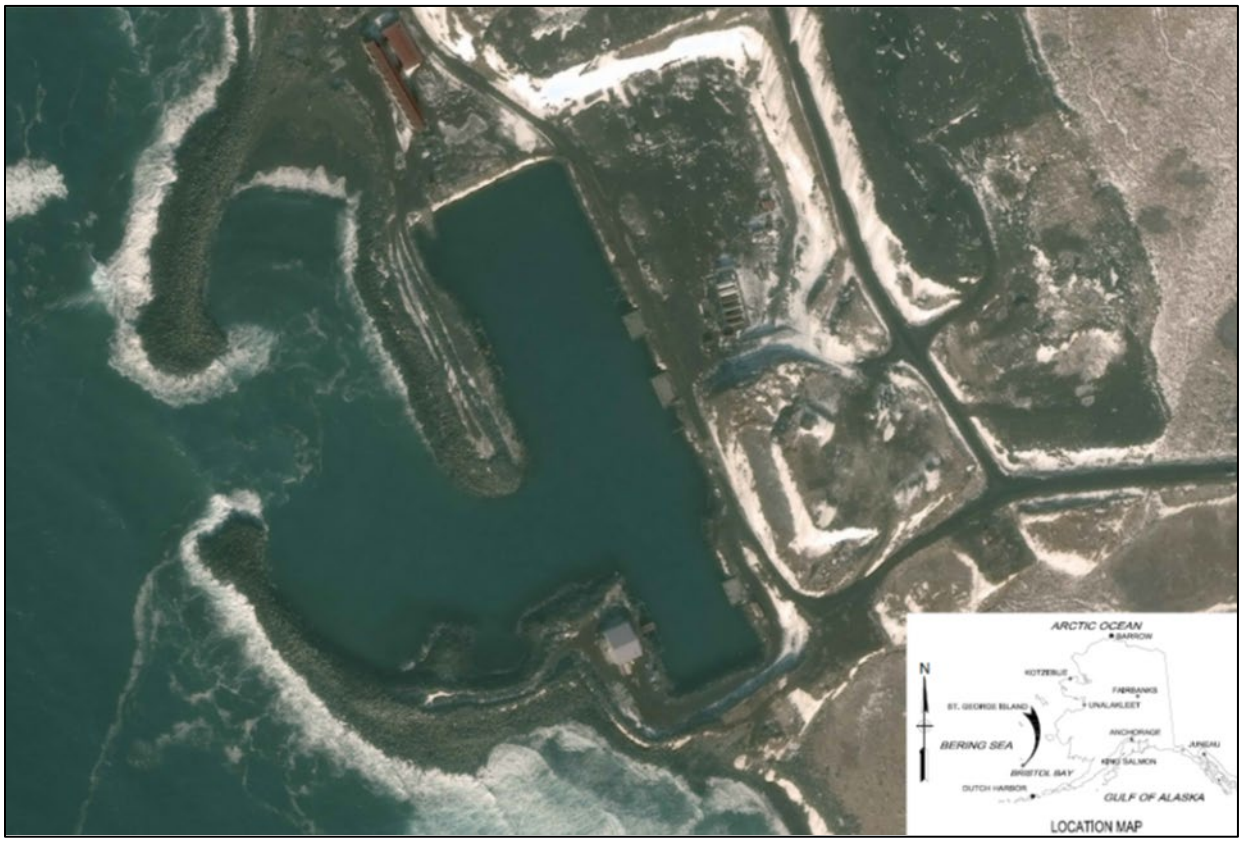
US Army Corps
of Engineers®

Navigation Improvements
Feasibility Study
St. George, Alaska



December 2019

Table of Contents

List of Tables

List of Figures

APPENDICES

1.0 INTRODUCTION

The U.S. Army Corps of Engineers (USACE), Alaska District (POA), Pacific Ocean Division (POD), has prepared this Environmental Assessment (EA), to evaluate the potential impacts of constructing a small boat harbor on the north side of Saint George Island, Alaska. This EA has been prepared in accordance with the National Environmental Policy Act of 1969 and the Council on Environmental Quality's Regulations (40 CFR 1500-1508), as reflected in the USACE Engineering Regulation ER 200-2-2. This EA provides sufficient information on the potential adverse and beneficial environmental effects to allow the District Commander, U.S. Army Corps of Engineers, POA District to make an informed decision on the appropriateness of an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI).

1.1 Background

St. George is the southernmost island of the Pribilof Islands group. It is located in the southeastern Bering Sea and shares the name with the Island's only community (Figure 1). The Island was not inhabited prior to Russian expansion into Alaska. In 1787, the Russian fur-hunting companies established seasonal sealing camps along the coasts of St. George and conscripted labor from the Unangax̂ population from a number of islands in the Aleutian chain, and resettled them on the Island (Eldridge 2016). The United States purchased the Pribilof Islands from Russia in 1867, after which St. George and the fur seal industry were managed by the Alaska Commercial Company (ACC) under the authority of the United States Treasury. Since the cessation of commercial seal harvesting in 1973, the community of St. George has been attempting to expand and diversify its economic base, concentrating on the groundfish and shellfish industries. Currently, a small boat harbor exists at Zapadni Bay on St. George Island; however, it is operationally limited. It has not enabled the St. George community to establish a viable fishery-based economy. The current conditions in the harbor are unsafe due to wave climate in the harbor entrance, seiche conditions within the inner basin, and degradation and overtopping of the existing breakwaters. These unsafe conditions limit the use of the harbor for potential users.

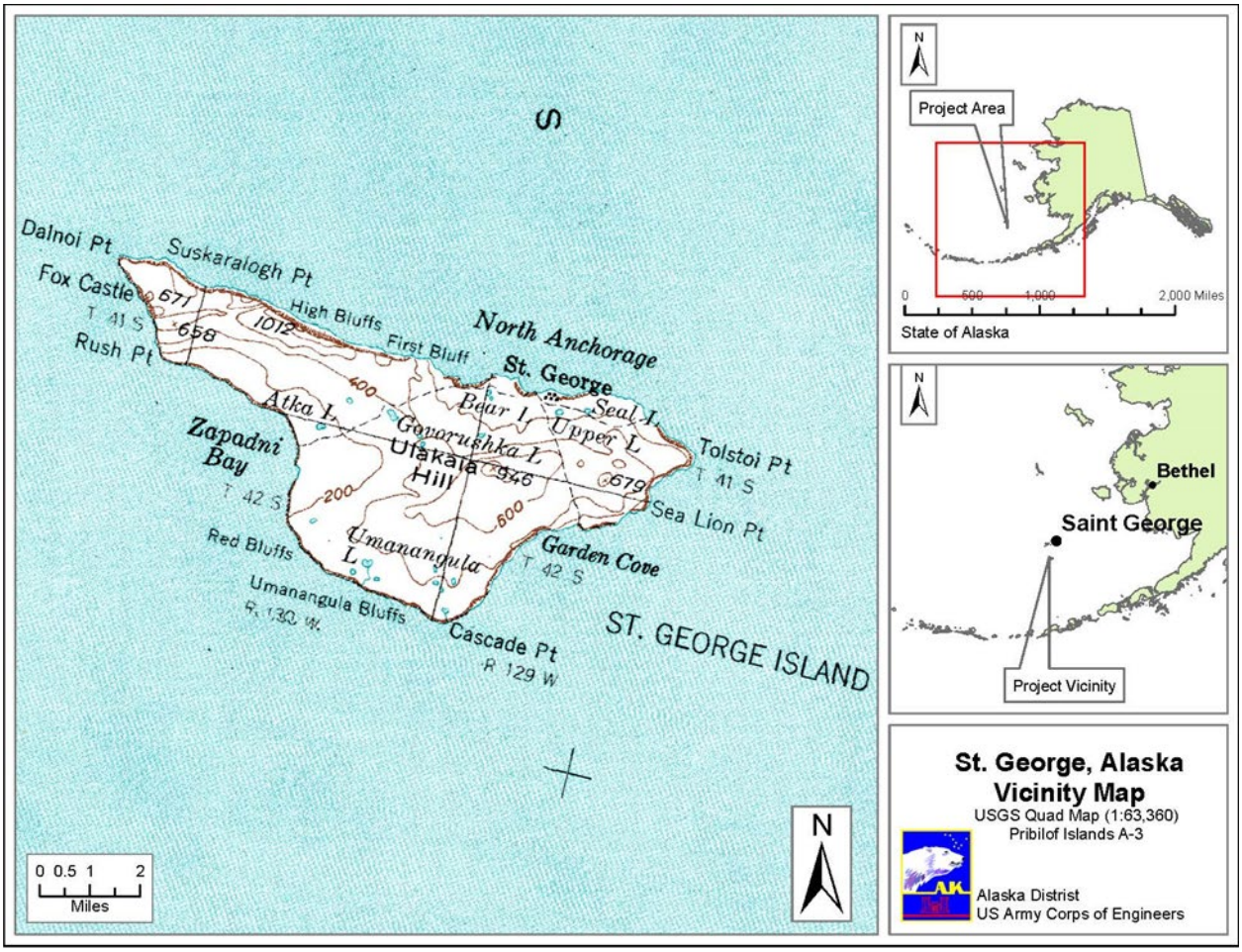


Figure 1 Project Location – St. George Island, Alaska

1.2 Purpose and Need for the Proposed Action

The purpose of the proposed action is to increase the safe accessibility of marine navigation to the community of St. George, Alaska. The need for the project is to reduce hazards to provide better safe navigation of subsistence vessels, fuel barges, cargo vessels, and a limited commercial fleet, all of which are critical to the long term viability of the mixed subsistence-cash economy of St. George.

1.3 Authorizing Federal Laws, Executive Orders, and Supporting Agency Guidance

1.3.1 USACE Authorities

The General Investigations study to which this EA applies is being conducted under authority granted by Section 4010 of the Water Resources Development Act (WRDA) of 2007, Public Law 110-114 which authorizes a study to determine the feasibility of providing navigation improvements at St. George, Alaska.

The proposed action is justified by Section 2006 of WRDA, 2007, Remote and Subsistence Harbors, as modified by Section 2104 of the Water Resources Reform and Development Act of 2014 (WRRDA 2014) and further modified by Section 1105 of WRDA 2016. The authority specifically states that in conducting a study of harbor and navigation improvements the Secretary may recommend a project without demonstrating that the improvements are justified solely by National Economic Development (NED) benefits, if the Secretary determines that the improvements meet specific criteria detailed in the authority.

Additionally, Section 1322 of the WRDA of 2016, (b)(2) Expedited Completion of Feasibility Studies, authorizes the Secretary to move directly into preconstruction engineering and design (PED) if the Secretary of the Army determines in a report that a project is justified. Implementation guidance was published on 12 February 2018.

2.0 ALTERNATIVES

A September 2018 Preliminary Feasibility Report (FR) identified ten alternatives to address navigation inefficiencies at St. George Island, with seven located at the existing Zapadni Bay harbor site and three at North Anchorage (which does not have any existing marine infrastructure). Based on a Cost Effectiveness/Incremental Cost Analysis, the Recommended Plan was identified as Alternative N-3, a new harbor at the North Anchorage site. An additional alternative, Alternative N-4 at the North Anchorage site to assess barge access only, was added to the final array of alternatives. The Zapadni Bay alternatives were removed from further analysis because none of the alternatives increased access days to the existing harbor. The four action alternatives at the North Anchorage site, in addition to a No-Action Alternative, were considered as the final array (see Figure 1). The North Anchorage alternatives are designed with different project depths as well as entrance and maneuvering channel alignments to accommodate differing portions of the vessel fleet anticipated to utilize the harbor. The proposed action area includes the footprint of breakwater and dredged channels, the dredged material placement site, and the in-water ensonified footprint (Figures 2 and 3). The in-water footprint is larger than the physical footprint and is defined by the ensonified and barge operational areas, drilling, confined underwater blasting, and material placement activities. The September 2018 FR is located on the Alaska District website, https://www.poa.usace.army.mil/Library/Reports-and-Studies/.

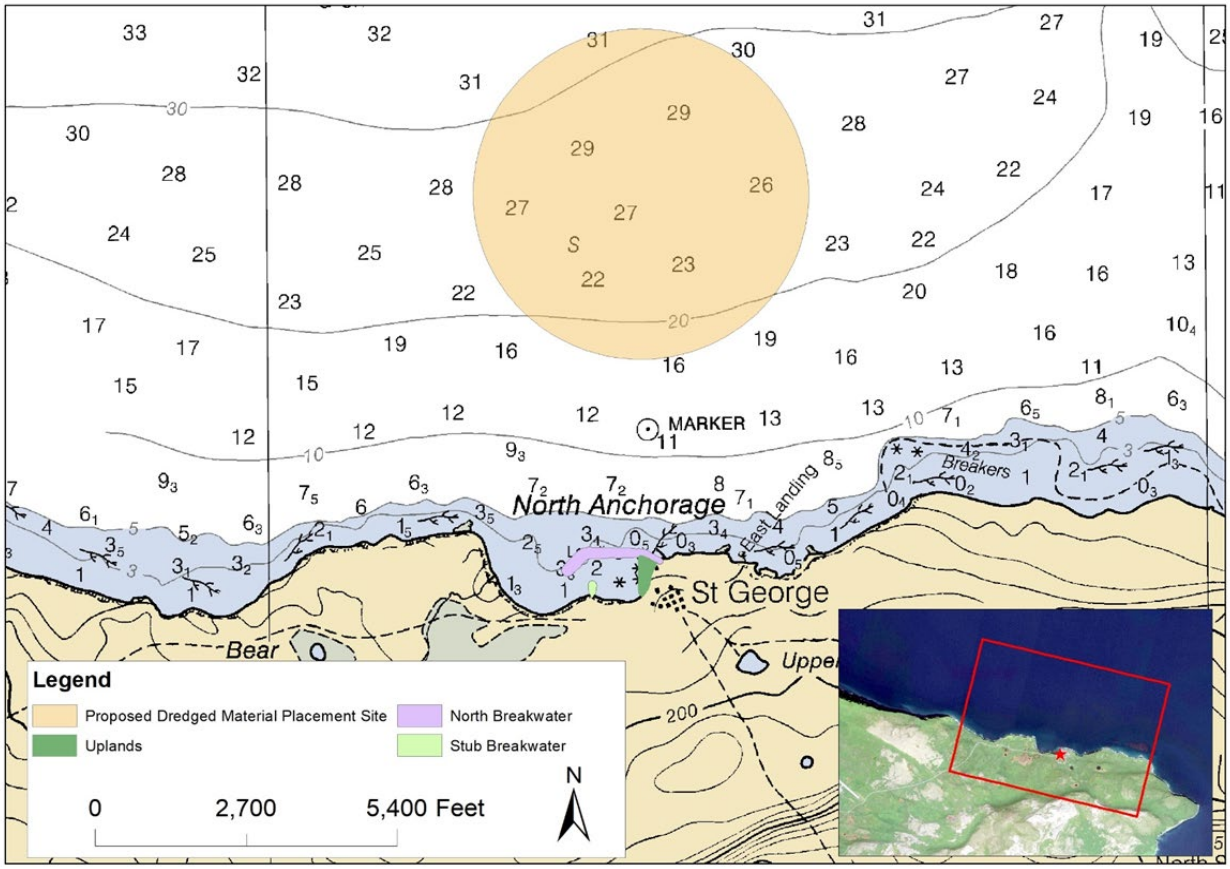


Figure 2. Project Element Footprints

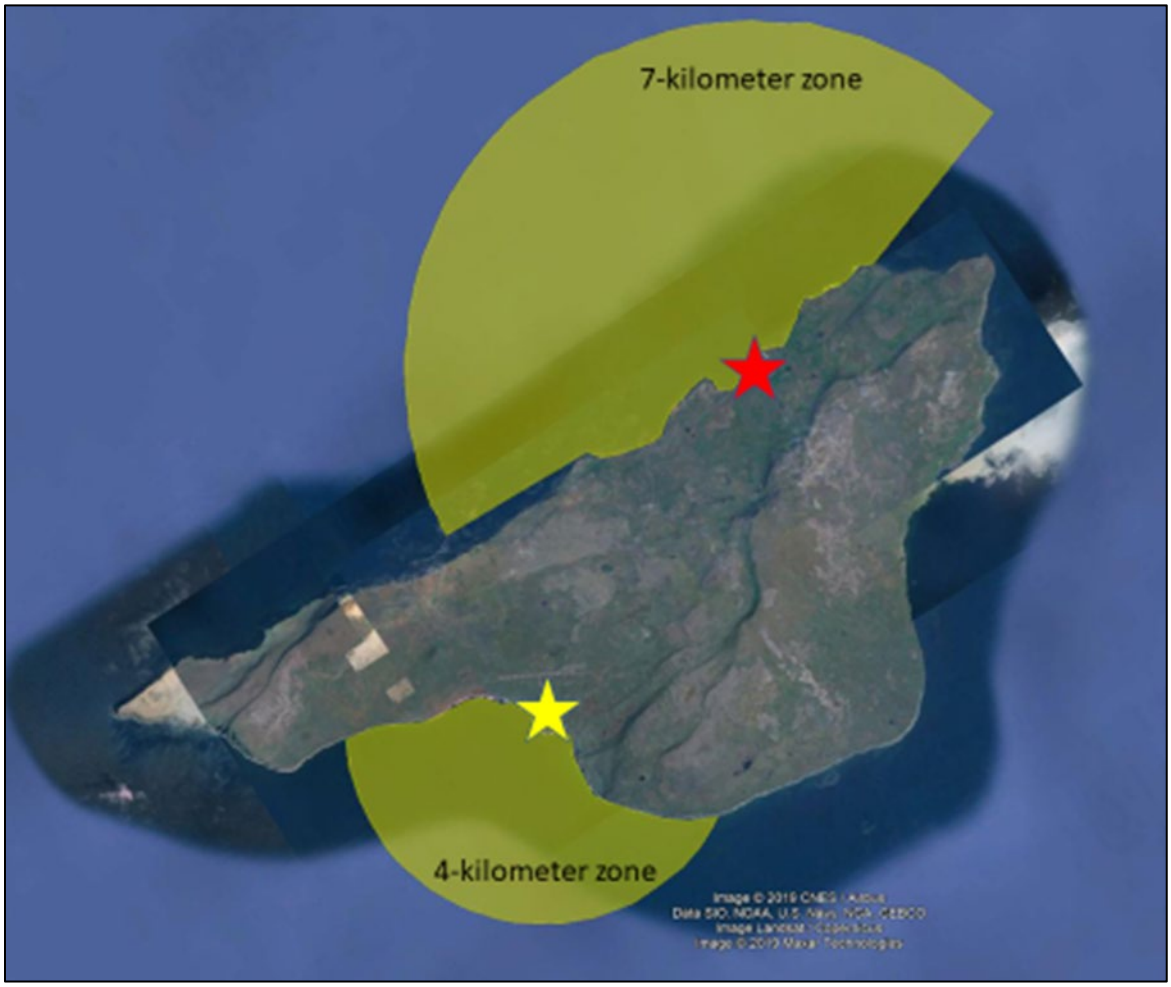


Figure 3. In-water Ensonified Footprints

2.1 No-Action Alternative

Under the No-Action Alternative, a new harbor would not be constructed at the North Anchorage site. Use of the Zapadni Bay Harbor would continue (Figure 4.). Adverse wave and seiche conditions would continue to limit access to, and the utility of the existing harbor. Because fuel barge and cargo vessel access would remain at the current reduced levels, freight delivery costs would continue to be expensive. Similarly, harbor access by fishery fleet vessels would continue to be limited, and the existing conditions would limit the ability to safely operate an onshore fish processing facility at the harbor or a floating facility within the harbor. Furthermore, periodic damage to the breakwaters would likely continue. Without a safe harbor to support a viable marine-resource economy to support the local mixed, subsistence-cash economy, St. George residents would likely continue to choose to relocate to other communities, threatening the long-term viability of the community.

