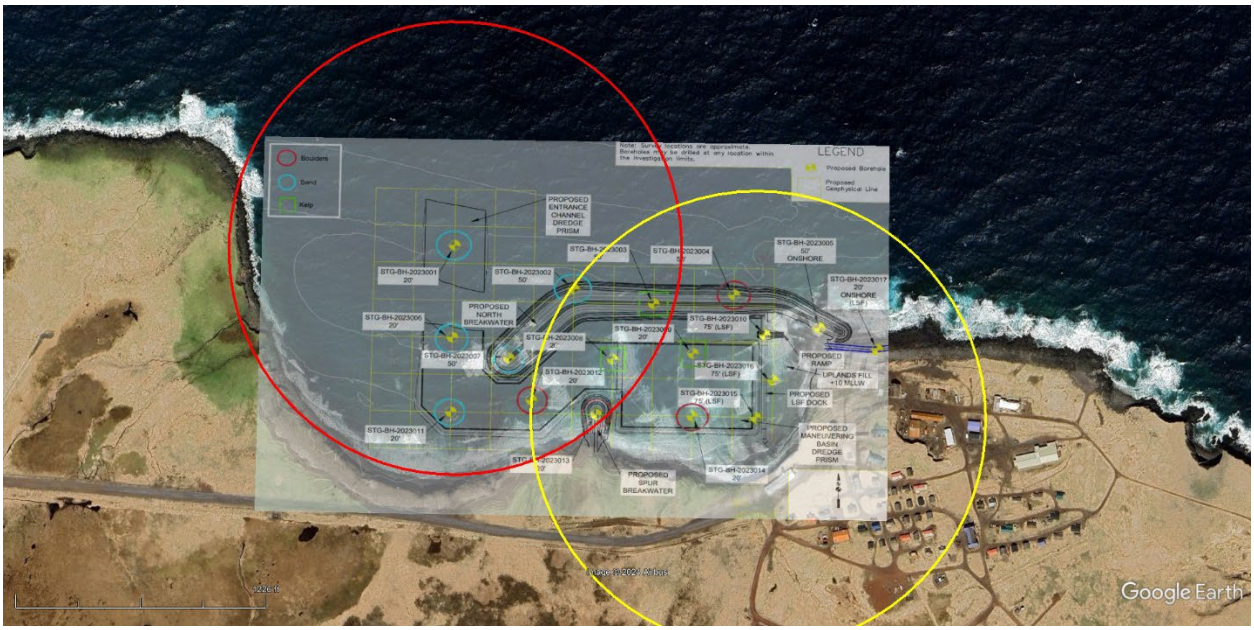

Figure 5-1. 341.5-meter isopleths shown around the outermost and innermost borehole locations.

The location of this isopleth would change to be centered on each borehole as drilling progresses.

The LPT source levels were initially based on Erbe and McPherson (2017) using their data from Table 1 for the Port of Geraldton as it was the worst-case scenario. The authors measured underwater noise data from a small penetration test (SPT), so calculated Level A and B data will be increased to be conservative for the slightly larger equipment associated with the LPT. LPTs for this project will be performed with a 3.0 inch outside diameter by 2.5 inch inside diameter split-barrel sampler and impact hammer weighing 340 lb. falling 30 inches. SPT, as used in the Erbe and McPherson (2017), are typically tubes with a 2.0 inch outside diameter and hammers less than 220 lbs. SPT source levels were 167 dB peak, 140 db SEL, and 154 dB RMS. The transmission loss coefficient was 15, the activity duration was 1 hour and the number of pulses in one hour was 3,600. This resulted in a Level B distance of 4.0 meters and Level distance of 0.3 meters for phocid pinnipeds and 0.1 for otariid pinnipeds based on the 2024 draft user spreadsheet. To be very conservative since we used SPT source data but will employ an LPT on site, we proposed to use a Level B distance of 20 meters and a Level A distance of 1.0 meters for both phocid and otariids.

Dialogue with NMFS staff after the IHA application was initially submitted led to a revision of the reference data for underwater noise. Data from Huang et al. 2023 was used to calculate revised distances and these data are summarized in Table 5-4.

