US Army Corps of Engineers®

Integrated Feasibility Report and Environmental Assessment

Akutan Harbor Navigational Improvements Akutan, Alaska

May 2024

Integrated Feasibility Report and Environmental Assessment

Akutan Harbor Navigational Improvements

Akutan, Alaska

Prepared By:

U.S. Army Corps of Engineers
Alaska District

28 May 2024

FINDING OF NO SIGNIFICANT IMPACT

Akutan Harbor Navigational Improvements
Akutan, Alaska

The U.S. Army Corps of Engineers, Alaska District (USACE) has conducted an environmental analysis in accordance with the National Environmental Policy Act of 1969, as amended. The final Integrated Feasibility Report and Environmental Assessment (IFR/EA) dated 01 April 2024, for the Akutan Harbor Navigational Improvements project addresses harbor opportunities and feasibility near Akutan, Alaska. The final recommendation is contained in the report of the Chief of Engineers, dated XXXX 2024.

The Final IFR/EA, incorporated herein by reference, evaluated various alternatives that would improve navigation in the study area. The recommended plan is justified under the 2006 Section of WRDA 2007 (Remote and Subsistence Harbors).

The harbor would be sized to accommodate a design vessel with a length of 58 feet and draft of 8 feet. The 400-foot-long rubble mound breakwater would protect a 120 foot by 120 foot turning basin. The entrance channel and turning basin dredge depths are -17 feet MLLW and -14 feet MLLW respectively. It is anticipated that blasting would be required for the turning basin and entrance channel at this location. The entrance channel would vary from a minimum width of 60 feet to a maximum width of 120 feet.

Local service facilities required would include a 560-foot-long by 12-foot-wide rubble mound causeway, a sheet pile dock, a 60-foot by 40-foot mooring basin (located withing the turning basin) with mooring dolphins, a 7,000 square foot pad for loading/unloading freight, and an 1,100-foot-long road connecting the harbor areas with the existing hotel pad. The road would have an average grade of 9.4%. The road would consist of a 12-foot-wide surface with 6 inches of aggregate surface over 2 feet of borrow material. Two 6% grade shoulders would extend 2 feet from the edge of road. Two 2H:1V slope drainage ditches would extend from the shoulders before daylighting to existing ground at a 1.5H:1V slope.

In addition to a “no action” plan, four alternatives were evaluated. The alternatives included dredging at three different locations and water depths in the same general area; two included blasting and one did not. An additional nonstructural alternative (larger helicopter) was also included. Section 5 of the Environmental Assessment describes alternative formulation and selection. Nonstructural alternatives were considered but eliminated from detailed analysis. Some nonstructural alternatives would have resulted in environmental impacts.

For all alternatives, the potential effects were evaluated, as appropriate. A summary assessment of the potential effects of the recommended plan are listed in Table 1.

Table 1: Summary of Potential Effects of the Recommended Plan.

	Insignificant effects	Insignificant effects as a result of mitigation	Resource unaffected by action
Aesthetics	☐	☐	☒
Air quality	☐	☒	☐
Aquatic resources/wetlands	☒	☐	☐
Invasive species	☐	☐	☒
Fish and wildlife habitat	☒	☐	☐
Threatened/Endangered species/critical habitat	☐	☒	☐
Essential Fish Habitat	☐	☒	☐
Historic properties	☐	☒	☐
Other cultural resources	☒	☐	☐
Floodplains	☐	☐	☒
Hazardous, toxic & radioactive waste	☒	☐	☐
Hydrology	☒	☐	☐
Land use	☒	☐	☐
Navigation	☒	☐	☐
Noise levels	☐	☒	☐
Public infrastructure	☒	☐	☐
Socioeconomics	☒	☐	☐
Environmental justice	☒	☐	☐
Soils	☒	☐	☐
Tribal trust resources	☒	☐	☐
Water quality	☒	☐	☐
Climate change	☐	☐	☒

All practicable and appropriate means to avoid or minimize adverse environmental effects were analyzed and incorporated into the recommended plan. Best management practices as detailed in the IFR/EA will be implemented, if appropriate, to minimize impacts. Mitigation for Threatened or Endangered species and noise levels includes industry standard stemming of charges and delays between charges to reduce the consequences of the confined underwater blasts. Impacts to Threatened and Endangered species are also mitigated by shutdown zones near the blast site to protect marine mammals from permanent injury or mortality. A discussion of mitigation measures is included in Section 8.7.

No compensatory mitigation is required as part of the Recommended Plan.

Public review of the draft IFR/EA and Finding of No Significant Impact (FONSI) was completed on 05 July 2023. All comments submitted during the public review period were responded to in the Final IFR/EA in Section 9.1 and FONSI. A 30-day state and agency review of the Final IFR/EA was completed on XXXX 2024.

An Incidental Harassment Authorization or Incidental Take Regulation and subsequent Letter of Authorization under the Marine Mammal Protection Act will be sought during the Preconstruction Engineering and Design phase for construction impacts to marine mammals from this project. A Biological Opinion will be issued from the National Marine Fisheries Service and United States Fish and Wildlife Service to conclude consultation under Section 7 of the Endangered Species Act of 1973, as amended, after the IHA process is concluded.

Pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended, the U.S. Army Corps of Engineers determined that historic properties would be adversely affected by the recommended plan. The Alaska State Historic Preservation Office concurred with this assessment on July 12, 2023. On July 19, 2023, the State Historic Preservation Office and USACE determined that a Programmatic Agreement (PA) executed in accordance with 36 CFR § 800.14(b)(1)(ii) would resolve the adverse effect. A PA among USACE, the SHPO, the Native Village of Akutan, the AEB, and the City of Akutan was executed, with the assistance Akutan Corporation, APIA, Aleut Corporation, Museum of the Aleutians, and other stakeholders, on 29 March 2024.

The State of Alaska does not currently have an active Coastal Zone Management Program. As of July 1, 2011, the Federal consistency provision of the Coastal Zone Management Act no longer applies in Alaska. Federal agencies shall no longer provide the State of Alaska with Coastal Zone Management Act Consistency Determinations or Negative Determinations pursuant to 16 U.S.C. 1456(c)(1) and (2), and 15 CFR § 930, subpart C.

The National Marine Fisheries Service provided concurrence that consultation under Section 305(b) of the Magnuson-Stevens Act Fishery Conservation Act and associated Essential Fish Habitat consultation has been satisfied.

Pursuant to the Clean Water Act of 1972, as amended, the discharge of dredged or fill material associated with the recommended plan has been found to be compliant with Section 404(b)(1) Guidelines (40 CFR § 230). The Clean Water Act Section 404(b)(1) Guidelines evaluation is found in Appendix F: Environmental of the IFR/EA.

A water quality certification pursuant to Section 401 of the Clean Water Act was obtained from the Alaska Department of Environmental Conservation on 16 January 2024. All conditions of the water quality certification shall be implemented to minimize adverse impacts to water quality.

Technical, environmental, economic, and cost effectiveness criteria used in the formulation of alternative plans were those specified in the Water Resources Council's 1983 Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies. All applicable laws, executive orders, regulations, and local government plans were considered in evaluation of alternatives. Based on this report, the reviews by other Federal, State, and local agencies, Tribes, input of the public, and the review by my staff, it is my determination that the recommended plan would not cause significant adverse effects on the quality of the human environment; therefore, preparation of an Environmental Impact Statement is not required.

Date	**JEFFREY S PALAZZINI** **Colonel, Corps of Engineers** **District Commander**

EXECUTIVE SUMMARY

The Akutan Harbor Navigational Improvements Integrated Feasibility Report and Environmental Assessment was prepared under authority granted by Section 203 of the Water Resources Development Act (WRDA) of 2000, Tribal Partnership Program, as amended. Section 1156 of Water Resources Development Act 1986, Cost Sharing Provisions for the Territories, as amended, is applicable to this effort because of the 2014 amendment including Federally Recognized Tribes as eligible for this cost-share waiver. This study has a $511,000 cost share waiver. The Project Partnership Agreement will also be eligible for a cost-share waiver under Section 1156. This study also utilized the authority of Section 2006 of WRDA 2007, Remote and Subsistence Harbors, as amended. The Section 2006 authority states that 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. The Section 2006 provision allows for the recommendation of harbor navigation improvements based on long-term community viability benefits within the region served by the project. This study meets the Section 2006 criteria. The study is cost-shared in accordance with Section 203, as amended. Due to the need to obtain a Letter of Authorization in Preconstruction Engineering and Design, a policy exception for Marine Mammal Protection Act/Endangered Species Act is currently in progress.

The Native Village of Akutan is located on Akutan Island in the eastern Aleutian Island chain, one of the Krenitzin Islands of the Fox Island group. It is 35 miles east of Unalaska, and 766 miles southwest of Anchorage. Akutan is only accessible by air or boat. Due to the volcanic geography of Akutan Island, the Akutan Airport is located on Akun Island, approximately 7 miles northeast of the Native Village of Akutan. Residents of and travelers to Akutan reach the Native Village of Akutan via fixed-wing aircraft from Unalaska (Dutch Harbor) to the Akutan Airport on Akun Island. They are then flown via helicopter to Akutan from Akun. The current transportation method (helicopter) between the Akutan Airport on Akun Island and the Native Village of Akutan is expensive, inefficient, and unreliable, with consequences for transporting passengers and obtaining medical supplies, mail, and airline freight. The purpose of this study is to identify a feasible solution that provides safe, reliable, and efficient navigation, access, and temporary moorage on Akun Island. Currently Akun Island has no moorage, harbor, or boat landing infrastructure. Providing marine infrastructure to access the Akutan Airport at Akun Island would improve efficiency by providing direct access and moorage for a ferry vessel and by providing safer subsistence opportunities for the Native Village of Akutan.