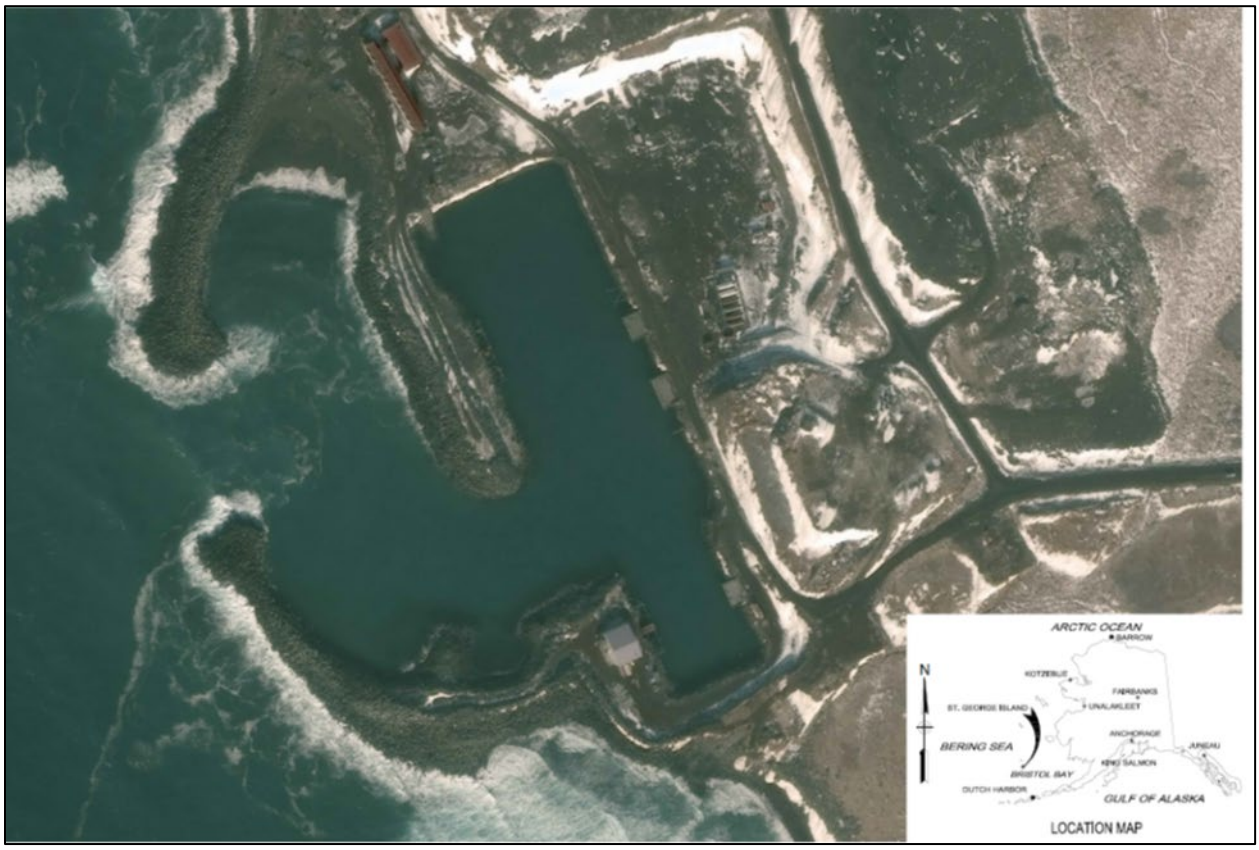


Figure 4. Existing Harbor Site, Zapadni Harbor, site of the No-Action Alternative

2.2 Action Alternative N-3, All Vessels, 85% of Crabber Fleet (Agency's Preferred Alternative)

Alternative N-3, the proposed action, (Figure 5) consists of a 450-foot wide by 550-foot-long mooring basin dredged to -20 feet mean lower low water (MLLW) protected by a 1,731-foot-long north breakwater and a 250-foot-long stub breakwater at the west edge of the basin. The basin connects to the Bering Sea with a 250-foot wide navigation channel dredged to -25 feet MLLW. Dredging the channel and basin for this alternative would require the removal of approximately 430,000 cubic yards of material. Inner harbor facilities include 3.55 acres of uplands area filled to +10 feet MLLW with a 300-foot-long pile-supported dock and a concrete boat launch ramp to -5 feet MLLW for full tide launching access. Under this alternative, safe access and moorage days increased by 179 days.

The Alaska District is evaluating the construction features and placement of dredged materials in waters of the United States under the Clean Water Act 404(b)1 Guidelines for Specification of Disposal Sites for Dredged or Fill Material. The dredge material would be used to construct a reef offshore of Saint George Island. The dredged material would be transported about one mile offshore and discharged in waters of the United States to construct a rocky reef intended to enhance blue king crab (BKC) habitat in the

area. The use of the material beneficially is evaluated under the Clean Water Act and would not represent a disposal activity. The entire volume of dredged material would likely be used beneficially; however, a portion (up to 45,000 CY) may be used for upland fill.

Figure 5. Alternative N-3, All Vessels, 85% Crabber Fleet Schematic

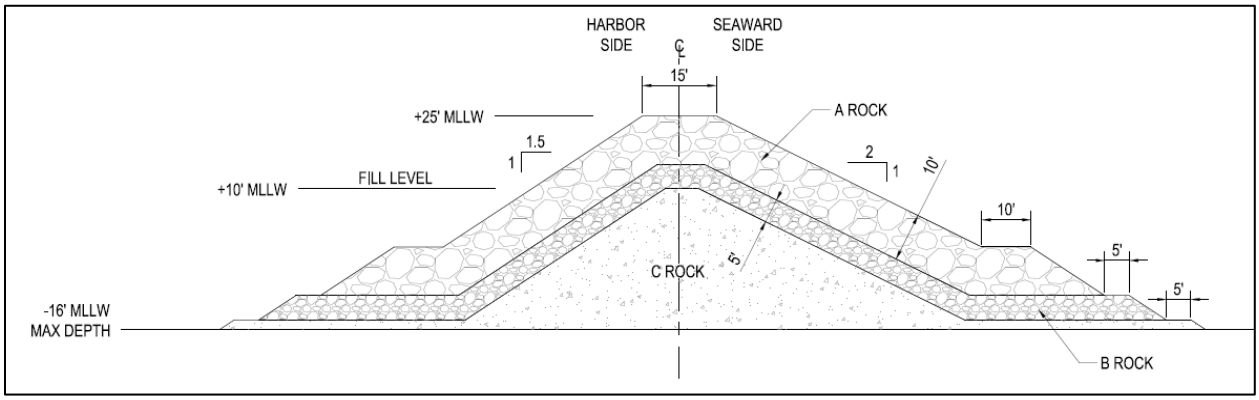


Figure 6. Typical Breakwater Cross Section for Alternatives N-3, N-2, N-1, and N-4

2.3 Action Alternative N-2, Fuel Barge and 25% of Crabber Fleet

Alternative N-2 (Figure 7) consists of a 450-foot wide by 550-foot-long mooring basin dredged to -16 feet MLLW protected by a 1,731-foot-long north breakwater and a 250-foot-long stub breakwater at the west edge of the basin. The basin connects to the Bering Sea with a 250-foot wide navigation channel dredged to -18 feet MLLW. Dredging the channel and basin for this alternative would require the removal of approximately 230,000 cubic yards of material. Inner harbor facilities include 3.55 acres of uplands area filled to +10 feet MLLW with a 300-foot-long pile-supported dock and a concrete boat launch ramp to -5 feet MLLW for full tide launching access. Under this alternative, safe access and moorage days increased by 149 days.

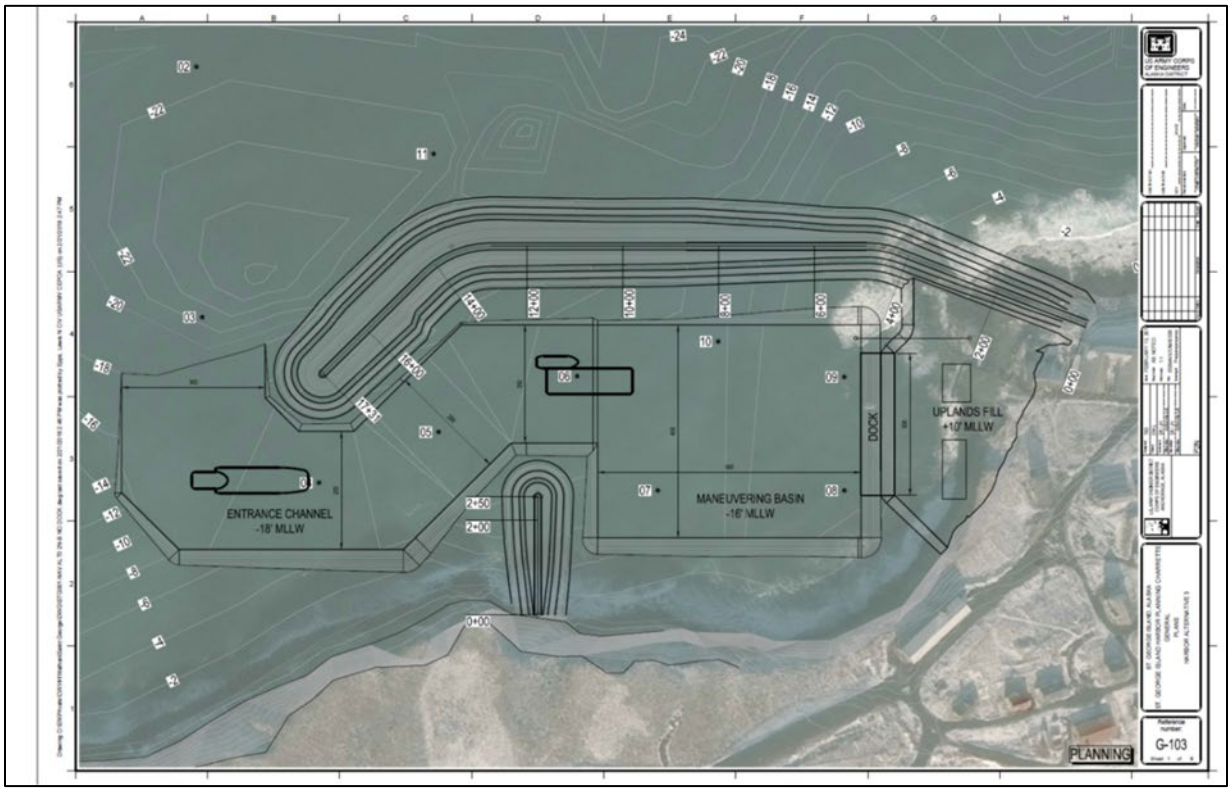


Figure 7. Alternative N-2, Fuel Barge and 25% of Crabber Fleet Schematic

2.4 Action Alternative N-1, Local Subsistence Fleet

Alternative N-1 (Figure 8) is a subsistence vessel launch harbor with a 775-foot long breakwater, a 700-foot long entrance channel dredged to -10 feet MLLW with a launch zone dredged to -8 feet MLLW. Dredging the channel for this alternative requires removal of approximately 10,000 cubic yards of material. Subsistence vessels access the harbor through concrete launch ramp to -5 feet MLLW providing full tide access for launching, and approximately 3.55 acres of uplands support vessel preparation and launching operations. Under this alternative, safe access and moorage days increased by 38 days.

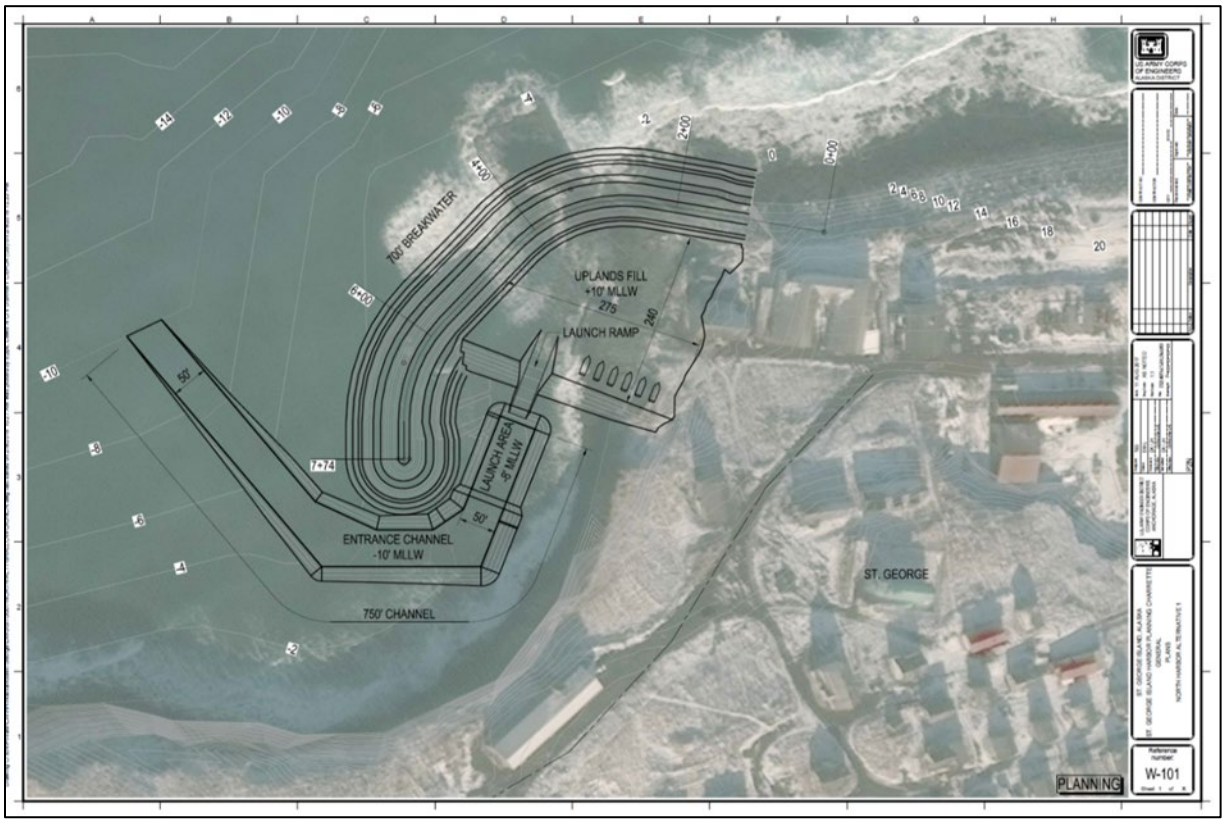


Figure 8. Alternative N-1, Local Subsistence Fleet Schematic

2.5 Action Alternative N-4, Subsistence and Fuel Barge

Alternative N-4 (Figure 9) is a subsistence vessel launch harbor with a 1,100-foot long breakwater; entrance channel dredged to -18 feet MLLW with a maneuvering basin dredged -16 feet MLLW. Dredging the channel and basin for this alternative would require the removal of approximately 150,000 cubic yards of material. Under this alternative, safe access and moorage days increased by 127 days.

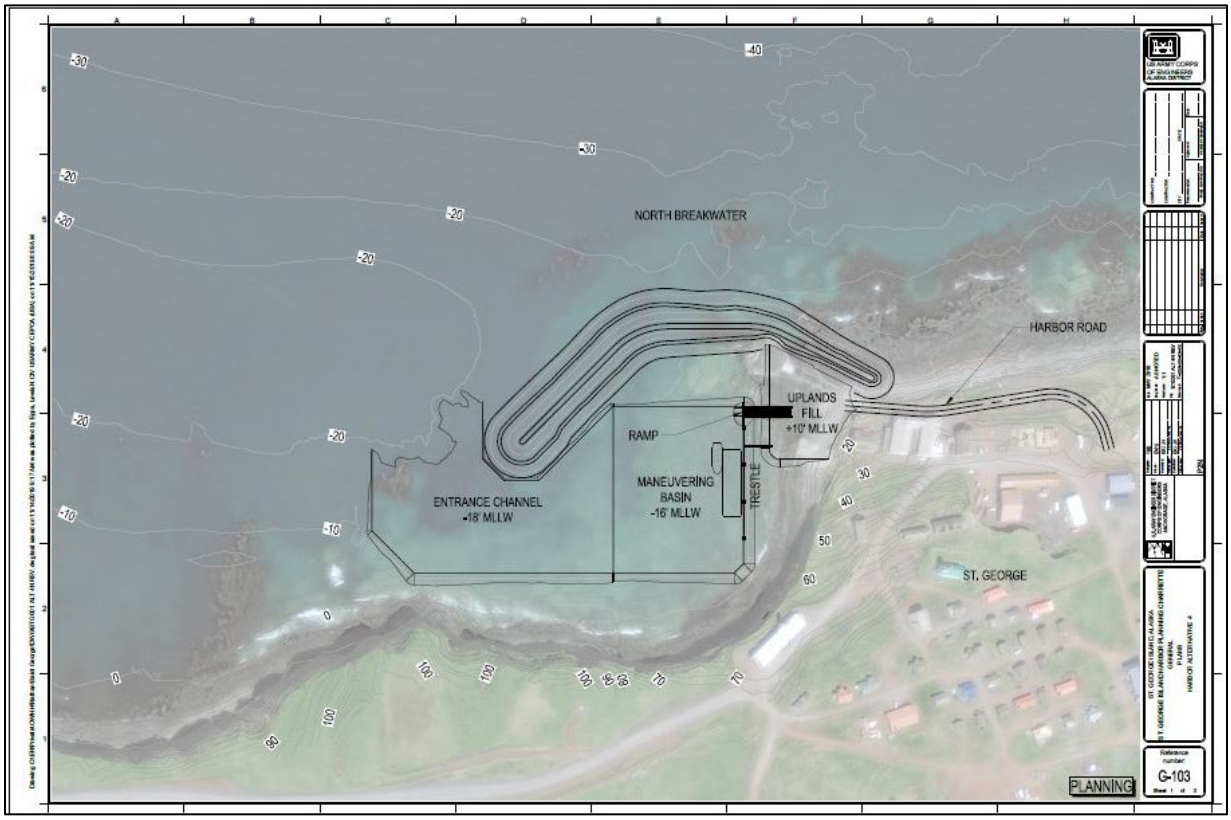


Figure 9. Alternative N-4, Subsistence and Fuel Barge Schematic

2.6 Alternatives Considered and Dismissed from Further Analysis

This section describes alternatives considered in the preliminary phases of the study and the rationale for eliminating them from further analysis. Alternatives were evaluated based on primarily two metrics: change in safe access days to the harbor by three-vessel classes (subsistence fleet, fishing fleet, and fuel barge) and change in days vessels could moor in the harbor. Discussion on these metrics can be found in section 5.6 of the Feasibility Report (FR).