A summary of the planned activities is shown in Table 5-3. Isopleths are summarized in Table 5-5.with isopleths shown for species that are not included in the IHA application (i.e., cetaceans). Take is not requested for cetaceans due to the small isopleths for this

project and based on lack of observations of these marine mammals near shore. Similarly, take is not requested for Steller sea lions because the zones are manageable to monitor from a combination of various shore and vessel-based stations and because of infrequent sightings in the area. Geotechnical survey operations will be shut down when any marine mammal other than a northern fur seal or harbor seal is close to entering the Level B zone for this project to avoid unauthorized take. Shutdown zones are presented in Table 5-6.

Table 5-3. Summary of Planned Activities

Activity Type	Total Holes	Holes/day	Duration per hole (min)	Strikes per bore hole	Strikes or minutes per day
Borehole Drilling (Vibratory)	15	1	540	N/A	540
LPT (Impact)			60	3,600	3,600

Table 5-4. Estimates of Mean Underwater Sound Levels Generated during Geotechnical Surveys

Activity	dB rms	dB SEL	dB Peak	TL	Reference Range	Literature Sources
Borehole Drilling (Vibratory)	155.9	N/A	N/A	15	1	Huang et al., 2023
LPT (Impact)	197	182	213			

Table 5-5. Level A and Level B harassment isopleths (m) and associated areas from geotechnical surveys

Activity	LF	HF	VHF	PW	OW	Level B
Borehole Drilling (Vibratory)	1.8	0.7	1.5	2.3	0.8	247
LPT (Impact)	200.5	25.6	310.2	178.1	66.4	293

Table 5-6. Proposed Shutdown zones

Activity	Shutdown Zones (m)					
	LF	HF	VHF	PW	OW	
					NOFS	Other OW
Drilling/Coring (Vibratory)	**300**	**300**	**300**	**10**	**10**	**300**
LPT (impact)	**400**	**400**	**400**	**200**	**100**	**400**

6.0 Take Estimates for Marine Mammals

6.1 Estimated Take

Incidental take is estimated for each species considering the following:

1. Acoustic thresholds above which NMFS believes marine mammals will be behaviorally harassed or incur some degree of permanent hearing impairment;
2. The size of the action area (the area of water that will be ensonified above acoustic thresholds in a day);
3. Number of marine mammals that could be exposed per day multiplied by the number or days of activity.

6.2 Estimated Take for Northern Fur Seals

Since the geotechnical survey could occur anytime between mid-April and mid-June 2025, the worst-case numbers from this period (i.e., June 2024 observations) were used. Take estimates have been updated from the initial application due to changes is the size of the Level A and B zones due to a change in the reference literature. Also, discussions with NMFS biologists have led us to include a large number of fur seals that spend much of their time on the beach below the rookery into the take estimate. Accordingly, the Level B estimate has been revised to 13,465 northern fur seals. The Level A zone was calculated using the following process:

- The area of largest level B zone (293 m) is 0.27 km^2
- The area of LPT Level A harassment zone (67 m) is 0.014
- The area of the proposed shutdown zone (50 m) is 0.007
- Thus , the Level A impact area (the LPT Level A zone - the shutdown zone) = 0.007

- Proportional comparison of the level A impact area to the largest Level B zone is 0.026
- Multiply the ratio above (0.026) to total take by Level B harassment estimate (~13,500) = 351 takes by Level A harassment.
- Since LPT activities are planned 1 out of 10 construction hours, multiply 351 by 10% = 35 takes by Level A harassment.

6.3 Estimated Take for Harbor Seals

Since geotechnical surveys could occur anytime between mid-April and mid-June 2025, the worst-case numbers from this period (i.e., April 2024 observations) were used. Take estimates have been updated from the initial application due to changes is the size of the Level B zones due to a change in the reference literature. The updated Level B take estimate for harbor seals is 120.

6.4 All Marine Mammal Take Requested

The IHA analysis for the St. George geotechnical survey predicts the following Level A and Level B takes under the MMPA (Table 6-1). See *Appendix B: Summary of Marine Mammals Sighting Data* for further information.

Table 6-1. St. George geotechnical survey take estimates and percent of stock.

Species	Stock	Level A harassment	Level B harassment	Take as percentage of Stock Abundance
Harbor Seal	Pribilof	0	120	[1]52%
Northern Fur Seal	E. Pacific	35	13,465	2%
Steller Sea Lion	Western DPS	0	0	0
Killer Whale	Eastern North Pacific Alaska Resident	0	0	0
	Eastern North Pacific Gulf of Alaska, Aleutian Islands and Bering Sea Transient	0	0	0

[1]These numbers represent the estimated incidents of take, not the number of individuals taken. It is highly likely that only a relatively small subset of these harbor seal would be harassed by project activities, as harbor seal primarily occur to the west on the far side of St. George Island.