Remote Alaska communities face challenges that are complex and multifaceted. The viability of a community is based on its ability to survive and thrive. The cultural identities of Alaska Native Tribal Nations are highly dependent upon subsistence activities tied to specific locations, and in-depth historical knowledge of land and subsistence resources. Factors impacting community viability include many Other

Social Effects (OSE) criteria that are difficult or impossible to quantify monetarily but are of critical importance. Without a safe and functioning harbor on Akun that would provide affordable and reliable access in and out of the Native Village of Akutan, the limited access to subsistence resources and high costs of basic essential goods, coupled with limited economic opportunities, compound the threats to community viability.

Nine preliminary sites were identified near Surf Bay on Akun Island that would provide access to the Akutan Airport: three at Nick's Camp, two at No-name Point, two at Darryl's Point, and two at Chulka Point. Subsequent screening resulted in two sites near No-name Point being carried forward for analysis. Three alternatives were developed at the two sites using identified structural and nonstructural measures, in addition to the Future Without Project (FWOP) condition (No Action). NED analysis was conducted, but no NED plan was identified. Under Section 2006, the project delivery team can utilize a Cost-Effectiveness/Incremental Cost Analysis (CE/ICA) to support plan selection. While Access Capability is the optimal metric representing the opportunity for safe access at each alternative plan, the metric alone inadvertently assumes all alternatives provide a uniform level of benefits for that access. By this assumption, the nuances of benefits and their contribution to community viability are not fully captured within that metric. Multi-Criteria Decision Analysis is used to account for these OSE benefit intricacies. A focus group was conducted in October 2022 with key community members to inform the MCDA. The final criteria (which were subsequently weighted and scored to reflect the various alternatives impacts on long term community viability) included Health and Safety; Subsistence; Delivery of Essential Non-Medical Goods; Cultural Identity (non-food gathering traditional practices); Income opportunities; Community Growth and Expansion; Transportation Mode Preferences; and Local Vessel Access.

Alternative 2 was endorsed as the Recommended Plan at the Agency Decision Milestone meeting on 16 January 2024. Alternative 2 consists of a harbor on Akun Island sized to accommodate a design vessel with a length of 58 feet and a draft of 8 feet. The 400-foot-long rubble mound breakwater would protect a 120 foot by 120 foot turning basin. The entrance channel and turning basin dredge depths are -17 feet MLLW and -14 feet MLLW respectively. It is anticipated that blasting would be required for the turning basin and entrance channel at this location. The entrance channel would vary from a minimum width of 60 feet to a maximum width of 120 feet.

Local service facilities (LSF) include a 560-foot-long by 12-foot-wide rubble mound causeway, sheet pile dock, a 60-foot by 40-foot mooring basin (located within the turning basin) with mooring dolphins, a 7,000 square foot pad for loading/unloading freight, and an 1,100-foot-long road connecting the harbor areas with the existing hotel pad. The road would have an average grade of 9.4%. The road would consist of a 12-foot-wide surface with 6 inches of aggregate surface over 2 feet of borrow material. Two 6% grade shoulders would extend 2 feet from the edge of road. Two 2H:1V slope drainage ditches would extend from the shoulders before daylighting to existing ground at a 1.5H:1V slope. It is anticipated that approximately 900 cubic yards (cy) of maintenance dredging will be required every 10 years, and up to 5 percent of the armor stone (~2,000 cy) could need to be replaced every 25 years.

Using the Level 3 Certified Cost estimate[1], Alternative 2 has a project first cost of $69,800,000. The total project construction cost is $79,700,000 which includes GNF, LSF and LERR as required for the economic analysis. The total economic cost, including interest during construction and the present value cost of operations and maintenance, is $86,146,000. The average annual equivalent economic cost is $3,191,000 and average annual benefits are $362,000 - $772,000, resulting in net annual NED benefits of $(2,829,000) to $(2,419,000), with a most likely net annual NED benefit of $(2,624,000). The project's benefit-cost ratio is 0.11 – 0.24, with a most likely BCR of 0.18. In accordance with the Section 2006 Authority, the CE/ICA produced one best buy alternative (Alternative 2) for the project other than the No Action plan. Alternative 2 was also the highest-ranked alternative in the MCDA analysis and provided the most effective and complete approach to addressing the problem and objectives while also efficiently realizing the specified opportunities compared to cost and being environmentally acceptable.

[1] The economic information shown in the Pertinent Data and Executive Summary sections is based on the Level 3 Certified Cost which is only produced for the Recommended Plan. These numbers will not match the information presented in the body of the report and the appendixes, which utilized Level 4 cost estimates for apples-to-apples plan comparison purposes.

PERTINENT DATA

Recommended Plan	
Alternative 2: Harbor South of No-name Point (With Blasting)	
GNF Dredge Volume	9,400 CY
LSF Dredge Volume	440 CY
Total Dredge Volume	9,840 CY
LSF Road Excavation Volume	45,000 CY

The economic information shown in the Pertinent Data and Executive Summary sections is based on the Level 3 Certified Cost which is only produced for the Recommended Plan. These numbers will not match the information presented in the body of the report and the appendixes, which utilized Level 4 cost estimates for apples-to-apples plan comparison purposes.

Economics	
Item	**Total ($)**
Total Average Annual Equivalent Cost[1]	$ 3,191,000
Total Average Annual Benefit	$ 362,000 - $ 772,000
Net Annual National Economic Development Benefits[1]	$ (2,829,000) to $ (2,419,000) most likely $ (2,624,000)
Benefit-Cost Ratio[1]	0.11 – 0.24 (most likely BCR of 0.18)
OSE – CE/ICA Result	Best Buy
OSE – MCDA Rank	1

Note: October 2023 Price (FY24) level, 50-Year Period of Analysis, 2.75 Percent Discount rate.
[1] Costs and benefits in this table are based on the Level 3 certified cost estimate (Project First Cost, Constant Dollar Basis) which is only produced for the Recommended Plan. These numbers will not match the information presented in the body of the report and the appendixes, which utilized Level 4 cost estimates for apples-to-apples plan comparison purposes.

Cost Share Table			
(October 1, 2023, Price Levels, Program Year (FY) 2024) [1]			
Description	**Total (Project First Cost w/Contingency)**	**Federal Share**	**Non-Federal Share**
General Navigation Features	$53,300,000	$48,000,000	$5,300,000
Planning, Engineering, & Design	$7,300,000	$6,600,000	$700,000
Construction Management	$9,100,000	$8,200,000	$900,000
Subtotal of Construction	**$69,700,000**	**$62,800,000**	**$6,900,000**
Cost adjustments			
LERR	$100,000		$100,000
Section 1156 Waiver[3]		$648,000	($648,000)
Ability to Pay Reduction to 25%[4]		$4,700,000	$(4,700,000)
Total Project First Costs	**$69,800,000**	**$68,100,000**	**$1,700,000**
LSF and Post Construction Adjustments			
Credit for LERR[5]		$100,000	($100,000)
Post-Construction 2.5% Payback (10% of the GNF, equal to the 25% Ability to Pay reduction)[5, 6]		($1,700,000)	$1,700,000
Local Service Facilities	$7,600,000		$7,600,000
Planning, Engineering, & Design	$1,000,000		$1,000,000
Construction Management	$1,300,000		$1,300,000
Total Cost Apportionment	**$79,700,000**	**$66,500,000**	**$13,200,000**

Notes:
* 1156 amount changes annually, the actual amount of the waiver is dependent upon the year the agreement is executed.
[1] Cost is based on the Total Project Cost (Fully Funded) within the Cost Certification Statement dated March 13, 2024, which is the project first cost escalated to the midpoint of construction.
[2] GNF cost-sharing totals are reflected as 90% Federal and 10% Non-Federal.
[3] IAW Section 1156 of WRDA 1986, as amended, the Federal Government will waive up to the first $665,000 of project execution for design and construction from the project cost-share requirements.
[4] Section 1156 IAW. Section 203 of WRDA 2000, as amended, provided that cost-share agreements for such studies are subject to a Tribe's ability to pay, as determined by and with procedures established by the Secretary of the Army.
[5] Credit is given for the incidental costs borne by the Non-Federal Sponsor for LERR per Section 101 of WRDA 86, not to exceed 10% of the GNF.
[6] The Non-Federal Sponsor shall pay an additional 10% of the costs of GNF of the NED plan, pursuant to Section 101 of WRDA 86. The value of LERR shall be credited toward the additional 10% payment except in the case of LERR for GNF.