2.6.1 Alternative Z-1

Alternative Z-1 includes constructing an 800 foot long extension to the existing south breakwater, a 500 foot jetty off the existing north breakwater, three 1,000 foot long submerged reefs, a new inner breakwater, a spending beach sloped at 10H:1V, a new navigation channel with a depth of -22 feet MLLW, and a new turning basin with a depth of -20 feet MLLW. This alternative re-routes vessel traffic to the north end of the harbor in an attempt to reduce the occurrence of storm waves entering the harbor from the southwest direction. Under this alternative, moorable days would decrease by more than 64 days from the existing harbor. There would be no increase in access days for any vessel class.

2.6.2 Alternative Z-2

Alternative Z-2 includes constructing a 1,050 foot long cap and extension to the existing south breakwater, a 400 foot jetty north of the new breakwater, a new navigation

channel with a depth of -22 feet MLLW, and a new turning basin with a depth of -20 feet MLLW. The existing breakwater would be demolished in this alternative. Under this alternative moorable days would decrease by 31 days from the existing harbor. There would also be no increase in access days for any vessel class.

2.6.3 Alternative Z-3

Alternative Z-3 includes constructing a new 700 foot long by 500 foot wide mooring basin to the northeast of the existing harbor. The new basin would be connected to the existing harbor by a 200 foot wide navigation channel. A new mooring basin would be excavated at the north end of the existing inner basin, and the new inner basin would be sloped at 5H:1V. Excavation quantities for this alternative would be approximately 2 million cubic yards of material. The existing harbor breakwaters would remain in their existing condition, and the existing channel would be widened to a minimum of 200 feet at the head of the inner breakwater and dredged to a depth of -22 feet MLLW. Under this alternative, moorable days would increase by 13 days from the existing harbor, but there would be no increase in access days for any vessel class.

2.6.4 Alternative Z-4

Alternative Z-4 includes constructing 400 foot long jetties at the ends of the north and south existing breakwaters, a 500 foot inner north breakwater, and a north mooring basin with a depth of -10 feet MLLW. The existing harbor breakwaters would remain in their existing condition. Under this alternative, moorable days would decrease by five days from the existing harbor. There would also be no increase in access days for any vessel class.

2.6.5 Alternative Z-5

Alternative Z-5 includes demolishing the existing south breakwater and constructing a 3,000 foot long breakwater that would extend seaward (north) beyond existing north breakwater. A 300 foot long extension of the north breakwater would be constructed perpendicular to the new breakwater. New docks would be constructed on the inside of the new main breakwater with the entire basin enclosed by the new breakwaters being dredged to -22 feet MLLW. The back slope of the existing inner harbor would be filled at a 10H:1V slope to provide a spending beach in the new mooring basin. Under this alternative, moorable days would increase by 30 days from the existing harbor, but there would be no increase in access days for any vessel class.

2.6.6 Alternative Z-6

Alternative Z-6 adapts the original berm breakwater design of St. George Harbor to the current shoreline. The design includes the original design locations for the breakwater using a berm cross-section. This would entail complete removal of both existing North and South breakwaters to allow for the new construction. The existing harbor geometry was modified by adding spending beaches at a 1V:10H slope to both ends of the inner harbor basin. Dredge areas for entrance and outer basin maneuvering are designed to -22 ft. MLLW and -18 ft. MLLW respectively. There would still be seiche conditions in the harbor and no increase in access days for any vessel class.

2.6.7 Alternative Z-7

Alternative Z-7 includes constructing a new 900 foot radius semi-circular mooring basin into the eastern edge of the existing inner harbor. The side slope of the new basin would be 10H:1V to reduce reflection in the mooring area. Excavation of the new mooring basin included excavation to construct a road around its perimeter to allow vehicles to traverse the perimeter of the harbor. Excavation quantities for this alternative are approximately 6 million cubic yards of material. The existing harbor breakwaters would remain in their existing condition, and the existing channel would be widened to a minimum of 200 feet at the head of the inner breakwater and dredged to a depth of -22 feet MLLW. Under this alternative, moorable days would increase by 26 days from the existing harbor, but there would be no increase in access days for any vessel class.

3.0 AFFECTED ENVIRONMENT

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.

The Pribilofs are ecologically unique and colloquially referred to as "the Galapagos of the north" due to their rich fisheries, abundance of colonial seabirds, and northern Fur Seal Rookeries. 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.

St. George Island occurs at the western margin of Alaska's continental shelf, where maximum depths do not regularly exceed 420 feet. However, approximately 75 miles to the west-southwest, the water depth is greater than 18,000 feet. National Oceanic and Atmospheric Administration's (NOAA) Chart 16380 describes the physical characteristics of St. George Island's nearshore areas as rocky, and gradually increasing in depth from the shoreline to 150 to 270 feet 3 miles from the shore. While some pyroclastic tuffaceous and glacial materials are surficially evident, St. George Island is primarily composed of lava flows and sills of basaltic olivine (Barth 1956). St. George's land mass consists of interspersed hills and valleys of varying steepness reaching a maximum elevation of 1,200 feet above sea level, relatively few planal areas, and is nearly circumscribed by steep oceanic cliffs. Areas of gradual, rocky beach-like shoreline to upland transition are uncommon. The Pribilof Islands are prone to regular seismic activity. St. George was struck by a 6.7 magnitude quake in 1991, and then again by a swarm of small >5.0 magnitude quakes in 2015. Davies (1981), predicts an 8.0 magnitude earthquake for the region based upon physical characteristics of the underlying geology and known seismic event history.

The climate at St. George Island is subarctic. St. George Island receives 29.5 inches of precipitation per year, and the average annual temperature is 36.3˚F. The warmest month is August, with an average temperature of 48.7°F, and the coldest month is January with the average temperature of 26.8°F.

The nearest tidal station to St. George is on St. Paul Island, 50 miles to the north. Due to the similarity of the sites, tidal data from Saint Paul was used for this environmental assessment (Table 1).

Table 1. Published tidal data for Village Cove, St. Paul Island, Alaska. Values in feet, Mean Lower Low Water.

Highest Observed Water Level (12/08/06)	+5.26
Highest Astronomical Tide (HAT)	+4.09
Mean Higher High Water (MHHW)	+3.30
Mean High Water (MHW)	+3.08
Mean Tide Level (MTL)	+2.03
Mean Tide Level (MSL)	+1.96
Mean Low Water (MLW)	+0.97
Mean Lower Low Water (MLLW)	0.00 (datum)
Lowest Astronomical Tide (LAT)	-1.50
Lowest Observed Water Level (12/06/10)	-2.10

Source: NOAA NOS, Tidal Epoch 1983-2001, published 12/12/11.

From the above data, the mean tide level (arithmetic average of the MHW and the MLW) is +2.03 foot. The mean tide range (the difference between MHW and MLW) is 2.11 feet.

St. George Island is located far enough south that it remains sea ice free in all but the harshest winters, as during the winter of 2012 when sea ice was observed at St. George Island for at least 79 days (National Weather Service 2012). A historical sea ice coverage assay was conducted through the sea ice atlas website, which utilizes various historical data to correlate sea ice presence, relative density, and timing in an area. Sea ice concentrations were investigated at 57.0°N, 169.5°W, approximately 25 miles north of USACE's proposed project. According to historical data generated by the Sea Ice Atlas website, sea ice presence at the north side of St. George Island is variable between years but appears to trend away from higher density occurrences over the observed timeframe. However, at the 30% concentration threshold, the period between 1978 to present closely resembles the preceding 1903 to 1953 period.

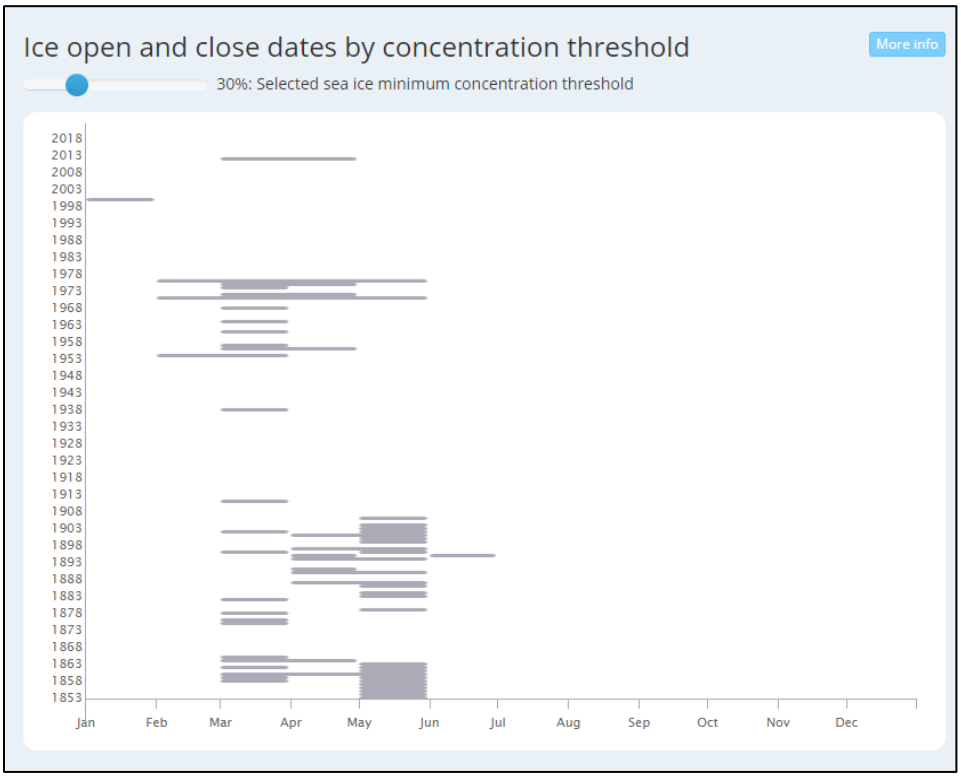


Figure 10. 30% sea ice minimum concentration historic presence

3.1 Environmental Resources Not Considered in Detail

Initial evaluation of the effects of the proposed project indicated that there would likely be little to no effect on several resources. This analysis also considers the No-Action Alternative, where the proposed action is not implemented. These resources are discussed below.

Table 2. Resources Not Considered in Detail.

Resources not considered in detail.			
Resource	Authority	Technically Important	Reason for Dismissal
Air Quality	Clean Air Act (CAA) of 1963, as amended; National Environmental Policy Act of 1970	Designed to control air pollution from listed criteria pollutants on a national level; promotes enhancement of the environment by evaluating the effects of government actions on a full suite of resource categories.	Due to insufficient air quality data to declare St. George as either “attainment or non-attainment,” the appropriate category is considered “unclassifiable,” according to the Alaska Department of Environmental Conservation (ADEC). As a result, the city is not in a CAA “non-attainment” area, and the “conformity determination” requirements of the CAA do not apply to the

			proposed project at this time. Air quality at St. George Island is also considered to be very good. Atmospheric convection is quite rigorous due to relative location and topographical characteristics, while anthropogenic influence is negligible.
Climate Change and Sea Level Change	National Environmental Policy Act of 1970; EC-1165-2-211;	Promotes enhancement of the environment by evaluating the effects of government actions on a full suite of resource categories. Incorporates physical effects of projected sea-level rise in planning, engineering, designing, constructing, operating, and maintaining USACE projects.	Short-term and long-term greenhouse gas emissions resulting from the implementation and operation of this project would be negligible. The Hydraulics and Hydrology appendix of the Feasibility Report contains sea level rise planning and design analysis regarding this project
Terrestrial Natural Resources: birds, mammals, plants, etc.	National Environmental Policy Act of 1970	Promotes enhancement of the environment by evaluating the effects of government actions on a full suite of resource categories.	Impacts are not expected to extend to the inland environment. This assessment is supported by the findings in the appended Fish and Wildlife Coordination Act Report.
Hazardous, Toxic, and Radioactive Waste (HTRW)	USACE Regulation 1165-2-132, HTRW guidance for Civil works projects. 18 AAC75 (ADEC).	USACE defines roles and responsibilities of HTRW sites. ADEC provides regulations for management of such sites	No impacts to HTRW sites are expected. ADEC contaminated sites mapping tool utilized to verify no HTRW sites occur within USACE's project footprint, as proposed.
Floodplains & Wetlands	Executive Order 11990: Protection of Wetlands, 1977	Recognizes that wetlands have unique and significant public values and calls for protection of wetlands.	No terrestrial wetland areas are affected by this project. Impacts from project-related actions to in-water habitat areas are analyzed under the Clean water Act, Magnuson-Stevens Fishery Conservation and Management Act, Endangered Species Act, and Marine Mammal Protection Act.

3.2 Relevant Resources

This section contains a description of relevant resources that could be impacted by the project. The resources described in this section are recognized by laws, executive orders, regulations, and other standards of National, state, or regional agencies and organizations; technical or scientific agencies, groups, or individuals; and the general public (Table 3).

Table 3. Relevant Resources

Resource	Authority	Technically Important	Publically Important
Non-Biological Resources			
Aesthetics	St. George and its national historic landmark represent a historically important viewshed.	Large structures could impair the natural and/or historic viewshed.	Conservation of historically relevant or uniquely natural viewsheds is important to the public.
Cultural Resources	National Historic Preservation Act of 1966; National Environmental Policy Act of 1970; The Abandoned Shipwreck Act of 1988.	The Community of St. George is located within the Seal Islands Historic District National Historic Landmark.	Law and policy require that Federal actions are considerate of the protection and enhancement of cultural and historical resources.
Environmental Justice	Executive Order 12898, 1994. Federal actions to address environmental justice in minority populations and low-income populations.	Identifies impacts to minority or low-income populations.	Executive Orders and policy require that federal actions consider the impacts of subsistence access and economic growth.
Navigation	U.S. Code Title 33 – Navigation and Navigable Waters	Safe navigation must not be impeded by material placement strategy.	Safe navigation improves efficiency and reduces overall costs of goods and fuel to consumers
Noise	Noise Pollution and Abatement Act of 1972	Designed to protect human health by minimizing annoyance of noise to the general public.	Ambient natural sounds at St. George are an effective attenuator of most noise; however, anthropogenic noise would be introduced into an area largely devoid of it.
Protected Tribal Resources	Executive Memorandum on Government-to-Government Relations with Native American Tribal Governments of 1994; DOD American Indian and Alaska Native Policy of 1998; DOA memorandum on American Indian and Alaskan Native Policy of 2012.	Assesses the impact that federal projects may have on protected tribal resources.	The majority of the population at St. George are members of the St. George Traditional Council, a Federally-recognized Tribe. Subsistence harvests are important to the identity and traditions of the Tribe.
Public Infrastructure	National Environmental Policy Act of 1970	Promotes enhancement of the environment by evaluating the effects of government actions on a full suite of resource categories.	The community of St. George has limited Public Infrastructure. Project related elements could affect their overall

			capacity to reliably service the community.
Sediments	Clean Water Act of 1972 as amended, Section 404 (b)(1)	In-water placement of sediments must comply with Section 404 (b)(1) guidelines.	Law and policy require that Federal actions adhere to water quality protection laws.
Socio-economics	Executive Order 12898, 1994. Federal actions to address environmental justice in minority populations and low-income populations.	Federal agencies must take into account the socioeconomic status of the community potentially affected by their actions.	Executive Orders and policy support that no group of people, because of their socioeconomic or racial or ethnic composition should be disproportionately negatively affected by the execution and/or operation of federal, state, local, or tribal programs or policies.
Water Quality	Section 401 of the Clean Water Act of 1972, as amended. 404(b)(1) Magnuson Steven's Fishery Conservation and Management Act of 1976, as amended.	The nearshore waters of St. George Island are important habitat for fish and wildlife. All marine waters surrounding St. George Island are designated Essential Fish Habitat.	Law and policy require that Federal actions adhere to water quality protection laws.
Biological Resources			
Fish and Essential Fish Habitat	Magnuson Stevens Fishery Conservation and Management Act of 1976, as amended. BSA Fisheries Management Plan. The Endangered Species Act of 1973 (ESA), as amended; the Marine Mammal Protection Act of 1972 (MMPA).	All marine waters surrounding St. George Island are designated Essential Fish Habitat. Section 305(b)(2) of the Magnuson-Stevens Act requires Federal action agencies to consult with National Oceanic and Atmospheric Administration (NOAA) NMFS on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH.	Law and policy promotes the protection of fish populations and fish habitat to help ensure maximum sustainable yields from those commercially important stocks, which, in turn, guarantees employment opportunities.
Invasive Species	E.O. 13751: Safeguarding the Nation from the Impacts of Invasive Species;	Unique island biomes, like St. George, are sensitive to invasive species, specifically, rats. History is replete with the loss of indigenous biodiversity	Law and policy requires that protecting indigenous natural resources includes measures that prevent the establishment of competitive or

	E.O. 13112: Invasive Species.	once rats colonized an island. St. George Island's importance to colonial cliff-nesting seabirds is significant. Annually, hundreds of thousands of seabirds nest at St. George Island.	destructive invasive species.
Marine Birds	FWCA Fish and Wildlife Coordination Act of 1934, as amended, Migratory Bird Treaty Act of 1918.	St. George Island's importance to colonial cliff-nesting seabirds is significant. Annually, hundreds of thousands of seabirds nest at St. George Island.	Law and policy recognize that migratory birds transcend geopolitical borders and that protection of their nesting, foraging, and resting habitats are important for the long-term conservation of avian resources.
Marine Invertebrates	Magnuson Stevens Fishery Conservation and Management Act of 1976, as amended.	Some marine invertebrates are commercially important, for instance, king and tanner crabs. Other species play integral roles in the food web of the Bering Sea ecoregion.	Law and policy recognizes the inherent nature of in-tact ecosystems, and that these systems are comprised of many parts.
Marine mammals, ESA-listed species, and critical habitat	The Endangered Species Act of 1973 (ESA), as amended; the Marine Mammal Protection Act of 1972 (MMPA).	All threatened and/or endangered species that occur within the nearshore waters of the Pribilof Islands are marine mammals. All marine mammals are protected under the MMPA. Marine mammals constitute a significant cultural and subsistence resource for Pribilof Island communities.	Law and policy supports the conservation and protection of marine mammals and of threatened and endangered species. Furthermore, federal actions are required to comply with federal laws regarding the conservation of such resources.

3.2.1 Non-Biological Resources

3.2.1.1 *Aesthetics*

The visual aesthetics of St. George Island have not been heavily impacted since the establishment of the community of St. George. There has been limited modification to the natural environment, with high cliffs supporting active bird communities, and the shorelines providing areas for seal rookeries. The historical significance of the community, including commercial infrastructure, provided the basis for its nomination as part of a National Historic Landmark (NHL), which visually has had limited change from the U.S. commercial sealing operations of the 1870s.

3.2.1.2 *Cultural Resources*

The community of St. George is located within the Seal Islands Historic District National Historic Landmark (XPI-00002). The NHL covers nearly half the northern shoreline of St. George Island, in addition to part of neighboring St. Paul Island. On St. George, many of the structures and buildings are associated with the NHL. There are 68 identified contributing cultural resources within the city; however, only two specific structures occur within the proposed project footprint. These contributing cultural resources are the St. George Inside Landing (XPI-00195) and the St. George Outside Landing (XPI-00194). The exact date of their construction is unknown; the St. George Inside Landing was likely the location of the first original dock for the community that was damaged in a fire in 1950. It was likely rebuilt, and the addition of the St. George Outside Landing was added to provide for better moorage and a minor breakwater for the Inside Landing. Both of these structures have since lost much of their original configuration due to weathering and storm damage. Additional information on the cultural resources in and around the project area can be found in the National Historic Preservation Act (NHPA) Section 106 consultation documents between the USACE and the Alaska State Historic Preservation Officer (SHPO; Appendix E).