7.0 Anticipated Impact of the Activity

USACE is requesting authorization for Level B take of marine mammals. Table 6-1 shows the take requests in relation to the overall stock size of each species. These numbers represent the estimated incidents of take, not the number of individuals taken. The proposed action has the potential to impact marine mammals by increasing the ambient noise in and around the action area to levels above the Level B harassment threshold. The project also has the potential to increase the likelihood of vessel interactions with marine mammals.

7.1 Noise

At the North Anchorage proposed action area, there is relatively little anthropogenically-generated noise. Other than an occasional pick-up truck or four-wheeler passing along the road to the eastern margin of Village Cove, there are no intermittent or continually operating machines or noise-generating facilities in its immediate surrounding areas. Wave action and wind act in concert as the most attenuating sources of ambient noise in the area. During the nesting season (spring and summer), the cacophony of thousands of colonial nesting seabirds flying overhead and echoing from the cliff faces combine with the nearshore breaking waves to compete with the attenuating effect of the constant wind for prevalence.

An increase in ambient noise levels from in-water geotechnical survey activities can affect marine mammals behaviorally. Auditory masking and TTS are the most likely negative hearing effects that may occur during geotechnical survey activities. Auditory masking is the partial or complete reduction of signal audibility by noise. This may affect the behavior of marine mammals in the project area due to the decrease in ability to hunt prey, avoid predators, and communicate (Southall et al., 2007).

The geotechnical survey has the potential to result in Level B harassment (i.e., behavioral harassment, TTS) of pinnipeds and cetaceans due to increased noise levels. Level B harassment is temporary in nature. Level A harassment (i.e., auditory injury, PTS) will be avoided by using mitigation measures. Level A Harassment zone are all 1 meter or less and shutdowns of such a small area are easy to monitor. Mitigation measures are discussed in *Section 11.0 Mitigation Measures to Protect Marine Mammals and Their Habitat*.

Threshold shifts, such as TTS, may occur during geotechnical survey activities due to the exposure of intense sounds for long periods. These threshold shifts could change a marine mammal's sound sensitivity to varying degrees depending on the intensity of the sound and the length of exposure to the sound. Moderate levels of underwater noise for relatively long duration can induce a TTS in marine mammals (Kastak et al., 2005). TTS is often referred to as auditory fatigue. It is recoverable hearing loss; meaning, hearing threshold can return to its pre-exposure value. Noise-caused physiological effects of TTS may include increased blood flow, reduced inner ear sensory hair cell sensitivity, displaced inner ear membranes, and residual middle-ear muscular activity. If there is not a complete recovery from the hearing threshold shift, the effect of noise is referred

to as PTS, an auditory injury. PTS is the irreversible reduction in sensitivity (or elevation in hearing threshold) due to damage or death of inner or outer cochlear hair cells often followed by retrograde neuronal losses and persistent chemical and metabolic cochlear abnormalities (Southall et al., 2007).

7.2 Vessel Interactions

A vessel will be used for the geotechnical survey – specifically during borehole drilling. The increase in vessel activity within the immediate action area will be temporary, and will be limited to the proposed borehole sites. No take is anticipated from vessel interactions, and collisions with marine mammals are unlikely given the slow speed of the vessel.

8.0 Anticipated Impacts on Subsistence Uses

8.1 Subsistence Hunting on St. George Island

Co-management of subsistence use of marine mammals in Alaska is a key provision of the MMPA. Under authority of Section 119 of the MMPA, NMFS and USFWS may enter into cooperative agreements with Alaska Native organizations to conserve marine mammals and provide co-management of subsistence use by Alaska Natives. On St. George Island, the subsistence harvest of marine mammals is currently co-managed by NMFS and the Traditional Council of St. George Island.

8.2 Impact on Subsistence Hunting

The geotechnical survey activities are not likely to adversely impact the availability of any marine mammal species that are commonly harvested for subsistence on St. George Island. To minimize the impacts on marine mammals within the area, the geotechnical survey is anticipated to be completed during the months of April and May, and end before 15 June 2025.

On St. George Island, northern fur seals are the main marine mammal species harvested for subsistence. The season to harvest of northern fur seal does not open until 24 June, and occurs from August through November. This season falls outside of the geotechnical survey window.