LIST OF ACRONYMS AND ABBREVIATIONS

AAEQ	Average Annual Equivalent Costs
ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish &Game
ADM	Agency Decision Milestone
AEB	Aleutians East Borough
AHRS	Alaska Heritage Resources Survey
AK	Alaska
AKDOT&PF	Alaska Department of Transportation and Public Facilities
AMNWR	Alaska Maritime National Wildlife Refuge
ANCSA	Alaska Native Claims Settlement Act
APE	Area of Potential Effect
APIA	Aleutian Pribilof Islands Association
APICDA	Aleutian Pribilof Island Community Development Association
ATV	All-Terrain Vehicle
BOEM	Bureau of Ocean Energy Management
CAA	Clean Air Act
CAP	Continuing Authorities Program
CDQ	Community Development Quota
CE/ICA	Cost Effectiveness/Incremental Cost Analysis
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CSRA	Cost Schedule Risk Analysis
CY	Cubic Yards
DPS	Distinct Population Segment
EFH	Essential Fish Habitat
EA	Environmental Assessment
eDNA	Environmental DNA
ER	Engineer Regulation
EQ	Environmental Quality
ESA	Endangered Species Act
ESR	Ecosystem Status Report
FCSA	Feasibility Cost Share Agreement
FONSI	Finding of No Significant Impact
FT	Feet
FWCA	Fish and Wildlife Coordination Act
FWOP	Future Without Project
FWP	Future With Project
GNF	General Navigation Features
H&H	Hydraulics and Hydrology
HQ	Headquarters
IFR/EA	Integrated Feasibility Report/Environmental Assessment
IHA	Incidental Harassment Authorization
IRA	Indian Reorganization Act

IWR	Institute for Water Resources
LERR	Lands, Easements, Rights-of-Way, Relocations and Disposal
LOA	Letter of Authorization
LSF	Local Service Facilities
MBTA	Migratory Bird Treaty Act
MCDA	Multi-Criteria Decision Analysis
MDC	Marine Design Center
MHHW	Mean Higher High Water
MHW	Mean High Water
MLLW	Mean Lower Low Water
MLW	Mean Low Water
MMPA	Marine Mammal Protection Act
MSL	Mean Sea Level
NED	National Economic Development
NEPA	National Environmental Policy Act
NFS	Non-Federal Sponsor
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
OMRR&R	Operations, Maintenance, Repair, Replacement, and Rehabilitation
OSE	Other Social Effects
P&G	Principles & Guidelines
PA	Programmatic Agreement
PCX	Planning Center of Expertise
PDT	Project Delivery Team
PED	Preconstruction Engineering and Design
POA	Pacific Ocean Alaska (Alaska District)
POD	Pacific Ocean Division
RED	Regional Economic Development
ROM	Rough Order of Magnitude
RSLC	Relative Sea Level Change
S&A	State And Agency
SAR	Search and Rescue
SHPO	State Historic Preservation Officer
SLC	Sea Level Change
SSC	Species of Special Concern
STWAVE	Steady-State Spectral Wave
TMDL	Total Maximum Daily Load
TSP	Tentatively Selected Plan
U.S.	United States
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
WRDA	Water Resources Development Act

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1. INTRODUCTION

This Akutan Harbor Navigational Improvements Integrated Feasibility Report and Environmental Assessment (IFR/EA) documents the United States Army Corps of Engineers (USACE) study planning and decision process for recommended navigational improvements for Akutan, Alaska and documents compliance with the National Environmental Policy Act (NEPA) in the planning process.

The focus of this study is to identify a feasible solution that provides safe, reliable, and efficient (cost-effective) marine navigation and mooring for passengers and cargo between the Akutan Airport on Akun Island and the Native Village of Akutan located on Akutan Island. The Native Village of Akutan is a Federally Recognized Tribe; the Akutan Tribal Council represents the Unangax̂ people of Akutan. The Native Village of Akutan and the Aleutians East Borough (AEB) are the cost-sharing, non-federal sponsors (NFS) of the feasibility study. The Feasibility Cost Sharing Agreement (FCSA) was executed on 21 July 2021. Henceforth in this study, NFS refers to both signatories unless otherwise specified.

1.1 USACE Planning Process

The USACE Civil Works planning process follows a standard approach to identifying and evaluating potential water resource solutions to ensure potential federal projects comply with applicable laws and guidance. The 1983 Economic and Environmental Principles and Guidelines for Water and Related Land Implementation Studies (P&G) provide guiding principles for the USACE planning process. Engineer Regulation (ER) 1105-2-103 Policy for Conducting Civil Works Planning Studies and the Planning Manual Part II: Risk-Informed Planning lay out an iterative planning process used for all USACE Civil Works studies in developing and evaluating alternative plans (IWR 2017).

The iterative six-step USACE planning process is outlined in the P&G and ER 1105-2-103 and was modified by the Planning Manual Part II into a risk-informed planning process. The six steps include identifying water resource problems and opportunities (Step 1), inventory and forecast of existing and future conditions (Step 2), plan formulation (Step 3), plan evaluation (Step 4) and comparison (Step 5), and finally plan selection (Step 6), with evidence gathering, risk management, and stakeholder involvement as taking place throughout the process.

1.2 Scope of the Study

This study evaluates the feasibility and environmental effects of implementing navigation improvements for Akutan, Alaska.

1.3 Study Authority

Section 203 of the Water Resources Development Act (WRDA) of 2000, Tribal Partnership Program (TPP), as amended, provides authority for the U.S. Army Corps of Engineers (USACE) in cooperation with Indian tribes and heads of other federal agencies to study and determine the feasibility of carrying out projects that will substantially benefit Indian tribes and are located within Indian country or within proximity to Alaska Native villages. The provision states:

Section 203 of the Water Resources Act (WRDA) of 2000, Tribal Partnership Program, as amended (33 U.S.C. 2269) provides authority for the U.S. Army Corps of Engineers (USACE) in cooperation with Indian tribes and heads of other federal agencies to study and determine the feasibility of carrying out projects that will substantially benefit Indian tribes and are located within Indian country or within proximity to Alaska Native villages. That provision states in pertinent part:
(a) Definition of Indian Tribe.--In this section, the term ``Indian tribe'' has the meaning given the term in section 4 of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450b).
(b) Program.—
(1) In general.—In cooperation with Indian tribes and the heads of other Federal agencies, the Secretary may carry out water-related planning activities, or activities relating to the study, design, and construction of water resources development projects that—
(A) will substantially benefit Indian tribes; and
(B) are located primarily within Indian country (as defined in section 1151 of title 18, United States Code) . . . or in proximity to Alaska Native villages.

. . .

(c) Consultation and Coordination With Secretary of the Interior.—
(1) In general.—In recognition of the unique role of the Secretary of the Interior concerning trust responsibilities with Indian tribes and in recognition of mutual trust responsibilities, the Secretary shall consult with the Secretary of the Interior concerning studies conducted under subsection (b).
(2) Integration of activities.—The Secretary shall—
(A) integrate civil works activities of the Department of the Army with activities of the Department of the Interior to avoid conflicts, duplications of effort, or unanticipated adverse effects on Indian tribes; and
(B) consider the authorities and programs of the Department of the Interior and other Federal agencies in any recommendations concerning carrying out projects studied under subsection (b).
(d) Cost Sharing.—
(1) Ability to pay.—
(A) In general.—Any cost-sharing agreement for a study under subsection (b) shall be subject to the ability of the non-Federal interest to pay.

(B) Use of procedures.—
(i) In general.—The ability of a non-Federal interest to pay shall be determined by the Secretary in accordance with procedures established by the Secretary.
(ii) Determination.—Not later than 180 days after June 10, 2014, the Secretary shall issue guidance n the procedures described in clause (i).
(2) Credit.—The Secretary may credit toward the non-Federal share of the costs of a study under subsection (b) the cost of services, studies, supplies, or other in-kind contributions provided by the non-Federal interest.
(3) Sovereign immunity.— The Secretary shall not require an Indian tribe to waive the sovereign immunity of the Indian tribe as a condition to entering into a cost-sharing agreement under this subsection.
(4) Water resources development projects.—
(A) In general.—The non-Federal share of costs for the study of a water resources development project described in subsection (b)(1) shall be 50 percent.

1.3.1 Additional Study Authority

Section 2006 of WRDA 2007 as amended provides for project justification to be pursued for Remote and Subsistence Harbors if certain criteria are met and sufficient National Economic Development (NED) benefits for project justification are not identified. The Remote and Subsistence Harbors 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 NED benefits if the Secretary determines that the improvements meet specific criteria detailed in the authority. The following are the criteria outlined in the authority:

1. The community to be served by the improvements is at least 70 miles from the nearest surface accessible commercial port and has no direct rail or highway link to another community served by a surface accessible port or harbor; or the improvements would be located in the State of Hawaii or Alaska, the Commonwealth of Puerto Rico, Guam, the Commonwealth of the Northern Mariana Islands, the United States Virgin Islands; or American Samoa;

Akutan is located in the State of Alaska.

2. The harbor is economically critical such that over 80% of the goods transported through the harbor would be consumed within the region served by the harbor and navigation improvement, as determined by the Secretary, including consideration of information provided by the non-Federal interest; and

The project meets this criterion. The community that is to be served by the navigation improvements is Akutan, Alaska. Based upon weight, commodities transported in the future with-project condition were analyzed to determine that over 80 percent of the *goods transported through the harbor (after construction) would be consumed within the community. Cargo is delivered by the fixed-wing aircraft between Dutch Harbor and Akun, and then carried on the helicopter between Akun and Akutan. Most of the mail and light freight transported by the helicopter goes into the community and supports the day-to-day needs of Akutan, with a much smaller percentage being transported away from the community (mostly consisting of United States Postal Service mail). Over 90 percent of the combined mail and light freight from 2018-2021 was delivered to the community for use, with less than 10 percent (by weight) utilized elsewhere. This analysis is in Appendix C: Economics.*

3. The long-term viability of the community in which the project is located, or the long-term viability of a community that is in the region that is served by the project and that will rely on the project, would be threatened without the harbor and navigation improvement.