Databases of shipwrecks in the region's waters are maintained by the Bureau of Ocean Energy Management (BOEM) and the National Oceanic and Atmospheric Administration (NOAA). These databases were consulted to determine if any shipwrecks were known to occur within the proposed project footprint; none were documented. An underwater camera was used during nearshore surveys for biological resources in the project area. No cultural resources were identified during a review of the recordings.

3.2.1.3 *Environmental Justice and the Protection of Children*

The City of St. George is considered the affected population for the purposes of this analysis. The City of St. George is comprised of minority populations, low-income populations, and children that meet both criteria. As of the 2010 U.S. Census, St. George was approximately 88.24% American Indian and/or Alaska Native, with a further 1.96% being Alaska Native and one other ethnicity. Alaska Native populations are treated as minorities under E.O. 12898. Income data from the U.S. Census Bureau's 2006-2010 American Community Survey show an estimated 17.2% of the population was below the poverty line, regardless of minority status. Data from the U.S. Census indicate that, in 2010, approximately 12.80% of the population of the St. George was comprised of children (19 years old or younger) (DCCED 2019).

3.2.1.4 *Navigation*

Navigation on St. George primarily originates from the Zapadni Bay harbor (see 2.1 No-Action Alternative). Boat traffic in the North Anchorage area is minimal. The high energy wave environment of the Bering Sea, in conjunction with the shallow rocky coast, hinders landings.

3.2.1.5 *Noise*

At the North Anchorage site, there is relatively little anthropogenically-generated noise. Other than an occasional pick-up truck or 4-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 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.

3.2.1.6 *Protected Tribal Resources*

The St. George Traditional Council is the Federally-recognized Tribe on St. George Island. There are no Tribal treaties in the State of Alaska, and, with the exception of the Annette Island Reservation, all Tribal land claims were extinguished by the Alaska Native Claims Settlement Act of 1971. There are multiple international treaties that impact protected tribal resources in Alaska, including: (1) the migratory bird treaties with Canada (1916), Mexico (1937), Japan (1974) and Russia (1976) implemented by the Migratory Bird Treaty Act of 1918, as amended; and (2) the International Whaling Convention (1946) implemented by the Whaling Convention Act of 1950. The Tribe has not identified any specific Protected Tribal Resources via Government-to-Government consultation with the USACE.

Subsistence harvests are likely to be considered protected tribal resources. The Tribe has used subsistence harvests to supply their community with food since its establishment. With limited access to commercial goods, subsistence resources supplement a large portion of their diet through hunting and gathering from the local environment. The community harvests fur seals (*Callorhinus ursinus*) annually for subsistence, in addition to other resources such as halibut (*Hippoglossus stenolepis*), reindeer (*Rangifer tarandus*), marine invertebrates, plants, and berries (ADFG 2011). The Federal government's trust responsibility, deriving from the Federal Trust Doctrine and other sources, for these Protected Tribal Resources is independent of their association with Tribal lands. USACE has identified protecting subsistence practices as a trust responsibility towards Protected Tribal Resources, which is discharged in the following analyses: Sections 3.2.1.2 (Cultural Resources), 3.2.1.3 (Environmental Justice and the Protection of Children), and Section 3.2.2 (Biological Resources).

3.2.1.7 *Public Infrastructure*

Public infrastructure on St. George is comprised of systems supporting transport (road, port, and aviation), energy delivery, public works, solid waste management, communication, and water distribution. St. George generates electricity for its community via diesel generator. There is no potable water supply at the existing harbor.

3.2.1.8 *Sediments*

Intertidal and subtidal sediments are primarily comprised of rocky cobble, much of which originates from the talus slides created by retrograding cliff faces. Marine sediments within the immediate vicinity of Village Cove are believed to be entirely rocky, presumably basaltic olivine bedrock, overlain in areas by sands, gravels, shell hash, cobbles, and boulders. Sediments in St. George's nearshore areas were observed via deep water camera and are comprised of vast reaches of sandy mud interspersed with

areas of coarse shell hash and rocky-cobble. A 1950s survey (NOAA Chart 16380) supports this characterization.

3.2.1.9 *Socioeconomic Resources*

Population and Demographics – In 1880, the U.S. Census reported a human population of 92 on St. George Island. It reached a high of 264 in 1960. Since then, decadal assessments illustrate a consistent decline in population to the most recent estimate of 70 in 2018. There was an isolated instance of population increase from 138 in 1990 to 152 in 2000. The 2010 census reported a population of 102, with a male:female ratio of 59:43 compared to 73:79 in 2000. In 2010, 4 persons were in the 0-4 age bracket, 17 in the 5 to 17, 72 in the 18 to 64, and 9 in the 65 and over; whereas in 2000, 9 were in the 0-4 age bracket, 47 in the 5 to 17, 86 in the 18 to 64, and 10 in the 65 and over.

Employment and Income - The City of St. George is an employer for residents; however, the local tax base is not sufficient to sustain employee pay or the City's expenses. The St. George Tanaq Corporation (an Alaska Native Claims Settlement Act village corporation), and St. George Tribal Council (Tribe) are other employers in the community. There were 14 halibut permit holders in 2016, but only six permit holders fished. An estimated 11 residents live below the poverty line. This number has held steady while the overall population has declined; thus, the percentage of residents below the poverty line has increased from 7.9% in 2000 to 17.2% in 2010. The Alaska Department of Commerce, Community, and Economic Development estimated that 24.2% were below the line in 2014.

3.2.1.10 *Water Quality*

Although naturally occurring freshwater lakes are scattered throughout the landmass of St. George Island, the community of St. George obtains freshwater through shallow-well groundwater extraction. Due to its recent history of volcanic activity, there has been little development of surface drainages (United States Geological Survey, 1976). Ocean waters surrounding St. George Island are considered to be of high quality, primarily due to the lack of development on St. George and great distance from any potential anthropogenic source of pollution. In compliance with the Clean Water Act 40 CFR Part 230, USACE has prepared a Section 404(b)(1) analysis; it is located in Appendix A of this assessment.

3.2.2 Biological Resources

3.2.2.1 *Fish and Essential Fish Habitat*

Essential Fish Habitat (EFH) is defined by the Magnuson-Stevens Fishery Conservation and Management Act as those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity.

St. George Island does not have any anadromous waters or streams that would traditionally be associated with salmonids and their allies, as would be defined under AS

16.05.871(a). However, the marine waters surrounding St. George Island, from the shoreline outward, are designated as EFH under the Groundfish of the Bering Sea Aleutian Islands (BSAI) Fishery Management Plan (FMP), the FMP for Bering Sea/Aleutian Islands King and Tanner Crabs, and the FMP for the Salmon Fisheries in the Exclusive Economic Zone (EEZ) off Alaska. A complete list of those fish species occurring within the various habitat types occurring in the marine waters in close proximity to the Pribilof Islands has been derived from the NMFS EFH mapping tool and is included in Appendix B, USACE's EFH Analysis. Catch data are summarized in USACE's EFH Analysis, Appendix B.

In June of 2019, USACE and NMFS biologists conducted a comprehensive assessment of the existing environment. Beginning at the derelict small boat landing and traversing west to the small rocky cliff spur area that demarks both lobes of the cove, intertidal and subtidal vegetation observations were made and photographs taken. Observations stopped at the spur area because the cliff face showed signs of instability and recent slides, and the beach width at that point was also quite narrow. It was observed at that time that the intertidal zone of the western lobe of Village Cove was not as nearly as densely colonized by intertidal and subtidal submerged aquatic vegetation (SAV), as was the eastern lobe despite the two rocky shorelines appearing on the outset to be similar.

Dragon kelp (*Alaria fistulosa*) is the predominant epiphyte in Village Cove, occurring at medium to very high density from the lower intertidal to the shallow subtidal zones. Also common within the mid to low intertidal and shallow subtidal zone were intermittent bunches of sea fern fringe (*Hymenana ruthenica*). Interspersed amongst the mid to low intertidal zone were small clusters of sieve kelp (*Agarum clathratum*). The upper-most intertidal zone was primarily colonized intermittently by rockweed (*Fucus distichus subspecies evanenescens)* and Arctic sea moss (*Acrosiphona arcta*).

SAV, as observed from the shoreline (Figure 11), appeared to be restricted to the highest energy portion of the surf zone, and did not extend more than approximately 50 meters from the shoreline within the cove, and was predominantly comprised of dragon kelp. USACE biologists confirmed this observation with underwater videography taken at approximately the 30 foot depth contour of Village Cove. Large epiphytic species were entirely absent at this depth, replaced in low densities by what appeared to be a small calciferous epiphyte, not exceeding an estimated 15 centimeters in height.

In virtual habitat assays of the entirety of St. George's nearshore areas via Geographical Information Systems (GIS) satellite imagery, SAV was observed to be restricted to the intertidal and shallow sub-tidal zones closest to the shoreline.

Figure 11. Intertidal Submerged Aquatic Vegetation at Village Cove

3.2.2.2 *Invasive Species*

St. George is relatively free from non-native species. Domestic reindeer were introduced as a food source and are now established on St. George. Non-native plants are also known to occur on the island. However, neither the reindeer nor the plants are known to be invasive. The U.S. Fish and Wildlife Service works with the Tribe and the City to implement biosecurity measures to prevent the establishment of non-native rodents. No non-native marine species are known to occur in the St. George area. Non-native species have the potential to become established, and impact native and endemic island flora and fauna; it is critical to prevent introductions.

3.2.2.3 *Marine Invertebrates*

During surveys in June 2019 (Figure 12) the most commonly encountered marine invertebrate was the Oregon hairy triton (*Fusitriton oregonensis*), followed by common sunstar (*Crossaster papposus*), widehand hermit crab (*Elassochirus tenumanus*), and green urchin (*Strongylocentrotus droebachiensis*), respectively. No commercially relevant species of marine invertebrate were encountered. Marine invertebrates that are commercially relevant or that are extended habitat protections under the BSAI FMP include blue king crab (*Paralithoides platypus*), red king crab (*Paralithoides camtschaticus*), tanner crab (*Chionoecetes bairdi*), and octopus (*Enteroctopus dofleini*).

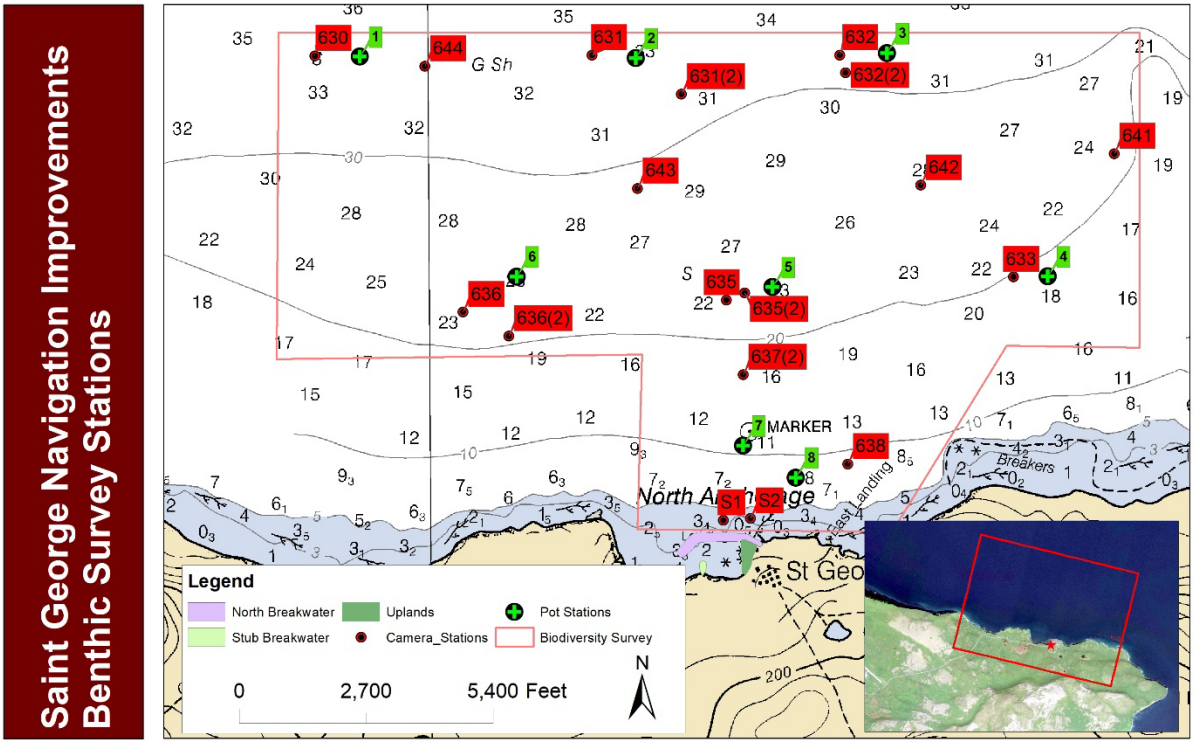


Figure 12. Underwater Video and Crab Pot Survey Stations

Benthic invertebrates were notably absent in areas that displayed rapidly moving currents and along the sand wave-type substratum. In places where the substrate was mud or sandy mud, tube worm casings were observed. Also observed along the sandy mud substrate were two varieties of giant plumose or white-plumes anemone (*Metridium farcimen*), and another species of anemone that was not identified to genus. Invertebrate diversity increased once the substrate began to transition to shell hash and rocky reef. Various hermit crabs, sponges, scallops, brittle stars, common sunstar, and chitons were observed. Video quality was not good enough to identify smaller organisms to species. Green urchins were particularly abundant at the 30 foot isobath, occurring in the hundreds.

Figure 13. Village Cove 30 ft Isobath, Green Urchins

3.2.2.4 ***Marine Birds***

The avifauna of St. George numbers 189 species of birds, of which 26 are known to breed on the island (Guitart et al. 2018). According to USFWS's annual monitoring reports, ten species of seabirds and seaduck commonly occur in the project area (Table 4). Of these ten, the red-faced cormorant, thick-billed murre, red-legged kittiwake, and least auklet were identified during the Fish and Wildlife Coordination Act process as important and warranting further evaluation because the proximity of their habitat to the project footprint. Of these four species, the cormorant, murre, and kittiwake perch and nest on the cliffs surrounding the proposed project site. Each species normally lays its eggs on ledges with minimal to no actual nest built.

Table 4. Marine Bird Species

Species	Nesting Habitat	Foraging Habitat / Area	Occurrence	Breeding
Horned puffins (*Fratercula corniculata*)	Sea cliff	Open water, continental shelf, areas of surface upwelling	May to Sep	Jun to Aug
Tufted puffins (*F. cirrhata*)	Sea cliff	Open water, continental shelf, areas of surface upwelling	May to Oct	May to Aug
Thick-billed murres (*Uria lomvia*)	Sea cliff	Open water, near ice edge if present	May to Oct	May to Jul

Red-legged kittiwakes (*Rissa brevirostris*)	Sea cliff	Open water, continental shelf or deeper, areas of surface upwelling	May to Oct	May to Aug
Black-legged kittiwakes (*R. tridactyla*)	Sea cliff	Open water, continental shelf or deeper, areas of surface upwelling	Apr to Sep	Apr to Jul
Northern fulmars (*Fulmarus* glacialis)	Sea cliff	Open water, continental shelf or deeper, areas of surface upwelling	May to Oct	May to Jul
Red-faced cormorants (*Phalacrocorax urile*)	Sea cliff	Coastal and inshore waters	Apr to Sep	Apr to Sep
Least auklets *(Aethia pusilla)*	Inland	Stratified waters with strong thermoclines, areas of surface upwelling	May to Sep	May to Jul
Parakeet auklets *(A. psittacula)*	Inland	Open water, continental shelf, areas of surface upwelling	May to Sep	May to Jul
Harlequin ducks (*Histrionicus histrionicus*)	N/A	Rocky nearshore inter-and subtidal	Possibly year-round	N/A

3.2.2.5 ***Marine Mammals, Endangered Species, and Critical Habitat***

All marine mammals are protected under the Marine Mammal Protection Act (MMPA), 1972. Based on NMFS's protected species mapping tool and available literature describing stocks of marine mammals in Alaska, 18 marine mammals have the potential to occur in the Pribilof region of the Bering Sea. These species include: harbor seal (*Phoca vitulina*), northern fur seal (*Callorhinus ursinus*), ribbon seal (*Histriophoca fasciata*), spotted seal (*P. largha*), beluga whale (*Delphinapterus leucas*), Dall's porpoise (*Phocoenoides dalli*), killer whale (*Orcinus orca*), minke whale (*Balaenoptera acutorostrata*), Stejneger's beaked whale (*Mesoplodon stejnegeri*), Steller sea lion (*Eumetopias jubatus*), fin whale (*B. physalus*), humpback whale (*Megaptera novaeangliae*), North Pacific right whale (*Eubalaena japonica*), sperm whale (*Physeter macrocephalus*), gray whale (*Eschrictius robustus*), bearded seal (*Erignathus barbatus nauticus*), ringed seal (*Pusa hispidia hispidia*), and Northern sea otter (*Enhydra lutris kenyoni*). The latter 9 of the above 18 species or Distinct Population Segments (DPS) are extended additional protections under the Endangered Species Act (ESA), 1973. Take (e.g., to harass, harm, kill) of species listed under the MMPA or ESA is prohibited without a permit.

Although stocks or individuals of the aforementioned species list are purported to occur in the Pribilof region of the Bering Sea, some are summarily dismissed from further discussion in the existing environment and from consideration in the subsequent effects analysis because their likelihood, generally due to habitat preference, of being in proximity to the proposed project footprint, is so remote as to be discounted. Marine mammals not carried forward for analysis: ribbon seal, spotted seal, beluga whale, Dall's porpoise, Stejneger's beaked whale, North Pacific right whale, sperm whale, and

gray whale. For some species brought forward for analysis, concise presence and absence timing data is somewhat unavailable.

Harbor seals inhabit the Pribilof Island region year-round at low densities, likely due to their high latitudes coinciding with the species' northern-most distribution. A 2010 stock abundance estimate of the Pribilof Islands harbor seal stock was 232 animals, which was also the number of individual animals observed during the July 2010 survey. Approximately 185 adults and 27 pups were observed on Otter Island plus an additional 20 other individuals on all the other islands combined (NOAA 2017).

Northern fur seals are regularly observed in great numbers in the nearshore waters of the Pribilof Islands, where it is estimated that greater than 70% of the global population aggregates around the summer breeding season, which occurs between June and August. On St. George, rookeries occur at beach areas where cliff faces do not preclude access to the gently sloping, grass-covered upland areas. One rookery, in particular, the North Rookery, exists approximately 1 kilometer to the west of USACE's proposed project area and produced approximately 6,200 of the Island's total 20,261 pups in 2016 (NOAA 2016).

Adult male fur seals arrive at rookery beaches in May and stay until mid-August to stake their claim to the best breeding areas. The majority of pregnant females begin arriving mid-June, and the peak of pupping season occurs in early July. From their rookery areas, females make frequent foraging trips, lasting 3-10 days, and suckle their pup for one to two days in between. Weaning is abrupt, and pups begin to depart by early November. By December, the entirety has departed the rookery grounds and surrounding waters (NOAA 2019). Most northern fur seals overwinter in the north Pacific away from St. George.