The subsistence harvest of Steller sea lion occurs in the winter and spring, with a greater hunting effort during the spring. The hunting location is along North Rookery, but is concentrated along the middle of the North Rookery and the western end near the old quarry site. Geotechnical survey activity would not be visible from these preferred Steller sea lion hunting areas, and the Level B isopleths do not extend far enough to affect these hunting areas.

Harbor seals are not sought after for subsistence on St. George Island.

Telephone and email conversations with the Mayor of St. George on 29 January 2025 established that there are no subsistence hunting activities taking place for marine mammals during the 15 April to 15 June time window. The Mayor is a local subsistence hunter and is well connected with the subsistence hunting timelines and locations of the very small number of other marine mammal subsistence hunters on St. George Island.

9.0 Anticipated Impacts on Habitat

9.1 Marine Mammal Avoidance or Abandonment

Anticipated noise level increase from the geotechnical survey activities could cause marine mammals to avoid the area. The elevated noise level is the primary reason that marine mammals would leave the project area. However, temporary avoidance is more likely than abandonment given observations of fur seals to human presence in the area outside of the rookery. Some marine mammals (i.e., harbor seals) may even be attracted to the area of activity, perhaps out of curiosity, despite the background noise levels.

9.2 Impact to Physical Habitat

Impacts to the physical habitat are expected to be minimal. 15 boreholes will be drilled in the proposed harbor area. The small holes would fill in naturally with sediment after the drill stem is removed.

9.3 Critical Habitat

No species for which take has been requested are ESA-listed. However, Steller sea lions are sometimes present in the area; and the area surrounding all of the Pribilof Islands is designated as Critical Habitat for Steller sea lion. As stated in *Section 9.2 Impact to Physical Habitat*, the impacts on habitat are insignificant as it would involve drilling 15 small boreholes which would fill in naturally. Habitat impacts would likely not be detectable after the first storm due to wave action and sediment transport.

10.0 Anticipated Effects of Habitat Impacts on Marine Mammals

The impacts of drilling 15 small boreholes are not expected to affect marine mammal use of the habitat. Northern fur seals feed far offshore and do not forage in the project area. The benthic habitat would minimally and temporarily be altered around 15 holes that are only a few inches in diameter. This would not affect the ability for sea lions or harbor seals to utilize the area once drilling is complete. The benthic habitat in the area is already subject to larger scale changes by sediment transport from frequent storm events, so the minor small scale impacts of 15 small boreholes is expected to be insignificant.

11.0 Mitigation Measures to Protect Marine Mammals and Their Habitat

Mitigation measures and construction techniques will be employed to minimize effects to marine mammal species and habitat. These measures are described below and presented in detail in the 4MP (Appendix A).

11.1 Mitigation Measures Designed to Reduce Project Impacts

The geotechnical survey is designed to drill the minimum number of holes needed to characterize the local geology of the harbor footprint.

11.2 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 Oil Pollution Emergency Plan for oil spill prevention and response.
- Fuel hoses, oil drums, oil or fuel transfer valves and fittings, and similar equipment would be checked regularly for drips or leaks and maintained and stored properly to prevent spills.
- Oil booms will be readily available for oil/fuel, or another containment should a release occur.
- All chemicals and petroleum products will be properly stored to prevent spills.
- No petroleum products, chemicals, or other deleterious materials will be allowed to enter surface waters.

11.3 Mitigation and Monitoring to Reduce Impacts to Marine Mammals

- The contractor is required to conduct briefings for construction supervisors and crews and the monitoring team prior to the start of all drilling and LPT. Upon hiring new personnel, project staff will explain responsibilities, communication procedures, the marine mammal monitoring protocol, and operational procedures.
- PSOs will be USACE biologists familiar with the species in the area. The lead PSO has extensive experience as a lead PSO, and will train and oversee the supporting PSO staff.
- Marine mammal monitoring must take place starting 30 minutes prior to initiation of drilling/LPT and end 30 minutes after completion. Survey activities may commence when observers have declared the shutdown zone clear of marine mammals. In the event of a delay or shutdown of activity resulting from marine mammals in the shutdown zone, their behavior must be monitored and documented until they leave of their own volition, at which point the activity may begin or resume. As the Level A zone is only 1-meter in size this process is simpler than most marine construction projects.
- Geotechnical survey activities must be halted or delayed if a marine mammal is observed entering or within an established shutdown zone. 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.

- Geophysical surveys 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. 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.