The project meets this criterion. Remote Alaska communities face challenges that are complex and multifaceted. Rural economies in Alaska, including Akutan, can be characterized as mixed subsistence-cash economies in which the subsistence and cash sectors are interdependent and mutually supportive. Higher costs of living, limited cash employment, and unreliable and expensive transportation are challenges the village faces daily. Transportation and access issues between Akutan and Akun Islands identified within the community that impact long-term community viability in many ways include health and safety, subsistence, delivery of essential non-medical goods, cultural identity (non-food gathering traditional practices), income opportunities, community growth and expansion, transportation mode preferences, and local vessel access.

A safe and functioning harbor improves access to transportation in and out of the community and addresses issues related to community viability. While the resident population appears stable, limitations of access to the transportation network (including both passenger and mail/light freight services) threatens long-term viability. Reductions in the costs of such basic essential goods are essential to community viability. The high cost and unreliable nature of transportation to/from Akutan could become a barrier to long term viability. This analysis is in Appendix C: Economics.

Compliance with the criteria of the authority has been confirmed by a USACE Vertical Team.

In addition, the Remote and Subsistence Harbors authority also notes that while determining whether to recommend a project under the criteria above, the Secretary will consider the benefits of the project to the following:

- Public health and safety of the local community and communities that are in the region to be served by the project and that will rely on the project, including access to facilities designed to protect public health and safety.
- Access to natural resources for subsistence purposes.

- Local and regional economic opportunities.
- Welfare of the local population; and
- Social and cultural value to the local community and communities that are in the region to be served by the project and that will rely on the project.

As indicated in the above narrative and throughout the report, navigation improvements at Akun Island would benefit each of the above listed categories. The project's benefits would provide positive effects for the community's social well-being, which extend beyond the NED benefits. Social well-being effects reflect a complex set of relationships and interactions between a proposed plan and the social and cultural setting in which these are received and acted upon (USACE 2000, Appendix D). For this study, these benefits are considered from a quantitative and qualitative perspective. In particular, the analysis uses the Cost Effectiveness/Incremental Cost Analysis (CE/ICA) metric of Access Capability (defined as percentage of time that the design vessel (marine ferry) can safely access and moor at the proposed navigation improvements, or the helicopter can safely operate between the islands) is utilized. This analysis along with other social effects are expanded upon in Appendix C: Economics.

1.4 Study Location

Lying between Unimak Island and Unalaska Island, Akutan and Akun Islands are part of the chain of rugged, volcanic Aleutian Islands stretching westward from the tip of the Alaska Peninsula at False Pass towards the Russian coast. Akutan is approximately 763 miles from Anchorage and 35 miles northeast of Dutch Harbor on Unalaska Island (Figure 1).

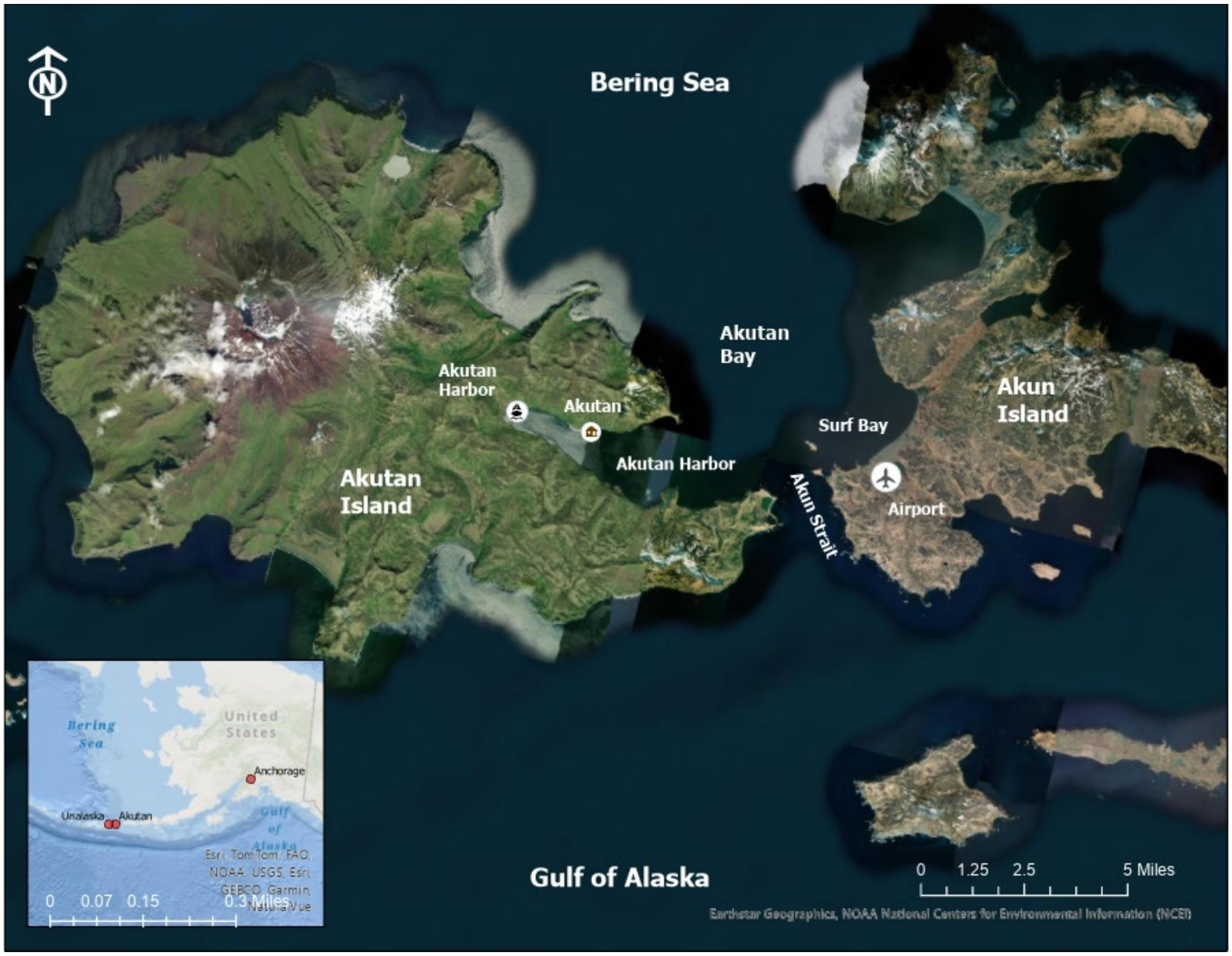


Figure 1. Location of Akutan and Akun Islands, Alaska.

Akutan Island is approximately 18 miles long and 13 miles wide, with an area of 129 square miles. Akutan Harbor is a large and naturally deep glacially formed body of water about 3.9 miles long and approximately 1.8 miles wide at its mouth, narrowing to about 0.6 miles at its head. Akutan Harbor accommodates large vessels, including floating processors, and large container and cargo ships that service both Akutan residents as well as a large adjacent shore-based seafood processing facility. The head of the harbor is a flat valley with a gradually increasing slope, while the northern and southern shorelines are rocky and steep. The inner portion of the harbor is substantially sheltered from incoming Bering Sea swell, and the island’s active volcano that blocks much of the prevailing easterly winds of the Aleutian Islands. Akutan Harbor opens to Akutan Bay and Akun Strait to the east. A small boat harbor also locally referred to as Akutan Harbor is located at the west terminus of the Akutan Harbor body of water. A road connecting the Native Village of Akutan to the Akutan Harbor has been funded and designs have been developed. Permitting for the road is underway with materials to be stockpiled in 2023 and construction to be completed in 2024.

The Native Village of Akutan is located on the eastern side of Akutan Island on the north side of Akutan Harbor, on a flat piece of land with the steep slope of a mountain rising behind the village, confining the community to a small geographic area (Figure 2).

Figure 2. Community location on Akutan Island (includes the City of Akutan and the Native Village of Akutan).

Akun Island is a large, comparatively flat island that lies immediately northeast of Akutan Island and has a land area of 64 square miles. It is 14.0 miles long and 11.3 miles wide. The Akutan Airport is located adjacent to Surf Bay, which opens to the Bering Sea to the northwest and is approximately 7 miles to the east of the Native Village of Akutan (Figure 3).

Figure 3. Study location on Akun Island.

1.5 History of Akutan

Akutan Island is part of the Krenitzin Island Group in the eastern Aleutian Islands. The eastern Aleutians have a long history of settlement, with the oldest archaeological sites, located on Hog Island in Unalaska Bay, dating to approximately 9,000 years ago (Davis et al. 2016). There is archaeological and ethnohistorical evidence for human occupation of all the Krenitzin Islands, including Akutan and Akun Islands. The oldest known archaeological site on Akun Island dates to approximately 5,000 years ago; however, archaeological excavations across the Krenitzin Islands are scarce and it is likely that these islands, like Hog Island, have been occupied for more than 9,000 years. The Unangan of the eastern Aleutian Islands speak the Eastern dialect of Unangam Tunuu. Historically, the Unangan of the Krenitzin Islands were part of the Qiĝigun political unit (Black 1987; Hudson and Mason 2014). Since the Russian Period, the term "Aleut" has been used to identify Unangax̂ from across the Aleutian Islands.