Killer Whales are regularly observed in the waters of the Pribilof Islands. Little is understood about the population dynamics of these animals inhabiting the Bering Sea; however, a portion of the transient population spends time in the waters surrounding the Pribilof Islands during the fur seal breeding months (2016b).

Minke whales are known to occur throughout the entirety of the Bering Sea and into the Chukchi Sea. NMFS currently estimates their abundance along the eastern Bering Shelf at 389 individuals. However, this estimate is approximately ten years old. Minke whales are typically observed in small groups of two to three, but larger aggregations are common when food resources are abundant. Minke whales in Alaskan waters are migratory, but animals found south of the Gulf of Alaska are considered resident animals. (NOAA 2018c).

3.2.2.6 *ESA-listed Species & their Critical Habitat*

Steller sea lions (western DPS) range throughout the entirety of the Bering Sea and have known rookery and haulout sites throughout the Pribilof Islands. Steller sea lions once came ashore at St. George Island to breed and whelp in the thousands but were systematically extirpated from breeding grounds. Although no pups have been recorded on St. George since 1916 (NMFS 2008), locations of the historic rookeries are known. Steller sea lion haulout sites on St. George are also known. Steller sea lions are frequently observed transitioning through and foraging in the nearshore waters of Village Cove and the North fur seal rookery. Steller sea lions are dependent upon isolated haulouts and rookery areas. Although not technically migratory, Steller sea lions move about the entirety of their range as they pursue prey species' seasonal abundance. Overall, populations of Steller sea lions declined precipitously in the decades between the 1950s and 1980 and began to stabilize and slightly increase by the 2000s, but there are trends in either direction depending upon which portion of the species' overall range is sampled.

Critical Habitat has been designated for the Steller sea lion Western DPS and is defined as a 20 nautical mile buffer around all major haulout and rookeries with their associated terrestrial, air, and aquatic zones (Figure 14). All of St. George's surrounding waters fall under the critical habitat designation for Steller sea lion, Known haulouts are located southeast and west of Village Cove.

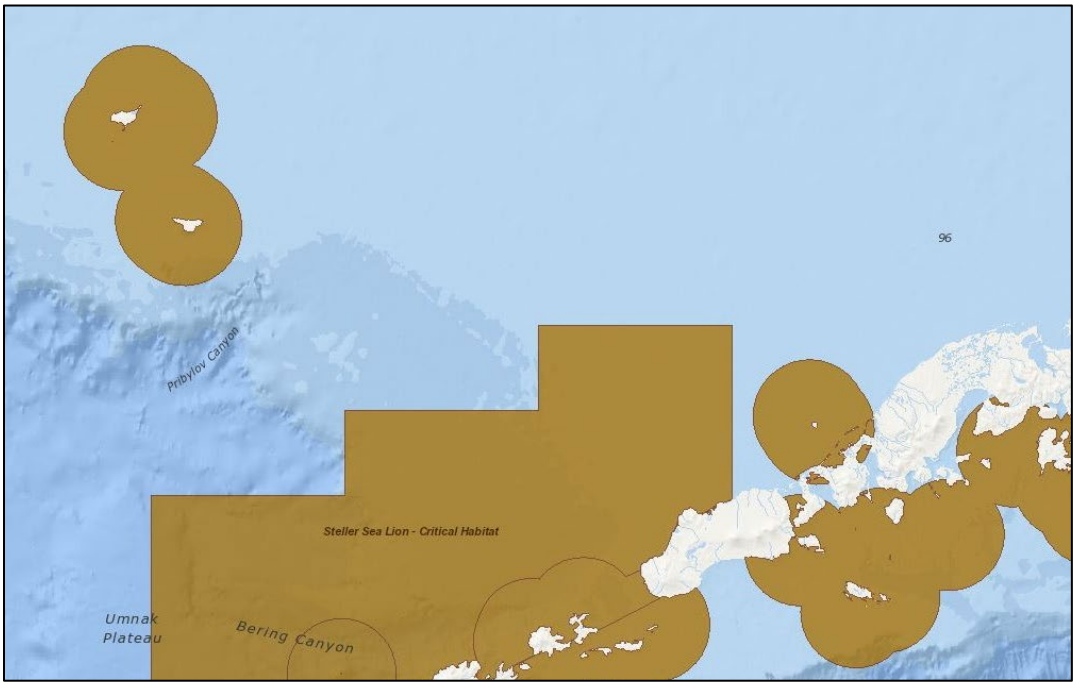


Figure 14. Steller Sea Lion Designated Critical Habitat: Pribilof Islands Upper Left, Aleutian Chain, Lower Right

Fin whales are seasonal migrants to the Bering and Chukchi Seas. There is not a lot of data on the North Pacific fin whale distribution; however, it is known that they are migratory, spending winter months in the warmer waters of the lower latitudes (NOAA 2018a). An acoustic study by Stafford and Mellinger (2009) recorded fin whale calls in the Bearing Sea for a full year in 2006-2007. This study detected the highest number of calls from August through December, with detections decreased drastically from March through August (Stafford and Mellinger, 2009). The detection of calls throughout the winter into spring is thought to be evidence that fin whales may be present in the Bering Sea year-round (Stafford and Mellinger, 2009). Fin whales are gregarious, often found in social groups of two to seven.

According to NMFS, there are no reliable estimates of the current and historical abundances for the entire Northeast Pacific fin whale stock. However, according to NMFS's stock report, relative densities of observed fin whales are greatest across the Bering Sea shelf break (200 meter isobaths) (NOAA 2018a).

Humpback whales in the Aleutian Islands, Bering, Chukchi, and Beaufort Seas are part of three recognized North Pacific DPSes: the Western North Pacific DPS, the Hawaii DPS, and the Mexico DPS. Humpback whales from the Western North Pacific DPS, which are listed as Federally endangered, are the least likely to be encountered in Alaskan waters, with an encounter probability of only 4.4 percent. Humpback whales from the Mexico DPS, which are listed as federally threatened, have a similarly low encounter probability at 11.3 percent. Humpback whales from the Hawaii DPS are not listed under the ESA; they are the most likely to be encountered in Alaskan waters, at 86.5 percent (NOAA 2016a). It should be noted that among these DPSes, individual whales do not exhibit physical traits that would allow for visual confirmation of population lineage.

Humpback whales are migratory, feeding in northern latitudes during summer and fall months and migrating to lower latitudes for breeding and calving. According to the (NOAA 2018b) Alaska Stock Assessment, humpback whales are consistently recorded by hydrophones north of the Bering Strait as late as early November. A study conducted by Stafford and Mellinger (2009) detected humpback whale calls year-round in the Bering Sea, with the highest number of calls occurring August through March. Humpback whales are known to traverse the Bering shelf and likely come within visual observation range of the landmass of St. George. Humpback whales are gregarious and often travel together or congregate at areas where food density is relatively high.

Ringed Seals are the smallest and most common Arctic seal; they exhibit a circumpolar distribution and are divided into five subspecies. There is one recognized stock of Arctic ringed seals in U.S. waters: the Alaska stock. The estimated population size for this stock is over 300,000 individuals. They are pagophilic and spend the majority of their time with the ice, relying upon it for pupping, nursing, resting, and molting. During the sea ice maximum, ringed seals are commonly observed in the northern Bering Sea, Norton and Kotzebue Sounds, and the Chukchi and Beaufort Seas. However, they are

typically not abundant south of Norton Sound, even in years of extensive ice coverage (NOAA 2016c).

Bearded Seals exhibit circumpolar distribution**,** and likely number over 500,000 worldwide. Bearded seals rely on the availability of suitable sea ice over relatively shallow waters for use as a haul-out platform for giving birth, nursing pups, molting, and resting; bearded seals rarely haul-out on land. Similarly, bearded seals typically migrate in concert with the pack ice at the sea ice's edge, with those animals overwintering in the Bering Sea migrating through the Bering Strait and over-summering in the waters of the Chukchi Sea until the sea ice reforms and migrate south back into the Bering Sea. The Okhotsk and Beringia DPSes of the Pacific sector are listed as threatened under the ESA (NOAA 2018).

Northern sea otters in the St. George area are listed as a threatened DPS. Otters are not abundant, but are regularly cited in the area (Guitart et al. 2018; Michelle St. Martin, USFWS, Nov 2019 pers. comm.). They can use all coastal marine habitats within their range but are most commonly observed within a few kilometers of shore. Their seaward distributional limit is defined by their diving ability and is approximated by the 100 m depth contour. Sea otters may haulout on intertidal or supratidal shores.

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 No-Action Alternative

4.1.1 Non-Biological Resources

4.1.1.1 *Aesthetics*

Under the No-Action Alternative, no harbor would be constructed, and the existing viewshed would likely not be impacted.

4.1.1.2 *Cultural Resources*

Under the No-Action Alternative, the impact on the visual features of the Seal Islands Historic District National Historic Landmark (XPI-00002) would not be incurred. The two historical landings, XPI-00194 and XPI-00195, will continue to degrade, likely leading to the eventual total loss of the structures through natural erosion.

4.1.1.3 *Environmental Justice and the Protection of Children*

Under the No-Action Alternative, no harbor would be constructed. Without a functioning harbor, the inefficiencies and safety concerns of the existing navigation infrastructure will continue, and food security will remain a concern for the entire community of St. George. This would likely negatively impact the long-term viability of the predominantly Alaska Native community.

4.1.1.4 *Navigation*

Under the No-Action Alternative, no harbor would be constructed, and safe navigation in the proposed site would likely not increase. Navigation at Zapadni Bay would likely continue under the current conditions.

4.1.1.5 *Noise*

Under the No-Action Alternative, no harbor would be constructed, and ambient noise would likely remain at the existing levels.

4.1.1.6 *Protected Tribal Resources*

Under the No-Action Alternative, no harbor would be constructed. Members of the St. George Traditional Council would likely experience the same opportunities to conduct terrestrially-based subsistence activities; however, opportunities for ocean-based subsistence activities would likely continue to decline. Subsistence patterns are likely to continue as they currently at the same rate; fur seal takes are conducted along the shores, while halibut and other marine resources would be accessible on weather-permitted days from fishing boats using the Zapadni Bay harbor. Other impacts to protected tribal resources are discussed in Section 4.1.1.2 (Cultural Resources), 4.1.1.3 (Environmental Justice and the Protection of Children), and Section 4.2.2 (Biological Resources).

4.1.1.7 *Public Infrastructure*

Under the No-Action Alternative, no harbor would be constructed, and the public infrastructure would likely not be impacted. Deterioration of the existing harbor facilities would be expected to continue. At a certain point, the fuel barge would no longer be able safely service the community.

4.1.1.8 *Socioeconomics*

Under the No-Action Alternative, no harbor would be constructed. Without a viable subsistence-cash economy, the human population on St. George is likely to continue to decline and increase in relative age. Similarly, without a viable economy, the percentage of the residents below the poverty line is likely to continue to increase.

4.1.1.9 *Sediments*

Under the No-Action Alternative, no harbor would be constructed, and sediments, and their natural decomposition and migration cycles would not be impacted.

4.1.1.10 *Water Quality*

Under the No-Action Alternative, no harbor would be constructed and water quality would likely remain in its current state.

4.1.2 Biological Resources

4.1.2.1 *Fish and Essential Fish Habitat (EFH)*

Under the No-Action Alternative, no harbor would be constructed, and fish and EFH would likely not be impacted.

4.1.2.2 *Invasive Species*
Under the No-Action Alternative, no harbor would be constructed, and the probability of inadvertent introduction of invasive species would likely not increase.

4.1.2.3 *Marine Birds*
Under the No-Action Alternative, no harbor would be constructed, and marine birds would likely not be impacted.

4.1.2.4 *Marine Invertebrates*
Under the No-Action Alternative, no harbor would be constructed, and marine invertebrates would likely not be impacted.

4.1.2.5 *Marine Mammals, Endangered Species, and Critical Habitat*
Under the No-Action Alternative, no harbor would be constructed, and there would likely be no impact to marine mammals, endangered species, or their respective designated critical habitats.

4.2 Alternative N-3 (Agency's preferred alternative)

4.2.1 Non-Biological Resources

4.2.1.1 *Aesthetics*
Under Alternative N-3 (Proposed), impacts on the aesthetics of St. George would be unavoidable and permanent. Views of the high cliffs supporting active bird communities, and the shorelines providing areas for seal rookeries where no anthropogenic structures currently exist would be marred by the sight of a breakwater protected harbor. These impacts are more specifically addressed in the Cultural Resources section below (Section 4.2.1.2). Mitigation is explained in a draft Memorandum of Agreement (MOA) currently out for review by all signatories. However, implementation of these measures would not minimize the impact to the resource. Once the MOA is signed, it will be attached to this EA.

4.2.1.2 *Cultural Resources*
The construction of Alternative N-3 (Proposed) would have an adverse effect on The Seal Islands Historic District National Historic Landmark (XPI-00002) by permanently altering the viewshed. There would also be an adverse effect on two of the NHL's contributing structures, the St. George Inside Landing (XPI-00195) and the St. George Outside Landing (XPI-00194); these two structures would be removed or buried within the project area. No other historic property or cultural resource would be impacted by this alternative. The SHPO has concurred that any of the structural alternatives would have an adverse effect on historic properties; this information is explained in detail in the Section 106 consultation documents between the USACE and the SHPO (Appendix E). Per 36 CFR § 800.6, this adverse effect would be resolved through the implementation of mitigation identified in a *Memorandum of Agreement among the*

USACE, SHPO, and the City of St. George Regarding the St. George Navigation Improvements. Mitigation would not minimize the impact to the resource but instead would compensate for the adverse effect on historic properties. Mitigation is likely to include the creation of an artistic landscape of the St. George North Anchorage viewshed during three periods of history: prior to the settlement of the community, the Russian Period, and the U.S. Territorial period. These depictions would likely be displayed from the vantage of the same North Anchorage viewshed, on a hill west of the community where a monument to the historic fur seal industry is already emplaced.

4.2.1.3 ***Environmental Justice and the Protection of Children***

Implementation of Alternative N-3 (Proposed) does not disproportionately negatively affect minority or low-income populations on St. George Island, the population of which is predominantly Alaska Native. Rather, the alternative seeks to reduce inefficiencies inherent to the existing navigation infrastructure, improve food security through increased subsistence access, and improve health and safety. Additionally, Alternative N-3 does not disproportionately negatively affect children. Children, as part of the community as a whole, are expected to benefit from the improved navigational safety and food security.

4.2.1.4 ***Navigation***

Under alternative N-3 (Proposed), the cumulative effects of the proposed project would be beneficial to navigation in the region. The 8 to 12 local subsistence vessels currently using Zapadni Bay would be expected to transition their activity to the proposed harbor. Additionally, neighboring St. Paul Island registers 17 subsistence-class vessels. It is anticipated that 5 to 8 of these vessels would operate out of St. George periodically based on fish season openings. These 13 to 20 (local vessels and those anticipated from St. Paul) subsistence vessels would be anticipated to transit in and out of the harbor up to 37 days per year, and these transit days would occur primarily during the fishing openings. The number of vessels in St. George's crabber fleet would be expected to increase from 0 to 2 vessels; however, 84 commercial crabbing vessels operate in the region, and approximately 70 these would be expected to use the harbor. Crabbing vessels would be anticipated to transit in and out of the harbor 8 to 17 days per year during the crabbing season. It is also anticipated that an approximately 300-foot-floating processor would operate inside the harbor and that additional vessels would transit to and from the harbor to deliver products. Freight and fuel barges currently using Zapadni Bay would be expected transition delivery to the proposed harbor. The fuel barge would be expected to make deliveries 2 to 6 times per year at the new harbor; whereas, one freight delivery would be expected annually. Because there is little to no navigational traffic in the proposed project area, this increase in boat traffic would not likely affect existing navigation. Placement of dredged material between the 20 and 30-fathom isobath would not raise the elevation of the seafloor enough to impact navigation.

4.2.1.5 *Noise*

Under Alternative N-3 (Proposed), impacts from project-related noise would be moderate, and are best categorized as in-water and atmospheric. Certain point source entities are capable of generating nose that would impact both media at the same time, especially if they are operating at or near the atmospheric/in-water interface.

Short-term direct impacts on ambient atmospheric noise levels would occur at their highest intensity during the construction phase of the project, which could occur at least seasonally for three to five years. The operation of heavy equipment such as loaders, excavators, cranes, dump trucks, and impact pile drivers as the upland features and breakwater structure are constructed may occur at times in 24-hour shifts to take advantage of seasonal daylight periods. Concurrently, the operation of drilling and dredging barges, confined underwater blasting, active dredging, keying in armor stone (placement), and impact pile driving would contribute to the overall impact to the ambient atmospheric noise. Impacts on ambient atmospheric noise levels would also occur at the existing Zapadni Bay Harbor and along the roadway that connects that harbor and the town of St. George. Increased barge traffic ferrying equipment and raw construction materials would likewise require additional over-ground transport to the proposed project site that would periodically impact ambient noise levels.

Similar short-term direct impacts to ambient in-water noise levels would occur at their greatest intensity during construction of the maneuvering basin and navigational channel, and presumably somewhat less so during barge operation, pile driving, and breakwater construction activities. Impacts would likely be seasonal, but would not necessarily occur at the same time as upland project features; project elements that generate in-water noise would likely be subject to specific windows of time or restrictions due to their propensity to potentially harass marine mammals.

Long-term impacts on atmospheric and in-water ambient noise levels as a result of the implementation of Alternative N-3 would likely be in the form of those noises produced as a result of increased vessel traffic and operation of attendant dock-side support equipment. As described in Section 4.2.1.4 Navigation, above, commercial and subsistence vessel traffic would be expected to increase as well, which would moderately affect the ambient baseline of the in-water and atmospheric noise profile at Village Cove.

Impacts to both atmospheric and in-water ambient noise levels would be most severe in the short-term; however, would abate over time as the largest construction features were completed. In the longer term, however, the acoustic baseline would come to resemble that of a small boat harbor. Conservation measures directing the specific timing of major construction elements would also likely reduce potential impacts to in-water ambient noise levels. Overall impacts on ambient noise at St. George would be moderate.

4.2.1.6 *Protected Tribal Resources*

Under Alternative N-3 (Proposed), there would be no adverse impacts to subsistence access in or around the community of St. George. Construction of the harbor would benefit the accessibility for subsistence practices, which are traditional to the local Unangax̂ population; the proposed harbor would increase the available days for accessing marine resources for subsistence activities. There would be adverse impacts on other protected tribal resources; these are discussed in Section 4.2.1.2 (Cultural Resources) and Section 4.2.2 (Biological Resources).

4.2.1.7 *Public Infrastructure*

Under Alternative N-3 (Proposed), St. George's public infrastructure would be impacted by an increase in the number of personnel and type of equipment that would be utilizing it in order to implement the project. However, in its current state, the majority of St. George's existing public infrastructure would be capable of handling an increase in utilization with only minor, temporary impact, including the existing harbor and facilities, road system, airfield, and St. George's solid waste management facilities.

St. George's existing harbor would be impacted by an increase in barge traffic, bringing construction-related equipment and raw materials to the island. However, these impacts would be temporary in nature and likely discountable because of its current state of utilization.

St. George's main road from the existing harbor to the Village site would be impacted by episodic increases in heavy equipment traffic, specifically when equipment and rock barges started arriving at the existing harbor and debarking their cargo for transference to the north side of the island. Although these impacts would be temporary, the added traffic could pose a hazard to local residents who frequently rely upon 4-wheelers as their preferred method of transportation around the local roads.