11.4 Shutdown and Monitoring Zones

USACE is requesting Level A and B takes described in detail in *Section 6.4 All Marine Mammal Take Requested*. USACE is not requesting take for any other marine mammals. Shutdown and monitoring zones are described in Table 5-5 and Table 5-6 and will be detailed along with monitoring and shutdown protocols in the Marine Mammal Monitoring and Mitigation Plan.

12.0 Mitigation Measures to Protect Subsistence Uses

This section is not applicable to the proposed geotechnical survey. The geotechnical survey will take place in waters south of 60˚N latitude, as St. George Island is located at 56˚N latitude. Timing of this geotechnical survey is scheduled so that it is complete prior to the northern fur seal subsistence harvest. The location of the geotechnical survey spatially avoids areas where Steller sea lions are sometimes harvested.

13.0 Monitoring and Reporting

13.1 Monitoring Plan

Monitoring measures for the project's potential impacts on marine mammals are discussed briefly in Section 11.3 Mitigation and Monitoring to Reduce Impacts to Marine Mammals and Section 11.4 Shutdown and Monitoring Zones. A more in depth discussion can be found in the 4MP (Appendix A).

13.2 Reporting

Reporting procedures are in discussed in this section and in the 4MP (Appendix A). A comprehensive marine mammal monitoring report documenting marine mammal observations will be submitted to NMFS at the end of the in-water work season. A draft report will be submitted to NMFS within 90 calendar days of the end of the in-water work period. The draft report will include marine mammal observations (e.g., pre-activity, during-activity, and post-activity) during survey days. A final comprehensive report will be prepared and submitted to NMFS within 30 calendar days following resolution of comments on the draft report from NMFS. The reports shall include at a minimum:

- General data:
  - Date and time of activity
  - Water conditions (e.g., sea-state)
  - Weather conditions (e.g., percent cover, percent glare, visibility)
- Specific pile driving data:
  - Description of activity being conducted (e.g., pile locations, pile size and type)
  - Description of drilling and LPT times (onset and completion)
- Pre-activity observational survey-specific data:
  - Date and time survey is initiated and terminated
  - Description of any observable marine mammals and their behavior in the immediate area during monitoring
  - Times when surveying is delayed due to presence of marine mammals within shutdown zones

- During-activity observational survey-specific data:
    - Description of any observable marine mammal behavior within monitoring zones or in the immediate area surrounding the monitoring zones, including the following:
        - Description of any observable marine mammal behavior within monitoring zones or in the immediate area surrounding the monitoring zones, including the following:
        - Distance from marine mammal to sound source
        - Reason why/why not shutdown implemented
        - If a shutdown was implemented
        - Behavioral reactions noted and if they occurred before or after implementation of the shutdown
        - The distance from marine mammal to sound source at the time of the shutdown
- Post-activity observational survey-specific data:
    - Results, including the following:
    - The detections and behavioral reactions of marine mammals
    - The species and numbers observed
    - Sighting rates and distances
    - Refined exposure estimate based on the number of marine mammals observed (may be reported as a rate of take, which is the number of marine mammals per hour or per day, or using some other appropriate metric).

14.0 Suggested Means of Cooperation

The data recorded during the geotechnical survey will be provided to NMFS in monitoring reports. These reports will provide information on the usage of the site by marine mammals in an area. The monitoring data will inform NMFS and future permit applicants about the behavior and adaptability of pinnipeds and cetaceans for future projects of a similar nature.

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16.0 Appendix A

Marine Mammal Monitoring and Mitigation Plan (4MP)

17.0 Appendix B

Summary of Marine Mammals Sighting Data

Marine mammal surveys were conducted in April and June 2025 to help derive numbers to support take requests. Only one of three survey days in April included observations of marine mammals on land due to our assumptions of how take would be calculated. More effort was placed on land observations beginning in June. Weather delays resulted in decreased survey effort in June.

Date	Clock hours of observations	Total Hours of Observations	In-water Observation Totals			On land Observation Totals*		
			NFS	Harbor Seal	SSL	NFS	Harbor Seal	SSL
23-Apr-24	1430-2200	7.5	16	6	3	no data	no data	no data
24-Apr-24	0815-2230	14.25	22	8	11	126	0	0
25-Apr-24	0830-2345	15.25	32	3	14	no data	no data	no data
14-Jun-24	1800-0000	6	98	0	5	245	0	0
15-Jun-24	0900-2345	13.75	110	0	4	300	0	0

* on land observations were estimated on a single daily point could in the afternoon when most were expected to be on shore instead of in the water