The earliest documented Russian contact with Unangax̂ of the Aleutian Islands occurred in 1741; the Russians first arrived in the eastern Aleutian Islands in 1759. In 1763, the Unangan of the Krenitzin Islands formed an alliance with other Unangan polities to fight back against the Russians. Active conflicts between the Unangan and Russians in the eastern Aleutians continued into the late eighteenth century. In 1792, there were five villages on Akutan Island. By 1821, the populations on Akutan Island had been reduced to only two villages (Black 1999, 2004). Akutan Island had once been populated by as many as 600 people, but disease, outmigration, and other causes reduced the population to 13 by 1834, and the island was soon after abandoned (McGowan 1999).

Alaska was purchased from Russia by the United States in 1867. The Western Fur & Trading Company opened a trading post in Akutan Harbor in 1878, and the opportunity to sell sea otter pelts and trade other goods attracted Unangan from nearby Akun, Tigalda, and Avatanak Islands (McGowan 1999). Later that year, Akutan village had 86 residents (Turner 2008). In 1879, the Alaska Commercial Company bought out the trading post and hired Hugh McGlashan to manage the facility (McGowan 1999). The community built a Russian Orthodox Chapel in 1880, leading to further immigration from nearby villages (Smith and Petrivelli 1994). In the 1890s, McGlashan bought the post from the Alaska Commercial Company, and soon established a commercial cod fishing and processing business which also attracted nearby Unangan to Akutan. The St. Alexander Nevsky Chapel was built in 1918 to replace the original Russian Orthodox Chapel built in 1880 (McGowan 1999).

Akutan village experienced significant development during the early 1900s. The Alaska Whaling Company built a whaling station along the shore across Akutan Harbor from the village in 1911. In 1913, the station was sold to North Pacific Sea Products. In 1926, the company rebranded as American Pacific Whalers. The Akutan Whaling Station was the only formal whaling station in the Aleutian Islands and operated until 1939 (Denfeld 1996). A Post Office was established at Akutan in 1914, as it had become the primary community in the Krenitzin Islands (Orth 1967). In 1921, a school was opened after years of petitioning by the community. And in 1938, a hydroelectric plant was built to provide electricity to the village. It operated until the 1980s, when a larger plant replaced it (McGowan 1999).

In 1942, the U.S. Navy leased the whaling station from American Pacific Whalers; the newly established Akutan Naval Refueling Station served as a seaplane base and vessel refueling station during World War II (Denfeld 1996). After the Japanese attacked nearby Unalaska Island and seized Attu and Kiska Islands in the western Aleutians in June 1942, the U.S. Government forcibly evacuated the 41 Akutan residents and interned them and other Unangan at the defunct Wards Cove cannery, near Ketchikan in Southeast Alaska (Mason 2010). While they were gone, their homes in the village of Akutan were raided by both military personnel from the Akutan Naval Refueling Station and visiting ships; personal possessions and furniture were taken. In 1943, the Dutch Harbor Naval Operating Base Command sent soldiers to Akutan to repair damage and board up homes, after which the village was off limits (Denfeld 1996).

The Unangan of Akutan were allowed to return to their village in April 1945. In addition to the original Akutan residents, most of the surviving Unangan from Biorka, Kashega, and Makushin joined the community in Akutan, as the military would not allow them to return to their original villages (Mason 2010). The Akutan Naval Refueling Station was closed on April 30, 1945, and returned to its previous ownership; however, American Pacific Whalers went bankrupt in 1948 and the facility burned down shortly thereafter (Denfeld 1996).

With the development of the Bering Sea red king crab fishery in the 1940s and Akutan's proximity to the Bering Sea, floating seafood processors began to operate inside Akutan Harbor. In 1968, Wakefield Seafood Processors constructed a new dock on land leased from the Russian Orthodox Church, and a floating fish and crab processor was stationed at the village. In 1979, Seawest, Inc. purchased the Wakefield dock and facility. Shore-based processing facilities began to increase as Akutan Harbor supported more floating seafood processors. Both Seawest, Inc. and Trident Seafood Company established facilities next to the village of Akutan, bringing in more than a thousand seasonal employees. Akutan incorporated as a second-class city in 1979, enabling the community to levy raw fish taxes on processing occurring in Akutan Harbor (McGowan 1999). What is now the largest single seafood processing plant in the country was developed by the Trident Seafood Company in 1981.

1.6 Congressional District

The study area is in the Alaska Congressional District with the following delegation: Senator Lisa Murkowski (Republican); Senator Dan Sullivan (Republican); and Representative Mary Peltola (Democrat).

1.7 Non-Federal Sponsor

The Native Village of Akutan and the Aleutians East Borough are the non-Federal Sponsors for this Study. The Native Village of Akutan is a Federally Recognized Tribe. The FCSA was signed on 19 July 2021.

1.8 Key Stakeholders

Although there are multiple stakeholders in the proposed project area, the key stakeholders are identified as the Native Village of Akutan, Akutan Native Corporation, the Aleutians East Borough, the City of Akutan, and USACE (Figure 4).

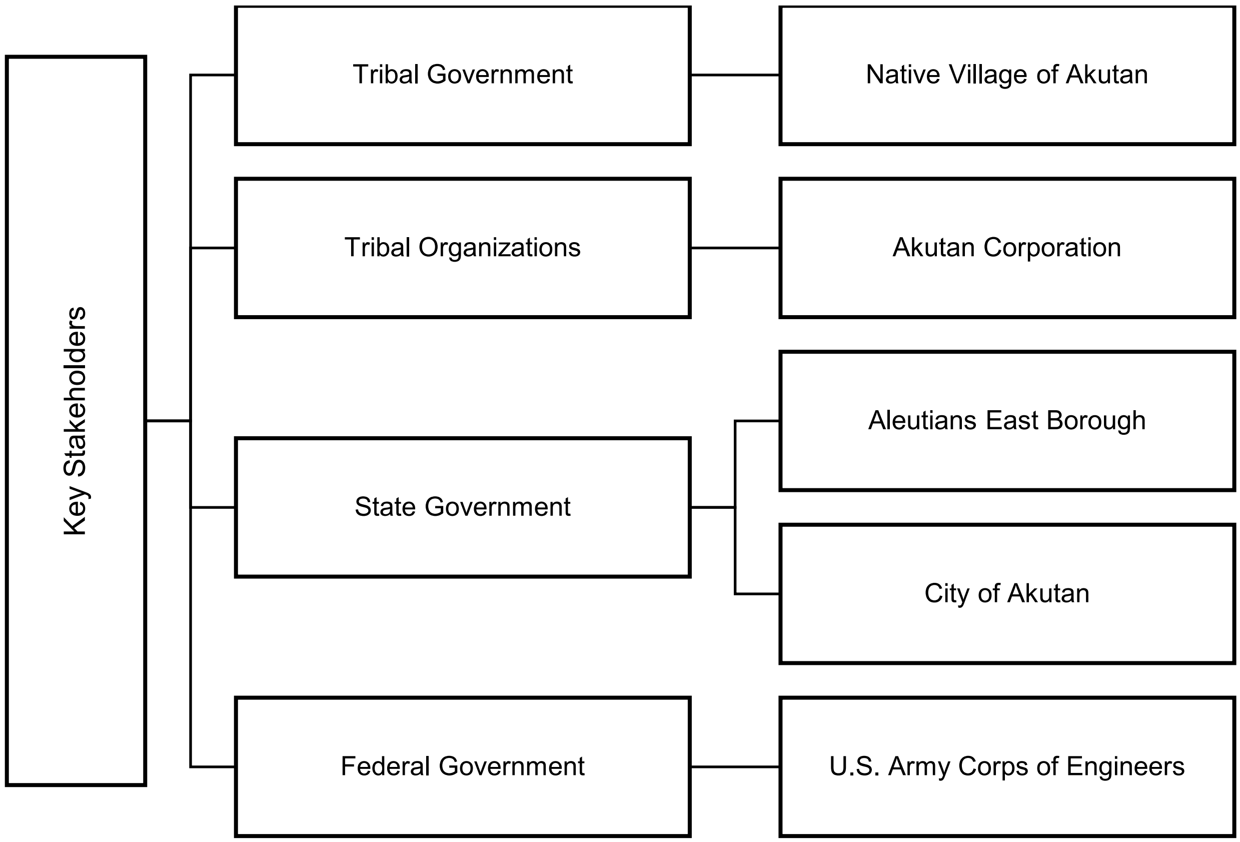


Figure 4. Overview of key stakeholders.

The Native Village of Akutan is a Federally Recognized Tribe and the local tribal government for Akutan, a primarily Unangan village with a permanent population of about 100 persons. The community has existed in its current location since 1878. The Native Village of Akutan was formally identified as a traditional council when the Akutan Reservation was created in 1943 by the Secretary of the Interior in accordance with the Alaska amendments of the Indian Reorganization Act (IRA) of 1934 (Case and Voluck 2012). The Akutan Reservation, which was extinguished with the passage of the Alaska Native Claims Settlement Act (ANCSA) of 1971, originally included the entirety of Akun Island and much of Akutan Island (Kappler 1971:1444).