St. George's existing airfield is currently underutilized, receiving few commercial and private aircraft per week. An increase in air traffic as a result of project construction or full project implementation would be easily supported, and represent only a temporary impact, In the long-term, the erosive forces of the Bering Sea's climate would have a more pronounced physical impact upon the airfield than a slight-to-moderate increase in air traffic.

St. George's solid waste management facilities are currently underutilized and would be only temporarily impacted by an increase in the solid waste stream generated by the project's construction activities. Full implementation of the proposed project would require dedicated long-term solid waste management support, but this is not expected to impact the existing condition of solid waste management on St. George.

Existing electrical and water distribution systems may require supplemental capacity or a diversion of resources to support project-related functions at either the existing harbor,

which currently has no running water or at the Village Cove project site, which has neither water nor power.

Long-term impacts on St. George's public infrastructure are most likely to be those associated with the requirements of the harbor itself, the water and electricity that it would draw, and the solid waste management support that it would require. The harbor would essentially become its own public infrastructure asset and would have to be addressed as such with maintenance and upkeep, incremental modernization, and constant monitoring.

Even after project implementation, impacts to the public infrastructure would not be expected to attain the same level intensity as while construction was actively occurring. The most recognizable direct effect to the existing public infrastructure would be the long-term demands and management of the new harbor. Indirect effects to public infrastructure may include increased air traffic, and an increase in overall traffic compared to the existing baseline. Overall, impacts to St. George's public infrastructure are likely to be minor as a result of the implementation of Alternative N-3.

4.2.1.8 ***Socioeconomics***

Under Alternative N-3 (Proposed), the socioeconomic paradigm within the community of St. George would be positively impacted. As such, impacts to the community's population and demographics, and employment and income would be likely to occur at some level in both the short- and long-term.

Facets of the community's population and demographics would be impacted by all aspects of the proposed project. An increase in transient laborers during construction, followed by more permanent-type positions during long-term harbor operations, would beget requirements for support services. These services would generate employment opportunities that may attract potential residents to St. George. Increased economic opportunity at St. George would likely impact the existing immigration to emigration ratio.

Significant portions of the construction work are likely to require heavy equipment operators, engineers, logistical specialists, and other well-paying positions. The project, as proposed, would possibly take as long as five years or more to complete. Long-term operation of the harbor and efforts that support maintenance and oversight of those facilities would also likely generate employment opportunities. Also, reliable, long-term operation of the harbor would be expected to reduce associated transportation costs applied to fuel and durable goods that borne by the community.

Long-term effects stemming from the implementation of Alternative N-3 may also include the stability that the harbor offers the community of St. George; fuel and durable goods could be reliably delivered, where in the past this was not guaranteed. Indirect impacts could vary in scale or scope but could include the establishment of ecotourism, fish processing, marine repair, or similar type business based at St. George.

4.2.1.9 *Sediments*

Under Alternative N-3 (Proposed), impacts to sediments would be short in duration but in some cases, disruptive. Approximately 430,000 cubic yards of marine sediments within the project footprint would be subject to drilling, blasting, dredging, compression, and hydraulic and atmospheric processes. It is likely that all of the dredge prism would be would be placed between the 20 and 30-fathom contours (Figure 2); however, a portion (up to 45,000 CY) may be used for upland fill. Exposed sediments in the Village Cove area next to the project features may also be impacted through exposure to weathering.

Initially, sediments would be fractured and pulverized during drilling and blasting, and these forces would also expose sediments to wave and current action, which may mobilize some sediments or cause others to fall out of suspension. Sediments would be compressed and compacted during dredging operations and the creation of upland features and placement at the beneficial utilization site. Sediments placed at the dredged material placement site (Figure 2) would be subject to the prevailing currents in the water column as they descend towards the bottom. Similarly, disturbance of those bottom sediments would occur as each iteration of placement occurs. Some sediments in these areas would be mobilized by such disturbance and later redistributed by the prevailing current.

Sediments utilized as fill in the project's upland feature may be subject to atmospheric weathering processes that cause them to degrade further or cause smaller particulate sediments to mobilize back into the marine environment where they may generate a short-lived and localized plume of suspended sediments. Wave action is rigorous enough at the project site that suspended sediments would be dispersed effectively, or they would fall out of suspension and be incorporated into the littoral sediment budget. These processes would be expected to subside over time as the bank of finer sediments in the fill area diminished over time.

Newly exposed shoreline sediments may be indirectly affected over the long-term by implementation of the project and may experience reduced capacity for mobilization as the project's two breakwaters would be likely to reduce the wave energy allowed to come into contact with those sediments behind it. Similarly, those areas of protected waters behind the breakwater would likely facilitate sediments in suspension to fall out and accumulate.

Implementation of Alternative N-3 would likely have a disruptive impact on sediments in the short-term. However, these impacts would be expected to dissipate and ultimately result in a minimal overall and long-term impact.

4.2.1.10 *Water Quality*

Under alternative N-3, impacts to water quality would be moderate and likely come from increased turbidity as a function of construction and other project-related activities such as drilling, blasting, dredging, and placement of dredged material. Impacts on water

quality may also be caused by project runoff and an increased probability of inadvertent release of environmentally persistent compounds over time.

Water quality at Village Cove would be impacted by increased turbidity levels associated with drilling, blasting, and dredging. These impacts would be most apparent during or immediately after each of these iterations before wave action, and sediment fallout would return water turbidity levels to ambient conditions. Sediment characteristics at the site suggest that due to its high energy and likely high percentage of bedrock, sediment fallout would be rapid. Despite multiple iterations of drilling, blasting, and dredging required to implement the proposed project, impacts to water quality as a result of turbidity would not be long-lived.

Water quality at the dredged material placement site would be impacted by increased turbidity. Each placement would release approximately 2,500 cubic yards of material from the dredge scow into the water column at the designated site. The mechanical action of sinking through the column would liberate finer particulate materials and set them adrift in the prevailing current, while those heavier sediments would impact the ocean floor and dislodge and expose finer sediments to the deep water current. Approximately 150-170 individual scow trips would be required to transport the entire dredge prism to the placement site. Water quality would be expected to be temporarily impacted in each case; however, turbidity values would decrease rapidly, the impact would be highly localized, and the interval between placements longer than the time required for turbidity to return to ambient levels. In the context of the project's ability to impact the water quality of the Bering Sea or even the span of such that separates St. George and St. Paul Island, the impact would be negligible.

Runoff from disturbed and exposed ground in proximity to or associated with the proposed project site represents a more likely source of fine particulate material that could impact water quality due to turbidity. St. George's coastal wave climate and currents would effectively dilute impacts from this source of turbidity, but would not be necessary if an appropriate stormwater pollution prevention plan were implemented to reduce such impacts. Impacts from project-related runoff would be minor with the implementation of a comprehensive stormwater pollution prevention plan.

Indirectly, in-water construction actions, short- and long-term petroleum, oil, and lubricant utilization and storage, increased vessel activity; and increased anthropogenic activity would increase the probability of an inadvertent release of compounds that could negatively affect water quality. Impacts on water quality as a result of such a release would be lessened by an appropriate spill response plans (both on land and at sea), a hazardous materials management plan, and the enforcement of safe navigational procedures into and away from the project site. Through appropriate planning and procedure, potential impacts to water quality through the inadvertent release of environmentally persistent compounds would be negligible.

No direct or indirect impacts to water circulation, dissolved oxygen levels, or salinity would be expected as a result of the project because St. George is very isolated and exposed to hundreds of miles of fetch in all directions, resulting in a rigorous nearshore wave climate. Short-term, temporary impacts to water quality in the form of localized increased turbidity levels would be expected to occur as a result of the implementation of Alternative N-3. Implementation of best management practices regarding stormwater pollution prevention, safe material storage, and safe navigation practices would ensure that the potential impact on water quality would be reduced as much as practicable.

4.2.2 Biological Resources

4.2.2.1 *Fish and Essential Fish Habitat*

Under Alternative N-3 (Proposed), fish and their corresponding EFH would be moderately impacted by in-water construction-related activities: drilling, blasting and dredging of sediments, and the placement of not only the dredge sediments but also the breakwater structures.

Drilling the bedrock in preparation for blasting would be a temporary mechanical and audible disturbance to fishes in the waters of Village Cove. Some fish may refuse to tolerate such disturbance and move to similar habitat within St. George's nearshore areas. However, some fishes may not be able to move to unaffected habitat due to size, habitat preference, lack of motility, or risk of predation, and would be subject to temporary audible and mechanical disturbance. Fishes unable to avoid exposure to drilling may suffer decreased fitness.

Confined underwater blasting would be a temporary, yet pervasive impact to fishes, likely resulting in the immediate death or mortal injury of those fishes within the highest energy blast radius. Similarly, fishes exposed to non-lethal blasting energy may alter their inherent behaviors associated with feeding predator evasion and communication, or they may seek to avoid the waters of Village Cove entirely. Conversely, the effects of blasting, the mortality of some fishes, could serve as a nuisance attractant for other fishes. Physical characteristics of the submerged habitat at Village Cove would be permanently impacted as successive blasting iterations deepened and shaped the navigation features of Alternative N-3.

Village Cove's depth contours and epibenthic habitat features would be permanently impacted by dredging activities. Fishes that are in and amongst the substrate while dredging were occurring would be at risk of injury or mortality. However, some fishes may not tolerate acoustic and mechanical disturbance generated by the dredging actions and would move from the area to suitable adjacent habitat. Dredging would be temporary in nature, yet its effects upon the depth at Village Cove would be permanent.

Dredge material placement represents a temporary disruptive impact to fish and their habitat along the seafloor at the proposed placement area. Some fishes may be crushed by successive barge scow-loads of dredged material from the Village Cove area. Rocky and similar sediments would be expected to disturb some fish as they

impacted the sea floor and liberated sediments into the water column. Some fishes may be displaced by the creation of the dredge material placement site because soft-bottom habitat would be replaced by rocky reef-type habitat. However, the creation of rocky reef-type habitat where none previously existed would be expected to be beneficial to juvenile blue king crab and other species that utilize interstitial spaces as a portion of their life history. Rocky substrate similarly facilitates colonization by invertebrates and marine algae.

Placement of the Breakwater structures would be a permanent impact on fish and their habitat because it would reduce wave energy to the waters behind it. Some fishes may find advantages in such reduced energies, while others may migrate to more suitable habitat conditions nearby. The breakwater structures would also act as rocky reef habitat and provide an appropriate substrate for invertebrates and marine algae colonization. Similarly, interstitial spaces created by boulder-upon-boulder placement would be beneficial for fish species that utilize such habitat during any portion of their life history. Emplacement of the breakwater structures would be a temporary disruptive impact to fishes throughout the nearshore water column of Village Cove, and fishes may choose to abandon the area influenced by the disturbance for similar, undisturbed habitat nearby.

Potential impacts to EFH and EFH-managed species/species complexes are likely to be highly localized, temporary, and minimal, and not reduce the overall value of EFH in the Bering Sea. Mitigation measures would be implemented to offset the potential unavoidable impacts of USACE activity (see Section 6.2). The construction of a reef intended to provide habitat for BKC would represent a substantial beneficial impact of the project. Therefore, the USACE concludes that its Federal action may affect but is not likely to adversely affect EFH and EFH-managed species/species complexes for BSAI groundfish, crab, and Alaska stocks of Pacific salmon. Indirect effects to fish and their habitat would not be expected to occur as the remaining 98% of St. George's nearshore habitat is unaffected by anthropogenic development.

4.2.2.2 *Invasive Species*

Under alternative N-3 (Proposed), a harbor would be constructed. This would result in a short-term increase in air and sea traffic to the island during the construction process. During construction, heavy equipment, including barges, loaders, etc., would be transported to St. George from elsewhere in Alaska. Similarly, material for the breakwater would be sourced off-island from sites in Alaska. Material and equipment sourced from off-island would have the potential to harbor and introduce species to St. George that are not native to St. George Island or the Pribilof Islands. During construction, a greater number of personnel on work crews would be transiting from mainland Alaska on a regular basis and increase the potential for transporting non-native species on supplies and clothing. Post-construction, if the harbor provides the anticipated benefits, there would be a long-term increase in air and sea traffic, which would carry the same risks described for the construction phase. Implementation of best management practices regarding the preclusion of invasive species would be expected

to greatly reduce the likelihood of non-native species being introduced to St. George. Indirect effects related to invasive species would be unlikely.

4.2.2.3 *Marine Birds*

Under Alternative N-3 (Proposed), impacts to marine birds would be minor. Marine birds that nest along the ledges of the cliff face that comprises Village Cove's southern margin would likely be impacted by disturbances associated with the timing and intensity of construction activities, and again by the long-term operation of the harbor.

Like their marine mammal counterparts, cliff-nesting marine birds would be present in, and in close proximity to, the proposed project area in high densities beginning in the months of April and May, and lasting until October and November. During this period, cliff-nesting marine birds socialize, select nesting sites, make foraging trips out to sea, engage in courtship rituals, lay and incubate eggs, care for and fledge their young, and finally, linger until seasonal weather and food abundance patterns change, triggering migration to the open ocean. Cliff-nesting marine birds are sensitive to anthropogenic disturbance regimes, such as the intensive construction actions required by Alternative N-3. Impacts associated with such disturbance would likely cause birds to startle off of their nest ledges, cause loss or abandonment of eggs or chicks, result in failure to establishing nests, and because of the cliff nesting marine bird density at St. George, relocation to a sub-optimal nesting habitat. Therefore, impacts associated with drilling, confined underwater blasting, proximal dredging and material placement, and construction of the stub breakwater during the period that coincides with the majority of the birds' nesting period would be avoided to the greatest extent practicable. Alternative N-3 is estimated to require three to five years to implement. The duration of the implementation is a function of such seasonal work windows that would most likely be applied to specific activities that would conflict with the conservation of marine mammals and of cliff-nesting marine birds.

Long-term impacts to marine birds that nested at the Village Cove cliff site would be unavoidable once the harbor became operational. However, the intensity of the impact would be much reduced from those impacts expected during the construction phase of the project. Constant vessel traffic, artificial lighting, tall structures, the sights and sounds of a functioning harbor, and an increased anthropogenic presence could make some birds abandon the nest sites at the Village Cove site or could impact birds through direct interaction such as collisions. Conversely, some birds may acclimate to the disturbance over time and would not be affected by harbor operations.

Indirect impacts to cliff-nesting marine birds as a result of construction and eventual harbor operation include the inadvertent release of invasive species, increased presence of plastic debris and trash, and a likely increase in the probability of inadvertent release of environmentally persistent compounds. These impacts would likely be reduced through coordination with USFWS Alaska Maritime National Wildlife Refuge personnel, and the implementation of their existing rodent monitoring protocol. The cliffs at Village Cove represent less than 1% of available suitable nesting habitat on

St. George Island. Conservation measures that would offset the timing of major construction actions with the majority presence of marine birds would result in only very minor impacts to marine birds.

4.2.2.4 *Marine Invertebrates*

Under Alternative N-3 (Proposed), long-term impacts on marine invertebrates would be beneficial. Marine invertebrates would be temporarily impacted by in-water project-related actions that alter the geometry of, fracture, dislodge, crush-together, cover, and bury the sediments and substrates that they use for attachment, cover, feeding, egg-laying, and breeding.

Impacts to marine invertebrates would occur during all phases of in-water construction: drilling, confined underwater blasting, dredging, dredged material placement, construction of the breakwater structures, and inner harbor facilities. Many invertebrates, with the exception of some cephalopods, lack the innate motility to extract themselves from acute disturbance quickly. As such, impacts from project-related in-water construction activities would pulverize, crush, dislodge, increase susceptibility to predation, and injure or kill invertebrates within the proposed project footprint. Construction-related impacts would be temporary, likely occurring seasonally over an approximately 5 ½ year period.

Indirect impacts to marine invertebrates include those associated with the long-term operation of the harbor and the increased probability of inadvertent release of environmentally persistent compounds.

Permanent impacts on invertebrates resulting from the implementation of Alternative N-3 include decreased wave energy in the harbor area behind the breakwater structure and an overall increase in the quantity of rocky reef-type substrate at the breakwater and dredged material placement areas. Despite their permanence, over time, these impacts would likely be beneficial to marine invertebrate communities by providing suitable habitable substrate and structure for colonization by marine invertebrates.

4.2.2.5 *Marine Mammals, Endangered Species, and Critical Habitat*

Under alternative N-3 (Proposed), impacts to marine mammals would be minor and may result in temporary exposure to sounds or equipment that causes them to alter their natural behavior. Marine mammals, and threatened or endangered species and their respective designated critical habitats would be impacted by construction activities, shipping, and logistical activities, and the long-term operational activities of the harbor itself. Threatened and endangered species that may occur in the nearshore waters of St. George are all marine mammals (though not all marine mammals in the area are threatened or endangered), and as such, potential impacts have directly comparable effects across similar taxa.

Under the Endangered Species Act (ESA), in order to ascertain the nature of the impact for each of the proposed project's individual elements, the action area must be defined. Thereby, the individual project element with the greatest potential or overreaching impact is identified to the extent or distance that the impact becomes negligible to the most sensitive organism being considered. Confined underwater blasting has been determined to be the project element to have the greatest potential in-water sound pressure impact upon all marine mammals in the area (regardless of ESA status), followed by pile driving, dredging, dredge material placement, and vessel/harbor operation.

The action area for Alternative N-3 is broken into two distinct areas. The north action area is a radius of seven kilometers from the harbor site and is based on the projected distance of Level B (behavioral) disturbance for low frequency cetaceans (Table 5), i.e., humpback whales, from confined underwater blasting assuming the largest charge size possible (100 kg/220 lbs.). The effects analysis detailed in this proposed project's Draft Biological Assessment (Appendix C) assumes a maximum charge size of 110 lbs., but to be conservative in determining the action area, the larger zone for the 220 lb. charge is used. This represents the greatest distance calculated for any construction-related noise and also encapsulates the zone of increased vessel traffic from the new harbor. Beyond this zone, marine traffic is considered to be indistinguishable from existing vessel traffic.

USACE has determined that due to the extensive presence of northern fur seals in the proposed project's action area during the late spring to late fall timeframe, it would seek to avoid unavoidable impacts through a conservative work window for its confined underwater blasting. Confined underwater blasting would be limited to the months of November through April. Although primarily concerned with the conservation of northern fur seals, conducting confined underwater blasting during winter months likely increases the probability of impacts to ice seals. Overall, the potential magnitude of the impact on ice seals would likely be far less than the impact on the abundant fur seals during the summer breeding season.