The Akutan Corporation is a for-profit Alaska Native village corporation formed under Section 8 of ANCSA. When ANCSA was passed, all land in the Akutan area, apart from land patented by the State of Alaska under the Statehood Act of 1959, was available for selection from the federal government. Under ANCSA, the Akutan Corporation became a major landholder in the area with 92,160 acres of land selections. The lands selected by the Akutan Corporation include portions of Akutan and Akun Islands, as well as several of the smaller neighboring islands. By 1983, 89,773 of these acres had been conveyed. Some lands in and around Akutan have been conveyed from the Akutan Corporation to other landowners including the City of Akutan and private individuals.

The Aleutians East Borough is a 2nd class borough in the State of Alaska. As of the 2020 census the Borough's population was 3,420. Communities located within the AEB include: Akutan, Cold Bay, False Pass, King Cove, Nelson Lagoon, and Sand Point. The AEB seat is Sand Point. Commercial fishing and fish processing dominate and occur almost year-round. Sand Point is home to the largest fishing fleet in the Aleutian Islands. Fish processing plants are located in King Cove, Sand Point, Akutan and False Pass. Transportation and other services provide year-round employment.

The City of Akutan (City) is the local government for the Native Village of Akutan and was incorporated as a second-class city in 1979. The City provides municipal facilities and utilities such as piped water and sewer, electric, refuse collection, volunteer fire department, two harbors, a library and museum, and state-funded Village Public Safety Officer. The incorporated boundaries of the City encompass Akutan Harbor and its uplands for an area of approximately 130 square miles, including approximately 25 square miles on Akutan Island, 27 square miles on Akun Island, and 77 square miles of submerged lands.

USACE is a Federal agency within the Department of Defense.

Other important Stakeholder Organizations in the region include:

- Aleutian Pribilof Island Association, Inc. (APIA) – APIA was chartered in 1976 as a non-profit corporation in the State of Alaska. As an Alaska Native non-profit consortium of the thirteen Federally Recognized Tribes in the Unangax̂ region, APIA provides primary and behavioral health care, public safety and family protection, cultural and language revitalization, and environmental advocacy and technical support (APIA 2023; Karen Pletnikoff, Pers. Comm. 10 July 2023).

- Aleutian Pribilof Island Community Development Association (APICDA) – APICDA is a non-profit dedicated to strengthening local economies and building infrastructure to support commerce in the Alaskan communities of Akutan, Atka, False Pass, Nelson Lagoon, Nikolski, and St. George. APICDA is one of six Western Alaska Community Development Quota (CDQ) organizations, which allocate a percentage of all Bering Sea and Aleutian Islands quotas for ground fish, halibut, and crab to eligible CDQ groups (APICDA 2023).

- Eastern Aleutian Tribes (EATS) – Eastern Aleutian Tribes is a tribally-owned health organization that is part of the Alaska Tribal Health Compact with the Indian Health Service. EATS provides medical, dental, and behavioral health services in federally qualified health centers in the Alaskan communities of Adak, Akutan, Cold Bay, False Pass, King Cove, Nelson Lagoon, and Sand Point (EATS 2023).

- Aleut Corporation – The Aleut Corporation was incorporated on June 21, 1972, as one of the 13 Alaska Native regional corporations established under ANCSA. As a for-profit corporation owned by over 4,000 Alaska Native shareholders, primarily of Unangax̂ descent, it is committed to promoting economic, cultural, and social growth for its shareholders through its subsidiaries, partnerships, and foundation (Aleut Corporation 2023).

- Trident Seafoods (Trident) – Trident Seafoods is the largest seafood company in the United States, harvesting primarily wild-caught seafood in Alaska. Trident manages a network of catcher and catcher processor vessels and processing plants across twelve coastal locations in Alaska. Their plant in Akutan is the largest single fish processing plant by volume in the United States.

- United States Fish and Wildlife Service (USFWS) - Alaska Maritime National Wildlife Refuge (AMNWR) – The Alaska Maritime National Wildlife Refuge, managed by the USFWS, stretches from the volcanic islands of the Aleutian Islands south to the Inside Passage and north to the Chukchi Sea, providing essential habitat for marine mammals and some 40 million seabirds representing more than 30 species.

For the purposes of this report, the term “Native Village of Akutan” is used to refer collectively to the Native Village of Akutan, the City of Akutan, and other entities located on the northern shore of Akutan Harbor (exclusive of Trident Seafoods).

1.9 Alaska Tribal Communities

The Indigenous peoples of Alaska occupy all regions of the state. Today “Alaska Native” is the accepted general term for the indigenous peoples of Alaska (Williams 2009). Alaska Natives have occupied the landscape and traditionally used the land and marine resources for more than 10,000 years. Traditional knowledge, oral histories, and archaeological evidence tell of cultural continuity, diversity, and complex and resilient history. Today there are 20 different Alaska Native languages and approximately 50 different dialects spoken in the state. The 229 Federally Recognized Tribes in Alaska represent eight broad cultural groups: Athabascan, Tlingit/Haida/Tsimsian, Siberian Yupik, Yup’ik/Cup’ik/Yupiaq, Iñupiaq, Alutiiq/Sugpiaq, Unangax̂ , and Eyak (Williams 2009). Most of these Federally Recognized Tribes reside in more than 200 Alaska Native villages (Figure 5). Alaska Natives make up nearly 20% of the total population of Alaska.

Figure 5. A Map of Federally Recognized Tribes in Alaska (BIA 2016)

No treaties exist between Alaska Natives and the U.S. government. The U.S. purchased what is now the State of Alaska from Russia in the 1867 Treaty of Cession. It is characterized as a "quit claim," meaning that, where Alaska Natives held their lands by aboriginal title under Russian rule, their aboriginal possession continued under U.S. rule unless extinguished by treaty or subsequent Federal legislation (Case and Voluck 2012). Alaska Natives were granted U.S. citizenship in the Citizenship Act of 1924. It was not until the List Act of 1994 that the sovereign status of Alaska Native villages was Federally recognized, and Alaska Natives were definitively identified as members of "Indian tribes" under United States law (Case and Voluck 2012).

Alaska Native leaders participated in and helped guide the passage of ANCSA in 1971, seeking to maintain control over their traditional lands. ANCSA formally extinguished aboriginal and statute-based Alaska Native title, use, and occupancy rights to all lands in Alaska, except for the Metlakatla Indian Community Federal Reservation on Annette Island. Instead of aboriginal title, monies from the U.S. government and control of a percentage of Alaska Native traditional lands was transferred to Alaska Native Corporations formed under ANCSA. These two tiers of Alaska Native Corporations and the apportioned land was to be held collectively for the benefit of Alaska Natives (Case and Voluck 2012; Mitchell 2001).

The first tier of Alaska Native Corporations created by ANCSA is the regional corporations. ANCSA divided Alaska into twelve geographic regions based on "common

heritage" and created a thirteenth regional corporation (now defunct) for those Alaska Natives living outside of the state. Each regional corporation was required to incorporate under the laws of the State of Alaska as a for-profit business. The second tier of the corporate organization were local corporations associated with eligible Alaska Native villages. These village corporations were required to incorporate as either for-profit or non-profit businesses. The majority chose to incorporate as for-profit corporations. Both regional and village corporations were entitled to select and hold land, with most village corporations holding fee title to surface estate only and regional corporations controlling both surface and subsurface estates (Case and Voluck 2012; Mitchell 2001).
There are at least three types of Federally recognized Alaska Native governments: (1) traditional governing councils, (2) IRA governing councils, and (3) the Tlingit and Haida Central Council (Case and Voluck 2012). As noted above in Section 1.8, the Native Village of Akutan is a traditional governing council.

As defined in the Indian Self-Determination Act of 1975, at least three different entities qualify as tribes: ANCSA regional corporations, ANCSA village corporations, and Federally Recognized Tribes. Additionally, the "twelve Native nonprofit associations… described in Section 7 ANCSA as 'existing Native associations'… have been administratively determined to be tribal organizations… under the Indian Self-Determination Act" (Case and Voluck 2012). Only Federally Recognized Tribes hold a Government-to-Government relationship with the Federal government.

1.10 Related Reports and Studies

USACE 2019. Continuing Authorities Program (CAP) Section 107 Akun Navigation Improvements Project Preliminary Fact Sheet. This CAP 107 study preliminarily evaluated three alternative plans for harbor concepts at Akun Island in the small cove between No-name Point and a rocky outcrop. Completing this study was not warranted because no alternative could be completed under the CAP project limit. The non-Federal sponsor expressed interest in pursuing a General Investigations Study under the Tribal Partnership Program

FAA 2007. FONSI and Record of Decision for the Final Environmental Assessment for the Construction of a Land-Based Airport on Akun Island, Alaska. This Federal Aviation Administration document evaluated the impacts of construction of a land-based airport on Akun Island to serve the Native Village of Akutan, Alaska.

USACE 2004. Navigation Improvements, Akutan, Alaska. Interim Feasibility Report and Final Environmental Impact Statement. This study examined the need for a protective harbor at Akutan, Alaska. This study resulted in construction of the Akutan Harbor (small boat) at the head of the body of water called Akutan Harbor in 2012 and was not connected to any harbor options on Akun Island.

Aleutians East Borough 2000. Preliminary Engineering Report for Akutan Harbor Access Road. This report describes the engineering work for developing a preliminary engineering design for a 2 miles long coastal road extending from the Native Village of

Akutan to the Akutan Harbor located at the head of the body of water called Akutan Harbor.

2. PLANNING CRITERIA, PURPOSE, AND NEED FOR PROPOSED ACTION

2.1 Problem

Before 2012, the Native Village of Akutan was only accessible by boat or amphibious aircraft. The Grumman Goose amphibious aircraft that provided air transport between Dutch Harbor and Akutan were built in 1946, and PenAir was the only U.S. air carrier flying scheduled routes with the Goose between 1985 and 2012, when they were taken out of service. An airport was opened on Akun Island (called Akutan Airport) in 2012 to provide a link between inhabitants of the Native Village of Akutan and mainland Alaska. It was necessary to construct the airport on Akun Island as a suitable location was not available on Akutan Island due to the mountainous topography. Starting in 2012, the Aleutians East Borough committed to providing access between Akutan and the Akun Airport for a period of 20 years. A Federal subsidy (Essential Air Service contract) partially funds the operation of transportation between Dutch Harbor and the Native Village of Akutan.

The AEB initially used a hovercraft to transport passengers between the Native Village of Akutan and the Akutan Airport on Akun Island from the completion of the Akutan Airport in 2012 to early 2014. However, operation costs of the hovercraft exceeded $4 million annually and it was minimally effective due to wind and wave threshold limitations. The annual helicopter service for transport of passengers, mail, and light freight costs approximately $2.3 million dollars per year which is heavily subsidized by both the AEB and an Essential Air Service contract (see Section 3.4.1 Transportation for a description of current operations). The AEB believes that transport via a conventional marine vessel would be much less financially burdensome, but there are currently no marine docking facilities on Akun Island that would enable marine transport via a conventional marine vessel (AEB 2023). A 195-foot Trident freight vessel can transport up to 40 passengers between the Trident facility on Akutan and Dutch Harbor. Community members of Akutan report that although the ferry is also available to non-Trident employees, the trip is rarely undertaken due to the voyage being uncomfortable and taking a long travel time of over 3.5 hours. Additionally, there is no connection between the Trident docks in Dutch Harbor and the Unalaska airport.

During subsistence and other activities on Akun Island, personal skiffs and small boats are tied or dragged onto the beach. However, due to a lack of protected moorage skiffs are not generally left unattended on Akun Island and at least one community member often stays behind with the vessel. This prevents that individual from engaging in subsistence or other activities on Akun Island with the remainder of their group.

Accessing the beach from and reboarding skiffs can be difficult and is compounded by even marginal wave conditions. Those wave conditions near Surf Bay can prohibit skiffs from accessing Akun Island even when it is possible to transit from Akutan to Akun Island.

2.1.1 Problem Statement

The current transportation methods between the Akutan Airport on Akun Island and the Native Village of Akutan are expensive, inefficient, and intermittently reliable. The lack of reliable vessel access and marine infrastructure limits transportation options between the Akutan Airport on Akun Island and the Native Village of Akutan for passengers, medical supplies, and freight. This lack of reliable transportation to get to Akutan results in delays while waiting in Dutch Harbor at significant expense to residents for lodging and meals. Delays in getting out of Akutan often cause missed medical appointments. Medication deliveries are also often delayed due to lack of reliable transportation to Akutan.

2.2 Purpose and Need

The purpose of the proposed action is to achieve feasible navigational improvements that provide for the safe, reliable, cost-effective, and efficient transportation of passengers and cargo between the Akutan Airport on Akun Island and Native Village of Akutan located on Akutan Island. The need for the proposed action is due to the lack of reliable vessel access and marine infrastructure limits transportation options between the Akutan Airport on Akun Island and the Native Village of Akutan for passengers, medical supplies, and freight.

2.3 National Objectives

The Federal objective for water and related land resources project planning is to contribute to National Economic Development (NED) consistent with protecting the Nation's environment, pursuant to national environmental statutes, applicable executive orders, and other Federal planning requirements. Contributions to NED are increases in the net value of the national output of goods and services, expressed in monetary units.

In addition to NED benefits, a complete accounting, consideration, and documentation of the total benefits of alternative plans across all benefit categories is required. Total benefits involve a summation of monetized and/or quantified benefits, along with a complete accounting of qualitative benefits, for project alternatives across national and regional economic, environmental, and social benefit categories.

2.4 Study Objectives

The overarching objective of this study is to improve navigation efficiency at Akutan and to realize any associated opportunities that may arise from improving the quality of life for the residents of the Native Village of Akutan. The effects of all objectives are expected to begin to be realized at the completion of project construction in 2032 and expected to continue to be realized throughout the 50-year period of analysis.

The project objectives for the study include the following:

- Provide sustainable, safe, reliable access to the Native Village of Akutan over the 50-year period of analysis beginning in 2033; and
- Improve transportation options for key services such as mail and medical supplies between the Akutan Airport on Akun Island and the Native Village of Akutan over the 50-year period of analysis beginning in 2033.
- Support the long-term viability of the Native Village of Akutan.

2.5 Opportunities

The opportunities identified during the charrette to alleviate the problems described above are listed below:

- Reduce financial burden of operating cost on the non-Federal sponsor.
- Reduce dependence on Federal Subsidies to operate transportation system.
- Improve reliable delivery of mail and goods to and from Akutan.
- Reduce impacts to life safety and improve delivery of critical medical supplies.
- Reduce cost of living to the Native Village of Akutan.
- Improve subsistence activities with additional navigation options.
- Increase population and settlement on Akun Island.
- Increase opportunity to study and learn about the marine and cultural environment.
- Facilitate potential expansion into the fresh seafood product market.
- Increase commerce in the region through improved transportation.
- Improve the long-term viability of the Native Village of Akutan.

2.6 Study Constraints

Planning Constraints. The universal constraints identified during the charrette included:

- Avoid or mitigate for the effects on Akun Island historic and cultural resources (impacts now are mainly from erosion).
- Avoid or mitigate for environmental resources and impacts.

A study-specific constraint that was identified during the charrette included the need to avoid negative impacts to subsistence opportunities associated with the only sockeye salmon stream on the west side of Akun Island. This stream flows near the former hovercraft landing area and hovercraft activities disrupted subsistence activities. In addition, there is concern that a harbor could create rockfish habitat that would increase the rockfish populations near the near the mouth of the stream or attract migrating juvenile salmon. The rockfish would then prey on the juvenile salmon migrating to the ocean which could lower adult salmon returns and the associated subsequent use of this resource.

2.7 National Evaluation Criteria

Alternative plans should be formulated to address study objectives and adhere to study criteria. The Water Resources Council's Federal Principles and Guidelines document establishes four criteria for the evaluation of water resources projects (WRC 1983). These criteria and their definitions are explained below.

2.7.1 Acceptability

Acceptability is "the workability and viability of the alternative plan with respect to acceptance by State and local entities and the public and compatibility with existing laws, regulations, and public policies."

2.7.2 Completeness

Completeness is "the extent to which a given alternative plan provides and accounts for all necessary investments or other actions to ensure the realization of the planned effects. This may require relating the plan to other types of public or private plans if the other plans are crucial to realization of the contributions to the objective. "

2.7.3 Effectiveness

Effectiveness is defined as "the extent to which an alternative alleviates the specified problems and achieves the specified opportunities."

2.7.4 Efficiency

Efficiency is "the extent to which an alternative plan is the most cost-effective means of alleviating the specified problems and realizing the specified opportunities, consistent with protecting the Nation's environment."

2.7.5 Study Specific Evaluation Criteria

Study-specific screening criteria used to evaluate alternative measures included constructability, avoidance of constraints, completeness, first costs, and maintenance costs.

According to Section 2006, as amended, implementation guidance, if there is no NED plan and/or the selection of a plan other than the NED plan is based in part or whole on non-monetary units, the recommendation will be supported by a CE/ICA. In addition, the

MCDA is used to account for benefit intricacies in the framework of CE/ICA. MCDA is a decision aiding tool and allows for analysis of multiple accounts.

The selection of criteria for the MCDA is based on key benefits that are non-monetary but support community viability and meet the planning objectives. The metric for this study and the results of the NED, CE/ICA, and MCDA analysis are presented in Section 6, “Comparison & Selection of Plans” as well as Appendix C: Economics.

3. BASELINE CONDITIONS

3.1 Physical Environment

Lying between Unimak Island and Unalaska Island, Akutan Island is a member of the chain of rugged, volcanic Aleutian Islands stretching westward from the tip of the Alaska Peninsula towards the Russian coast. Akutan Island is part of the Krenitzin Islands in the Fox Island Group.

Akutan and Akun Islands fall within the overarching boundary of the AMNWR. Portions of its surface landmass are owned and managed by the USFWS for conservation, protection, and the overall enhancement of fish, wildlife, plants, and their habitats for the continuing benefit of the American people. Akutan and Akun are difficult to access by airplane or boat due to the wave, wind, and fog climate of the Aleutian Islands/Bering Sea region.