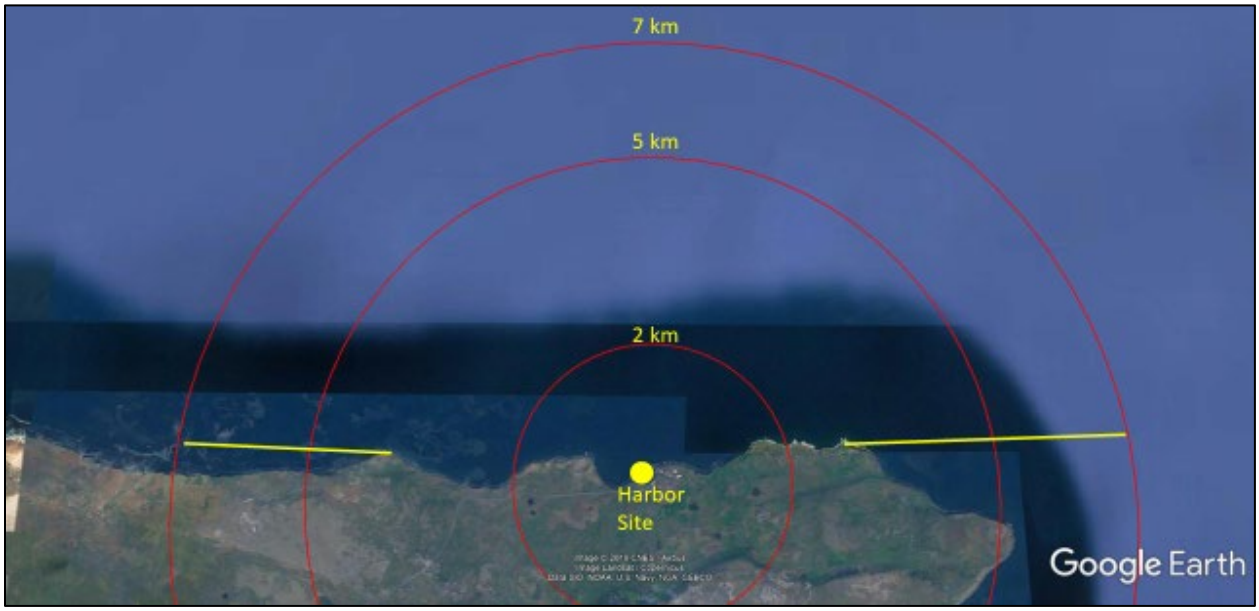


Figure 15. Northern Action Area Map

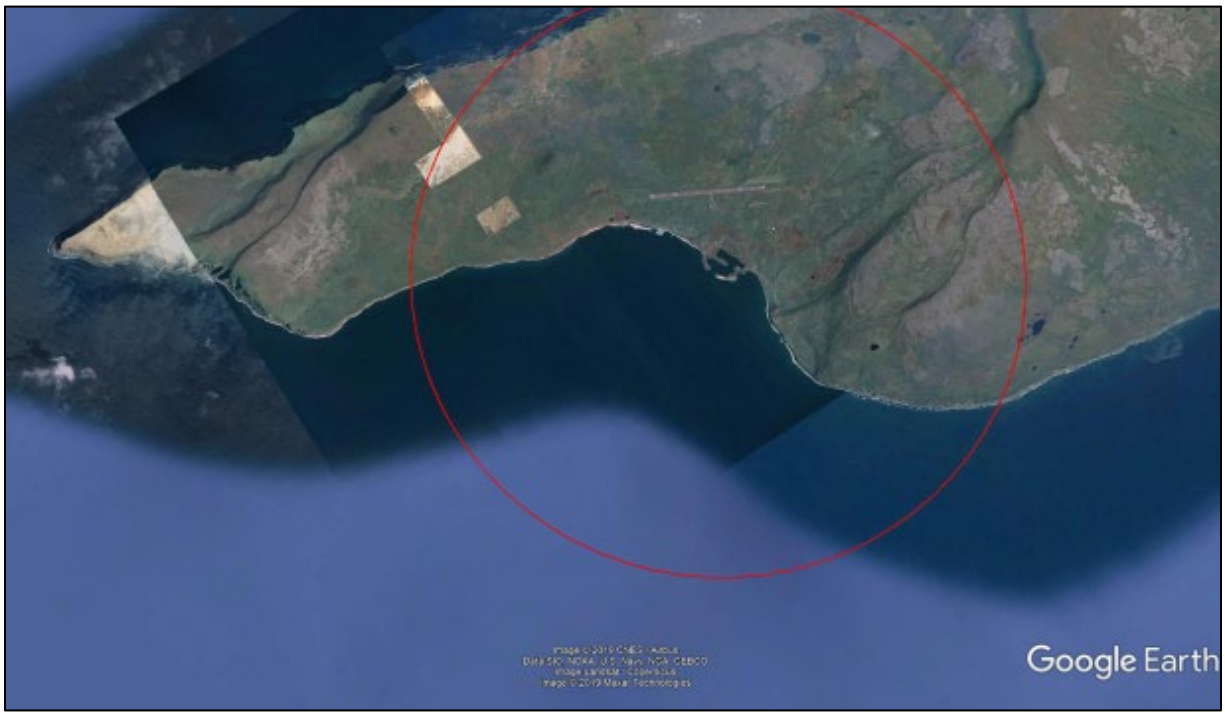


Figure 16. South action area map with 4 km action area zone indicated in red.

Table 5. Explosive Criteria for Marine Mammals

Group	Species	Behavior		Slight Injury			Mortality
		Behavioral (for ≥2 pulses/24 hours)	TTS	PTS	Gastro-Intestinal Tract	Lung	
Low-frequency Cetaceans	Mysticetes (e.g., humpback whale)	167 dB SEL (LF_{II})	172 dB SEL (LF_{II}) or 224 dB peak SPL	187 dB SEL (LF_{II}) or 230 dB peak SPL	237 dB SPL or 104 psi	39.1 $M^{1/3}$ $(1+[D_{Rm}/10.081])^{1/2}$ Pa-sec Where: M = mass of the animals in kg D_{Rm} = depth of the receiver (animal) in meters	91.4 $M^{1/3}$ $(1+[D_{Rm}/10.081])^{1/2}$ Pa-sec Where: M = mass of the animals in kg D_{Rm} = depth of the receiver (animal) in meters
Mid-frequency Cetaceans	Most delphinids, medium and large toothed whales	167 dB SEL (MF_{II})	172 dB SEL (LF_{II}) or 224 dB peak SPL	187 dB SEL (MF_{II}) or 230 dB peak SPL			
High-frequency Cetaceans	Porpoises and *Kogia* spp.	141 dB SEL (HF_{II})	146 dB SEL (HF_{II}) or 195 dB peak SPL	161 dB SEL (HF_{II}) or 201 dB peak SPL			
Phocidae	Hawaiian monk, elephant, and harbor seal	172 dB SEL (P_{WI})	177 dB SEL (P_{WI}) or 212 dB peak SPL	192 dB SEL (P_{WI}) or 218 dB peak SPL			

Otariidae	Sea lions and fur seals	195 dB SEL (O_{WI})	200 dB SEL (O_{WI}) or 212 dB peak SPL	215 dB SEL (O_{WI}) or 218 dB peak SPL			

Groups of like-taxa marine mammals display sensitivity thresholds to specific sound pressure levels (Table 5). As such, impacts to marine mammals are evaluated by which construction element's noise-generating capacity might affect them, and by what the long-term effects of dredged material placement and harbor operations might be. A subset of marine mammals described in the existing environment section have been placed in three like-taxa groups corresponding to the explosive criteria for marine mammals. First, the Otariidae, comprised of northern fur seal, Steller sea lion, and northern sea otter (which is usually included amongst this group in acoustic impact analyses). Second, the mid and low-frequency cetaceans comprised of minke whale, fin whale, humpback whale, and killer whale. Third, the Phocidae, comprised of harbor seal, ringed seal, and bearded seal.

Table 6. Potential Impacts to Group Otariidae, Including Northern Sea Otter

Activity	Potential impact to group Otariidae, including northern sea otter.
Drilling (for blast holes)	Sound levels are below in-water threshold levels for noise. Moderate adverse effects for disturbance due to the presence of the drill barge and associated traffic. Potential effects would be limited to the period of construction.
Blasting	Moderate effects due to disturbance from pressure waves in the Level B zone, no blasting allowed in with animals in Level A zone. Disturbance from blasting could lead to displacement from the Level B zone for a short period of time. Potential effects are limited to a short duration after the blast.
Dredging	Dredging would take place after the area is drilled and blasted and would likely occur in blasted areas concurrent with drilling in other areas of the footprint. Underwater noise is anticipated to be audible, but not above regulatory thresholds for marine mammals. Dredging would likely be by clamshell or hydraulic extended-reach excavator.
Dredged Material Placement	Moderate adverse effects during disposal due to vessel activity and temporary increases in turbidity. Beneficial effects as the area is used by fish and invertebrates, with the benefits increasing over time.
Pile Driving	Low numbers of Steller sea lions, northern fur seals, or northern sea otters would be exposed to Level B harassment from pile driving during construction. Additional details are necessary to determine the potential impacts of pile driving more accurately.
Harbor Operation	Harbor use would lead to increased vessel traffic in the action area, but given timing of commercial seasons, disturbance and increased risk of vessel strikes would be limited to time periods surrounding seasonal openings and closures when most vessels are transiting through the area.

Table 7. Potential Impacts to Groups Low and Mid-frequency Cetaceans

Activity	Potential impact to groups low and mid-frequency cetaceans.
Drilling (for blast holes)	Sound levels are below in-water threshold levels for noise. Moderate adverse effects for disturbance due to the presence of the drill barge and associated traffic. Potential effects would be limited to the period of construction.
Blasting	Moderate effects due to disturbance from pressure waves in the Level B zone, no blasting allowed in with animals in Level A zone. Disturbance from blasting could lead to displacement from the Level B zone for a short period of time. Potential effects are limited to a short duration after the blast. Disturbance could trigger responses ranging from leaving the area to no visible response at all.
Dredging	Dredging would take place after the area is drilled and blasted and would likely occur in blasted areas concurrent with drilling in other areas of the footprint. Underwater noise is anticipated to be audible, but not above regulatory thresholds for marine mammals. Dredging would likely be by clamshell or hydraulic extended-reach excavator.
Dredged Material Placement	Moderate adverse effects during disposal due to vessel activity and temporary increases in turbidity. Beneficial effects as the area is used by fish and invertebrates, with the benefits increasing over time. While humpback whales would not forage on the reef directly, they could benefit from an overall enrichment in the area.
Pile Driving	Low numbers of low and mid-frequency cetaceans would be exposed to Level B harassment from pile driving during construction. Additional details are necessary to determine the potential impacts of pile driving more accurately.
Harbor Operation	Harbor use would lead to increased vessel traffic in the action area, but given timing of commercial seasons, disturbance and increased risk of vessel strikes would be limited to time periods surrounding seasonal openings and closures when most vessels are transiting through the area.

Table 8. Potential Impacts to Group Phocidae

Activity	Potential impact to phocidae.
Drilling (for blast holes)	Sound levels are below in-water threshold levels for noise. Moderate adverse effects for disturbance due to the presence of the drill barge and associated traffic. Potential effects would be limited to the period of construction.
Blasting	Moderate effects due to disturbance from pressure waves in the Level B zone, no blasting allowed near animals in Level A zone. Disturbance from blasting could lead to displacement from the Level B zone for a short period of time. Potential effects are limited to a short duration after the blast. Disturbance could trigger responses ranging from leaving the area to no visible response at all.
Dredging	None. Phocids would likely not be in the area during dredging due to seasonal migration.
Dredged Material Placement	Beneficial effects as the area is used by fish and invertebrates, with the benefits increasing over time.
Pile Driving	Potential moderate effects on resident phocids as a result of potential level b harassment from exposure to pile driving during construction. Additional details are necessary to determine impacts of pile driving more accurately.
Harbor Operation	Harbor use would lead to increased vessel traffic in the action area, but given timing of commercial seasons, disturbance and increased risk of vessel strikes would be limited to time periods surrounding seasonal openings and closures when most vessels are transiting through the area.

Short-term direct impacts to marine mammals would likely include Level B exposure to construction-related noise or equipment that causes them to alter their natural behavior (foraging, surfacing for breath, diving, feeding of young, socializing, and transitioning through an area). However, long-term direct impacts to marine mammals or their stocks, i.e., changes in seasonal distributions over a long period of time, or reduction of critical food resources are not likely as a result of the proposed project. Refer to Appendix C, Draft Biological Assessment for more in-depth analysis of potential impacts and coordination requirements for marine mammals.

Indirect impacts to marine mammals may include those that occur as a result of emplacement of the breakwater structures. Some marine mammals would likely choose to haul-out on such structures. Similarly, reduced wave energies in the maneuvering basin could serve as an attractant for some marine mammals, particularly juvenile fur seals; this would expose or habituate these animals to the increased anthropogenic presence in the harbor itself. In summary, impacts to marine mammals resulting from the implementation of Alternative N-3 would be low.

4.3 Alternative N-2

4.3.1 Non-Biological Resources

4.3.1.1 *Aesthetics*

Under Alternative N-2, impacts on aesthetics would likely be the same to the impacts described in Alternative N-3, Section 4.2.1.1. Alternative N-2 differs from N-3 in the depth of dredging (N-3 is deeper); however, the design of the breakwaters under N-2 and N-3 is the same and would have the same visual impact on the seaward and the landward viewsheds.

4.3.1.2 *Cultural Resources*

Under Alternative N-2, impacts to cultural resources would likely be the same as Alternative N-3, Section 4.2.1.2. The *Memorandum of Agreement among the USACE, SHPO, and the City of St. George Regarding the St. George Navigation Improvements* would still be completed to address affects to the Seal Islands Historic District National Historic Landmark and the two contributing structures.

4.3.1.3 *Environmental Justice and the Protection of Children*

Under Alternative N-2, impacts to environmental justice and the protection of children would likely be similar to Alternative N-3, 4.2.1.3. Implementation of Alternative N-2 does not disproportionately negatively affect minority or low-income populations on St. George Island, the population of which is predominantly Alaska Native. Rather, the alternative seeks to reduce inefficiencies inherent to the existing navigation infrastructure, improve food security through increased subsistence access, and improve health and safety. Additionally, Alternative N-2 does not disproportionately negatively affect children. The community's children are expected to benefit from the improved navigational safety and food security.

4.3.1.4 *Navigation*

Under Alternative N-2, impacts to navigation would likely be similar to N-3, Section 4.2.1.4., except that this alternative would provide access to 25% of the commercial fishing fleet provided by Alternative N-3.

4.3.1.5 *Noise*

Under Alternative N-2, impacts to ambient atmospheric and in-water noise would likely be reduced compared to Alternative N-3, Section 4.2.1.5. Alternative N-2 would generate approximately 53% of the dredge materials compared to N-3 and would thus produce proportionally less noise From a long-term perspective, with no crabber fleet access, noise associated with harbor activities would likely be reduced.

4.3.1.6 *Protected Tribal Resources*

Under Alternative N-2, impacts to protected tribal resources would likely be the same as Alternative N-3, Section 4.2.1.6.

4.3.1.7 *Public Infrastructure*

Under Alternative N-2, impacts to public infrastructure would likely be similar to Alternative N-3, Section 4.2.1.7.

4.3.1.8 *Socioeconomics*

Under Alternative N-2, impacts to socioeconomics would likely be similar to Alternative N-3, Section 4.2.1.8., with the exception of the possibility of reduced long-term employment opportunity resulting from the inability of Alternative N-2 to support a greater proportion of the commercial fishing fleet.

4.3.1.9 *Sediments*

Under Alternative N-2, impacts to sediments would likely be similar toAlternative N-3, Section 4.2.1.9., with the exception of duration and overall quantity of sediments produced. Alternative N-2 would generate approximately 53% of the dredge material compared to N-3 and disturb approximately 66% of the area. This would proportionally reduce the amount of time required for blasting and dredging and would result in proportionately less sediment generation. Additionally, it would result in a proportionally smaller quantity of material in-water placement as that for Alternative N-3.

4.3.1.10 *Water Quality*

Under Alternative N-2, impacts to water quality would likely be similar to Alternative N-3, Section 4.2.1.10., with the exception of a reduction in duration and the quantity of dredge material produced would be less (see Section 4.3.1.9 for details).

4.3.2 Biological Resources

4.3.2.1 *Fish and Essential Fish Habitat*

Under Alternative N-2, impacts to fish and essential habitat would likely be similar to Alternative N-3, Section 4.2.2.1. Impacts to fish would be less as the duration of activities to dredge would be reduced by approximately 53%. The areal impact to EFH would be 66% of that for N-3 and the amount of rocky reef-type habitat created would be reduced by approximately 53%.

4.3.2.2 *Invasive Species*

Under Alternative N-2, impacts from invasive species would likely be reduced compared Alternative N-3, Section 4.2.2.2. The reduced size and depths of N-2 compared to N-3 would result in a shorter duration of construction activities and less materials being transported to St. George. Also, with a reduction in the crabber fleet, fewer vessels would be docking. Combined these factors would translate into a reduced risk of species introduction.

4.3.2.3 *Marine Birds*

Under Alternative N-2, impacts to marine birds would likely be similar to Alternative N-3, Section 4.2.2.3., with the exception that construction activities related to dredging would be reduced by approximately 53%. Additionally, because N-2 would support a 25% smaller commercial fishing fleet, it would be likely that impacts related to the fleet would be proportionally smaller than for N-3.

4.3.2.4 *Marine Invertebrates*

Under Alternative N-2, impacts to marine invertebrates would likely be reduced compared to Alternative N-3, Section 4.2.2.4. The areal impact to EFH would be 66% of that for N-3 and the amount of rocky reef-type habitat created would be reduced by approximately 53%.

4.3.2.5 *Marine Mammals, Endangered Species, and Critical Habitat*

Under Alternative N-2, impacts to marine mammals, endangered species, and critical habitat would likely be similar as Alternative N-3, Section 4.2.2.5., with the exception that construction activities related to dredging would be reduced by approximately 53%. Additionally, because N-2 would support a 25% smaller commercial fishing fleet, it would be likely that impacts related to the fleet would be proportionally smaller than for N-3.

4.4 Alternative N-1

4.4.1 Non-Biological Resources

4.4.1.1 *Aesthetics*

Under Alternative N-1, impacts to aesthetics would likely be similar to Alternative N-3, Section 4.2.1.1., but reduced in scale and scope. There would be no spur breakwater and the main breakwater would be approximately 45% the length of that proposed for N-3. The other components of the breakwater would be the same as for N-3, as such the impact to the viewshed would be reduced both from the seaward and landward sides.

4.4.1.2 *Cultural Resources*

Under Alternative N-1, impacts to cultural resources would likely be similar to Alternative N-3, Section 4.2.1.2, but reduced in scale and scope (see Section 4.4.1.1 for details). The *Memorandum of Agreement among the USACE, SHPO, and the City of St. George Regarding the St. George Navigation Improvements* would still be completed to address

affects to the Seal Islands Historic District National Historic Landmark and the two contributing structures.

4.4.1.3 *Environmental Justice and the Protection of Children*

Under Alternative N-1, impacts to environmental justice and the protection of children would likely be similar to Alternative N-3, 4.2.1.3. Implementation of Alternative N-1 does not disproportionately negatively affect minority or low-income populations on St. George Island, the population of which is predominantly Alaska Native. Rather, the alternative seeks to reduce inefficiencies inherent to the existing navigation infrastructure, improve food security through increased subsistence access, and improve health and safety. Additionally, Alternative N-1 does not disproportionately negatively affect children. The community's children are expected to benefit from the improved navigational safety and food security.

4.4.1.4 *Navigation*

Under Alternative N-1, impacts to navigation would likely be reduced compared to Alternatives N-3, Section 4.2.1.4. N-1 would not support a commercial fleet or provided for barge access; thus, impacts to navigation would be reduced compared to N-3.

4.4.1.5 *Noise*

Under Alternative N-1, impacts to ambient atmospheric and in-water noise would likely be reduced compared to Alternative N-3, Section 4.2.1.5. N-1 would generate approximately 2% of the dredge material compared to N-3 and would thus produce proportionally less noise. From a long-term perspective, with no crabber fleet or barge access, noise associated with harbor activities would likely be reduced.

4.4.1.6 *Protected Tribal Resources*

Under Alternative N-1, impacts to protected tribal resources would likely be the same as Alternative N-3, Section 4.2.1.6.

4.4.1.7 *Public Infrastructure*

Under Alternative N-1, impacts to public infrastructure would likely be similar to Alternative N-3, Section 4.2.1.7., except that the overall duration of the project would likely be shorter because the 55% smaller breakwater and 98% reduction in dredging-related activities would require proportionally less construction activity. Also, without the development of a subsistence-cash economy it is unlikely that additional long-term public infrastructure would be required to support Alternative N-1.

4.4.1.8 *Socioeconomics*

Under Alternative N-1, impacts on socioeconomics would likely be the reduced relative to Alternative N-3. The harbor would not support barge access or a commercial fleet, which would result in continued higher prices for fuel and products and would not facilitate the development of a viable subsistence-cash economy. As a result, the human population on St. George would likely continue to decline and increase in relative age. Similarly, without a viable economy, the percentage of the residents below the poverty line would be likely to continue to increase.

4.4.1.9 *Sediments*

Under Alternative N-1, impacts to sediments would likely be reduced compared to Alternative N-3, Section 4.2.1.9. Alternative N-1 would generate approximately 2% of the dredge material compared to N-3 and disturb approximately 6% of the area. This would proportionally reduce the amount of time required for blasting and dredging and would result in proportionately less sediment generation. Additionally, there would likely be no need for in-water dredged material placement.

4.4.1.10 *Water Quality*

Under Alternative N-1, impacts to water quality would likely be reduced compared to Alternative N-3, Section 4.2.1.10. (see Section 4.4.1.9 for details). Also, there would be no need for in-water dredged material placement.

4.4.2 Biological Resources

4.4.2.1 *Fish and Essential Fish Habitat*

Under Alternative N-1, impacts to fish and essential fish habitat would likely be reduced compared to Alternative N-3, Section 4.1.2.1. Impacts to fish would likely be less as the duration of activities to dredge would be reduced by approximately 98%. The areal impact to EFH would be approximately 6% of that for N-3 and it is likely that no rocky reef-type habitat would be created by the in-water placement of dredge material and habitat creation from construction of the breakwater would be reduced by approximately 55%.

4.4.2.2 *Invasive Species*

Under Alternative N-1, impacts from invasive species would likely be reduced compared to Alternative N-3, Section 4.1.2.2. The reduced size and depths of N-2 compared to N-3 would result in a shorter duration of construction activities and less materials being transported to St. George. Also, with no crabber fleet or barge access fewer vessels would be docking. Combined these factors would translate into a reduced risk of species introduction.

4.4.2.3 *Marine Birds*

Under Alternative N-1, impacts to marine birds would likely be similar to Alternative N-3, Section 4.1.2.3., with the exception that construction activities related to dredging would be reduced by approximately 98%. Additionally, because N-1 would only support a subsistence fleet, it would be likely that impacts related to the fleet would be proportionally smaller than for N-3.

4.4.2.4 *Marine Invertebrates*

Under Alternative N-1, impacts to marine invertebrates would likely be reduced compared to Alternative N-3, Section 4.1.2.4. The areal impact to EFH would be approximately 6% of that for N-3 and it is likely that no rocky reef-type habitat would be created by the in-water placement of dredge material and habitat creation from construction of the breakwater would be reduced by approximately 55%.

4.4.2.5 *Marine Mammals, Endangered Species, and Critical Habitat*

Under Alternative N-1, impacts to marine mammals, endangered species, and critical habitat would likely be reduced compared to Alternative N-3, Section 4.1.2.5. The area requiring blasting and/or dredging would be approximately 6% of that for N-3 and the amount of dredge material would be approximately 2%. This would likely result in a reduced duration of impact.

4.5 Alternative N-4

4.5.1.1 *Aesthetics*

Under Alternative N-4, impacts to aesthetics would likely be similar Alternative N-3, Section 4.2.1.1., but reduced in scale and scope. There would be no spur breakwater and the main breakwater would be approximately 64% the length of that proposed for N-3. The other components of the breakwater would be the same as for N-3, as such the impact to the viewshed would be reduced both from the seaward and landward sides.

4.5.1.2 *Cultural Resources*

Under Alternative N-4, impacts to cultural resources would likely be similar to Alternative N-3, Section 4.2.1.2, but reduced in scale and scope (see Section 4.5.1.2 for details). The *Memorandum of Agreement among the USACE, SHPO, and the City of St. George Regarding the St. George Navigation Improvements* would still be completed to address affects to the Seal Islands Historic District National Historic Landmark and the two contributing structures.

4.5.1.3 *Environmental Justice and the Protection of Children*

Alternative N-4, would likely negatively affect minority or low-income populations on St. George Island, the population of which is predominantly Alaska Native. While the alternative would increase access to the barge, it would not improve food security as the subsistence fleet would still rely on the previous infrastructure. Alternative N-4 would not disproportionately affect children, as the community as a whole would receive the same impact.

4.5.1.4 *Navigation*

Under Alternative N-4, impacts to navigation would likely be reduced relative to Alternative N-1, Section 4.4.1.4 N-1 would not support a commercial fleet; thus, impacts to navigation would be reduced compared to N-3.

4.5.1.5 *Noise*

Under alternative N-4, impacts to ambient atmospheric and in-water noise would be reduced compared to Alternative N-3, Section 4.2.1.5., N-4 would generate approximately 35% of the dredge material compared to N-3 and would thus produce proportionally less noise. From a long-term perspective, with no barge access, noise associated with harbor activities would likely be reduced.

4.5.1.6 *Protected Tribal Resources*

Under Alternative N-4, impacts to protected tribal resources would be likely as there would be no increase of use by the subsistence fleet, as the N-4 Alternative would not be able to moor the local fleet used for subsistence fishing.

4.5.1.7 *Public Infrastructure*

Under Alternative N-4, impacts to public infrastructure would likely be similar to Alternative N-3, Section 4.2.1.7., except that the overall duration of the project would likely be shorter because the 36% smaller breakwater and 65% reduction in dredging related activities would require proportionally less construction activity. Also, it is unlikely that additional long-term public infrastructure would be required to support Alternative N-1. Also, without the development of a subsistence-cash economy it is unlikely that additional long-term public infrastructure would be required to support Alternative N-2.

4.5.1.8 *Socioeconomics*

Under Alternative N-4, impacts on socioeconomics would likely be reduced relative to Alternative N-3, Section 4.2.1.8. The harbor would not support a commercial fleet, which would not facilitate the development of a viable subsistence-cash economy. As a result, the human population on St. George is would likely to continue to decline and increase in relative age. Similarly, without a viable economy, the percentage of the residents below the poverty line is would be likely to continue to increase.

4.5.1.9 *Sediments*

Under Alternative N-4, impacts on sediments would likely be reduced compared to Alternative N-3, Section 4.2.1.9. Alternative N-4 would generate approximately 35% of the dredge material compared to N-3 and disturb approximately 48% of the area. This would proportionally reduce the amount of time required for blasting and dredging and would result in proportionately less sediment generation. Additionally, the amount of dredge material available for in-water placement would be reduced compared to N-3.

4.5.1.10 *Water Quality*

Under Alternative N-4, impacts to water quality would likely be reduced compared to Alternative N-3, Section 4.2.1.10. (see Section 4.5.1.9 for details). Additionally, the amount of materials available for in-water dredged material placement would be reduced compared to N-3.

4.5.2 Biological Resources

4.5.2.1 *Fish and Essential Fish Habitat*

Under Alternative N-4, impacts to fish and essential fish habitat would likely be reduced compared to Alternative N-3, Section 4.2.2.1. Impacts to fish would likely be less as the duration of activities to dredge would be reduced by approximately 65%. The areal impact to EFH would be approximately 48% of that for N-3 and it is likely that the amount of rocky reef-type habitat created by the in-water placement of dredge material would be reduced by 65% and habitat creation from construction of the breakwater would be reduced by approximately 36%.

4.5.2.2 *Invasive Species*

Under Alternative N-4, impacts from invasive species would likely be reduced compared to Alternative N-3, Section 4.1.2.2. The reduced size and depths of N-2 compared to N-3 would result in a shorter duration of construction activities and less materials being transported to St. George. Also, with a reduction no crabber fleet fewer vessels would be docking. Combined these factors would translate into a reduced risk of species introduction.

4.5.2.3 *Marine Birds*

Under Alternative N-4, impacts to marine birds would likely be similar to Alternative N-3, Section 4.1.2.3., with the exception that construction activities related to dredging would be reduced by approximately 65%. Additionally, because N-4 would not support a crabber fleet, it would be likely that impacts related to the fleet would be proportionally smaller than for N-3.

4.5.2.4 *Marine Invertebrates*

Under Alternative N-4, impacts to marine invertebrates would likely be reduced compared to Alternative N-3, Section 4.1.2.4. The areal impact to EFH would be approximately 48% of that for N-3 and it is likely that the amount of rocky reef-type habitat created by the in-water placement of dredge material would be reduced by 65% and habitat creation from construction of the breakwater would be reduced by approximately 36%.

4.5.2.5 *Marine Mammals, Endangered Species, and Critical Habitat*

Under Alternative N-4, impacts to marine mammals, endangered species, and critical habitat would likely be reduced compared to Alternative N-3, Section 4.2.2.5. The area requiring blasting and/or dredging would be approximately 48% of that for N-3 and the amount of dredge material would be approximately 35%. This would likely result in a reduced duration of impact.

4.5.3 Cumulative Effects

“Cumulative effects” are the impacts on the environment that result from the incremental impact of the action when added to past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from minor, but collectively significant actions taking place over a period of time (40 CFR 1508.7).

Increased vessel access/traffic to St. George Island is the intended result of the implementation of USACE’s project and would be expected to occur as a functional harbor made routine navigation more accessible for business interests, residents, and visitors. Determining the level of significance of this is difficult. The Central Bering Sea has difficult navigational conditions, and the initial wave of increased traffic to St. George may be limited to the local commercial fleet, then expanding to government

researchers, fisheries observers, ecological tourists, and residents or resident's visitors. Once the operational harbor would begin to generate employment and economic opportunities, immigration to St. George would presumably become more attractive.

- There are no Federal projects of this same scale that are planned for the Central Bering or Pribilof region.
- Establishment of a National Marine Sanctuary is also possible given the current circumstances. The local community of St. George made a convincing argument in its July 1, 2016 resolution and formal request to NMFS' Office of National Marine Sanctuaries (ONMS) as to why the waters surrounding St. George should be designated as the St. George Unangan Heritage National Marine Sanctuary. The community's petition was well received and forwarded for consideration within the ONMS designation process. Establishment of a National Marine Sanctuary at St. George is supported the Audubon Alaska, Alaska Native Science Commission, and many more. Such an establishment may spur increased ecological tourism or new research interests in the region. Economic opportunity may increase for the community of St. George. Similarly, an increase in ecological tourism and research interests would not interfere with subsistence fisheries. It is unclear at this time how the establishment of a National Marine Sanctuary might affect commercial fisheries interests.
- Development of the existing St. George town site is likely as a result of the implementation of the harbor. However, given its existing infrastructure, development would be expected to be slow-paced and methodic.
- Increased vessel traffic/operations predictably increases the opportunity for the inadvertent release of environmentally persistent pollutants.
- Incremental degradation of the water and habitat quality at the boat harbor would occur if inadvertent releases of environmentally persistent pollutants were to occur with any frequency.
- Impacts to the natural environment as a result of increased vessel traffic/operations include not only an increased probability of vessel/marine mammal interactions but also an increased risk of inadvertent release of rats or mice upon St. George Island.

5.0 COORDINATION

Table 9. History of Environmental Coordination

Agency	Date	Coordination type
ADEC	Dec-15	Participated in charrette
ADEC	Oct-19	Coordinated review of 404(b)(1) Analysis
USEPA	Apr-19	Dredge material disposal methodology planning coordination
NMFS	Dec-15	Participated in charrette
NMFS	Jun-17	Coordination for on-island contacts for USACE site visit.

NMFS	May-18	Presented TSP to Protected Marine Resources and Habitat Division personnel
NMFS	Jun-19	Formal request and response of protected resources species list.
NMFS	Apr-19 - Sep-19	Development of the FWCA Report. Site visit (Jun-19) to St. George with USFWS and NMFS Habitat Division.
NMFS	Sep-19 - Present	EFH analysis and dredge material placement strategy development
USFWS	Dec-15	Participated in charrette
USFWS	Jun-17	Coordinated with Alaska Maritime National Wildlife Refuge personnel concerning cliff-nesting bird monitoring. Conducted site familiarization with USFWS monitors during June 2017 site visit.
USFWS	Feb-18	USACE formally requested FWCA Report
USFWS	July-19	FWCA Scope of Work finalized
USFWS	May-19 - Sep-19	Development of the FWCA Report. Site visit (Jun-19) to St. George with USFWS and NMFS Habitat Division.
USFWS	Oct-19	FWCA Report completed

6.0 MITIGATION

6.1 Non-Biological Resources

Cultural Resources

Per 36 CFR § 800.6, the adverse effect on historic properties would be resolved through the implementation of mitigation identified in a *Memorandum of Agreement among the USACE, SHPO, and the City of St. George Regarding the St. George Navigation Improvements*. This mitigation is likely to include the creation of an artistic landscape of the St. George North Anchorage viewshed during three periods of history: prior to the settlement of the community, the Russian Period, and the U.S. Territorial period. These depictions would likely be displayed from the vantage of the same North Anchorage viewshed, on a hill west of the community where a monument to the historic Fur Seal Industry is already emplaced.

6.2 Biological Resources

The USACE is required by the Planning and Guidance Notebook (ER 1105-2-100) to consider mitigation throughout the planning process, and each alternative plan shall include mitigation as determined appropriate. According to Appendix C of the Planning and Guidance Notebook (PGN):

(12) Mitigation. Mitigation includes:
(a) Avoiding the impact altogether by not taking a certain action or part of an action;

(b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation;
(c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
(d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action;
(e) Compensating for the impact by replacing or providing substitute resources or environments. “Replacing" means the replacement of fish and wildlife resources in-kind. "Substitute" means the replacement of fish and wildlife resources out-of-kind. Substitute resources, on balance, shall be at least equal in value and significance as the resources lost.

USACE began developing conservation measures in the early stages of plan formulation and coordinated with the managing agencies for the respective species that may be affected by the proposed project in order to reduce impacts through avoidance and minimization. Through the FWCA coordination process, USFWS and NMFS identified a number of mitigation actions that would offset unavoidable impacts to fish and wildlife resources identified in the Coordination Act Report. Because of the full function and utilization of the cliff nesting habitat at St. George Island, no in-kind mitigation opportunities could be realized. Out-of-kind mitigation opportunities included the development of a robust biosecurity plan; removal of derelict structures, buildings, and machinery from around the harbor sites; repurposing of existing vacant buildings; and exploring uses for closed buildings, such as the school.

In its EFH Assessment provided to NMFS, USACE proposed avoidance, minimization and mitigation actions to offset its may adversely affect EFH determination. Avoidance and minimization actions were included in NMFS’ response letter to USACE and were comprised of in-work windows, vessel restriction timing, and the implementation of BMPs to reduce the likelihood of oil spills. Mitigation of the permanent loss of EFH is accomplished by creation of new, complex, vertical habitat at the dredge material placement area and also by the implementation of the breakwater structures.

Because USACE has determined in its Draft Biological Assessment that the action "may affect and is likely to adversely affect" ESA-listed marine mammals, the formal ESA consultation procedures established by 50 CFR 402 et seq. are triggered, which will lead to the development of a Biological Opinion by NMFS. Section 7(b)(4)(C) of the ESA provides that if an endangered or threatened marine mammal is involved, the incidental taking (in this case, through harassment) must first be authorized by Section 101(a)(5) of the MMPA through a Letter of Authorization (LOA) or Incidental Harassment Authorization (IHA) prior to the issuance of a Biological Opinion.

USACE intends to collect the data required for to apply for an LOA during the project’s engineering and design phase, which will provide more detail regarding the specific impacts to marine mammals, including ESA-listed marine mammals. Well-reasoned and effective mitigations to reduce those impacts will also be developed, in consultation with NMFS, along with the predicted number of marine mammals that may be taken by

harassment. The final mitigation measures for the proposed project cannot be presented prior to the development of the LOA. Refer to Appendix C, Draft Biological Assessment for potential mitigation strategies based upon similar projects that required confined underwater blasting.

7.0 COMPLIANCE WITH ENVIRONMENTAL LAWS AND REGULATIONS

Table 10. Environmental Compliance Table

Federal Statutory Authority	Compliance Status	Compliance Date/Comment
Clean Air Act	FC	This project is not reasonably expected to impact air quality negatively, nor is it in a non-attainment area.
Clean Water Act	PC	Pursuant to the Clean Water Act of 1972, as amended, the discharge of dredged or fill material associated with the project is not fully compliant with section 404(b)(1) guidelines (40 CFR 230) because ESA compliance is not yet achieved.
Coastal Zone Management Act	N/A	CZMA Federal consistency provision, section 307, no longer applies in Alaska
Endangered Species Act	PC	Draft Biological Assessment in development. Full compliance requires completion of MMPA consultation prior to receipt of a biological opinion.
Marine Mammal Protection Act	PC	A Letter of Authorization for incidental take is required for full compliance. Additional data and consultation required during PED.
Magnuson-Stevens Fishery Conservation and Management Act	PC	Pending EFH effects determination response from NMFS.
Fish and Wildlife Coordination Act	FC	Final FWCA Report received in October 2019.
Marine Protection, Research, and Sanctuaries Act	N/A	MPRSA is not triggered by this project.
Migratory Bird Treaty Act	FC	Conservation Measures provided by USFWS in FWCA report will be applied.
National Historic Preservation Act	PC	In progress. USACE and SHPO have concurred on adverse effects to cultural resources, and are developing a Memorandum of Agreement.
National Environmental Policy Act	PC	Pending completion of the EA/FONSI.
Executive Order 11990: Protection of Wetlands	FC	No wetlands are expected to be impacted by this project.
Executive Order 12898: Environmental Justice	FC	Project does not disproportionately negatively affect underserved communities.

Executive Order 13045: Protection of Children from Environmental Health Risks and Safety Risks	FC	Does not disproportionately affect the health or well-being of children.
Executive Order 13112: Invasive Species	FC	Conservation measures will include anti-rodent provisions.
Executive Order 13186 Protection of Migratory Birds	FC	Conservation Measures provided by USFWS in FWCA report will be applied.

8.0 CONCLUSION

The proposed construction of a small boat harbor on St. George Island would increase safe accessibility of marine navigation to the community of St. George, Alaska, thus reducing hazards to navigation and providing increased safety for subsistence vessels, fuel barges, cargo vessels, and a limited commercial fleet. Providing safe navigation is critical to the long term viability of the mixed subsistence-cash economy of St. George. This office has assessed the environmental impacts of the proposed action and has determined that the proposed action would likely have permanent adverse impacts upon aesthetics and cultural resources; moderate and temporary adverse impacts would be expected on noise and threatened and endangered species; moderate and temporary impacts would be expected to water quality, marine invertebrates, and EFH. Marine birds are only expected to experience minor and temporary impacts. Upon the findings of this EA, The recommendation is that an Environmental Impact Statement is not warranted, and to sign a Finding of No Significant Impact.

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