3.1.1 Climate

Akutan has a maritime climate primarily influenced by strong low-pressure centers generated in the Bering Sea and western Pacific Ocean. The high frequency of cyclonic storms crossing the north Pacific and the Bering Sea are dominant factors in the weather at Akutan. These storms account for the persistent high winds and the frequent occurrences of low ceilings and low visibility. Cool summers, mild winters, and year-round rainfall characterize the climate. Snow falls primarily between November and April, with an average annual snowfall of 19.6 inches. Rains occur any time of the year, with an average annual precipitation of 79 inches. The wettest month is October, with a record of 13.4 inches and an average of 11.3 inches of precipitation. Fog is common during summer when the seas are calmer. Normal winter temperatures range within a few degrees above and below freezing (32 °F), and summer temperatures range from +45 °F to +60 °F. The lowest recorded temperature was -8 °F and highest recorded temperature was 72 °F at Dutch Harbor, 35 miles away. Wind summary data is available in Figure 6 with statistics based on observations taken between 06/2017 – 04/2023. Additional climate data is available in Appendix A: Hydraulics & Hydrology.

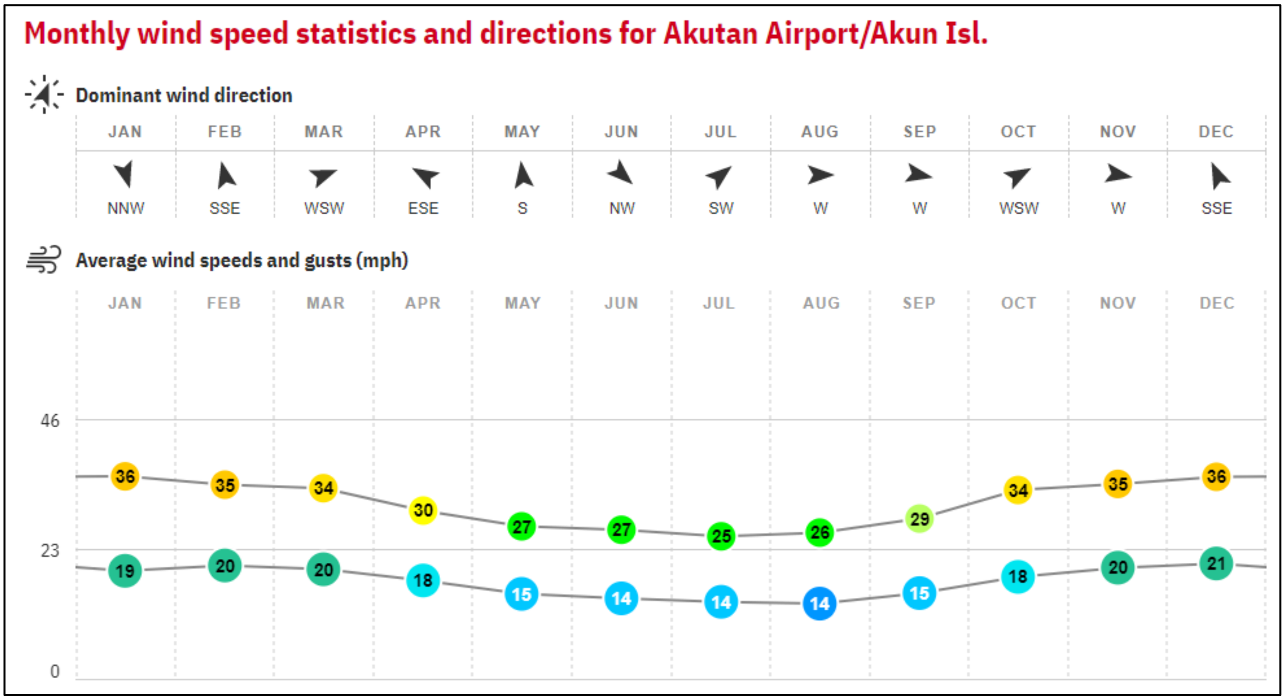


Figure 6. Wind summary data for Akutan Airport on Akun Island (Windfinder 2023)
Note: Observations taken between 06/2017 – 04/2023

3.1.2 Tides

Akun Island is in an area of semi-diurnal tides with two high waters and two low waters each lunar day. National Oceanic and Atmospheric Administration (NOAA) tide stations for Akutan were deployed for spring of 2009 and in Surf Bay (Akun Island) between 2008 to 2011. Surf Bay is the closest tidal station to the project area. The closest tidal station with long term data is 35 miles to the southwest at Unalaska (Figure 7), with over 68 years of data including lowest and highest observed water levels. Tides at Surf Bay range between +3.76 feet and 0.0 feet (Table 1).

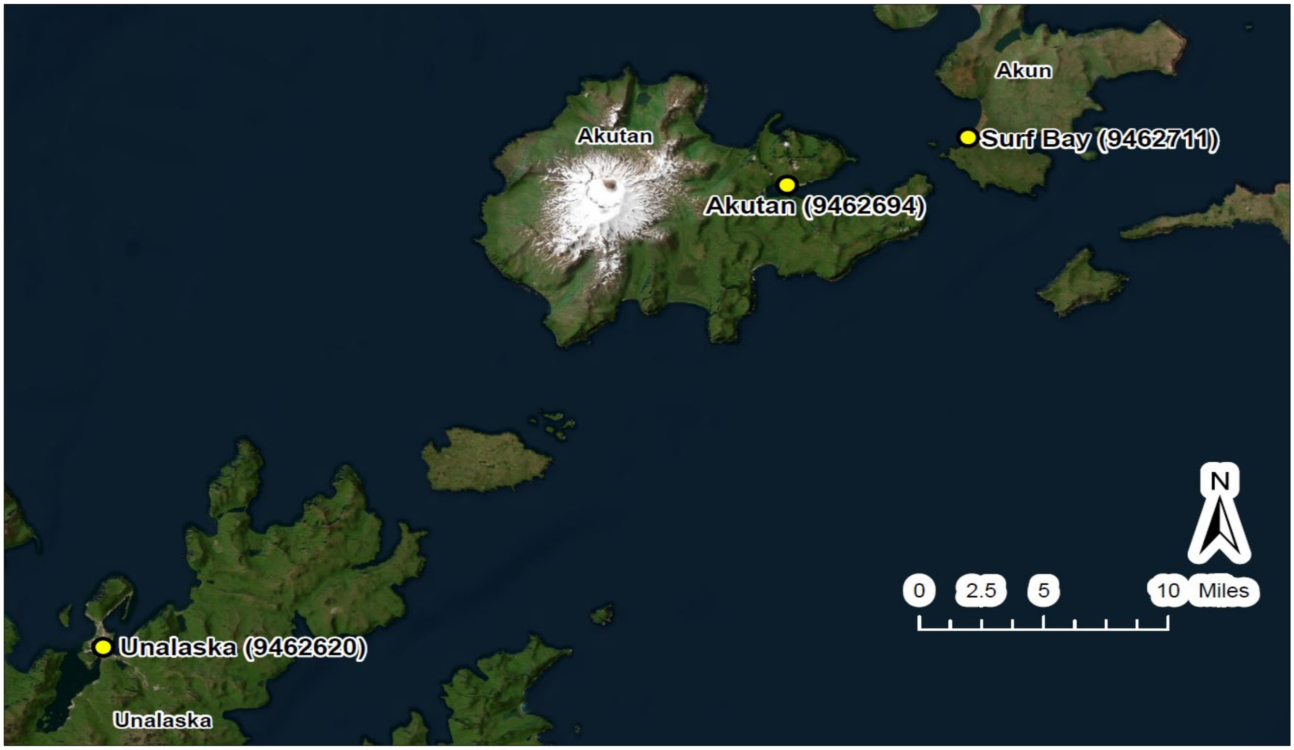


Figure 7. Location of NOAA Tide Stations (Yellow)

Table 1. NOAA Tide Station Data

	Akutan	Surf Bay	Unalaska
Station Number	9462694	9462711	9462620
Established	3/7/2009	7/15/2008	5/7/1955
Removed	5/1/2009	9/18/2011	N/A
	(Feet MLLW)		
Highest Observed Water Level	-	-	6.70
Mean Higher High Water (MHHW)	3.73	3.76	3.60
Mean High Water (MHW)	3.42	3.47	3.31
Mean Sea Level (MSL)	2.16	2.19	2.08
Mean Low Water (MLW)	0.89	1.00	0.93
Mean Lower Low Water (MLLW)	0.0	0.0	0.0
Lowest Observed Water Level	-	-	-2.78

3.1.3 Currents

Tidal currents are a significant consideration for vessels when transiting between Akutan and Akun Islands (Figure 8). NOAA buoys measuring current were deployed near the project area between June 11 to June 23, 2010, measuring a maximum current velocity of 0.8 knots at the Akutan Bay buoy and 7.5 knots at the Akun Strait buoy.

Approximate flood (increasing) tide directions were 340° and 350° respectively, aligning as expected with the Akun Strait.

Figure 8. Google Earth Imagery of Akun Strait Currents in the Project Study Area

According to the NOAA Coast Pilot (40th Edition, 2022), currents in Akun Strait can attain an estimated velocity of 12 knots in the narrowest part, setting north with the flood. The slack period is very short. Tide rips, swirls and overfalls occur and with a northerly wind or swell from the Bering Sea create can be extremely heavy. These tidal rips and currents influence vessel traffic transiting north of Akun Strait, between Akutan and Akun Islands. A local captain with extensive local knowledge of tides and currents in the Akutan/Akun area stated the currents northward through Akun Strait persist to approximately the 40-fathom area in Akutan Bay (Figure 9), at which point the velocity of the currents is reduced by 50%.

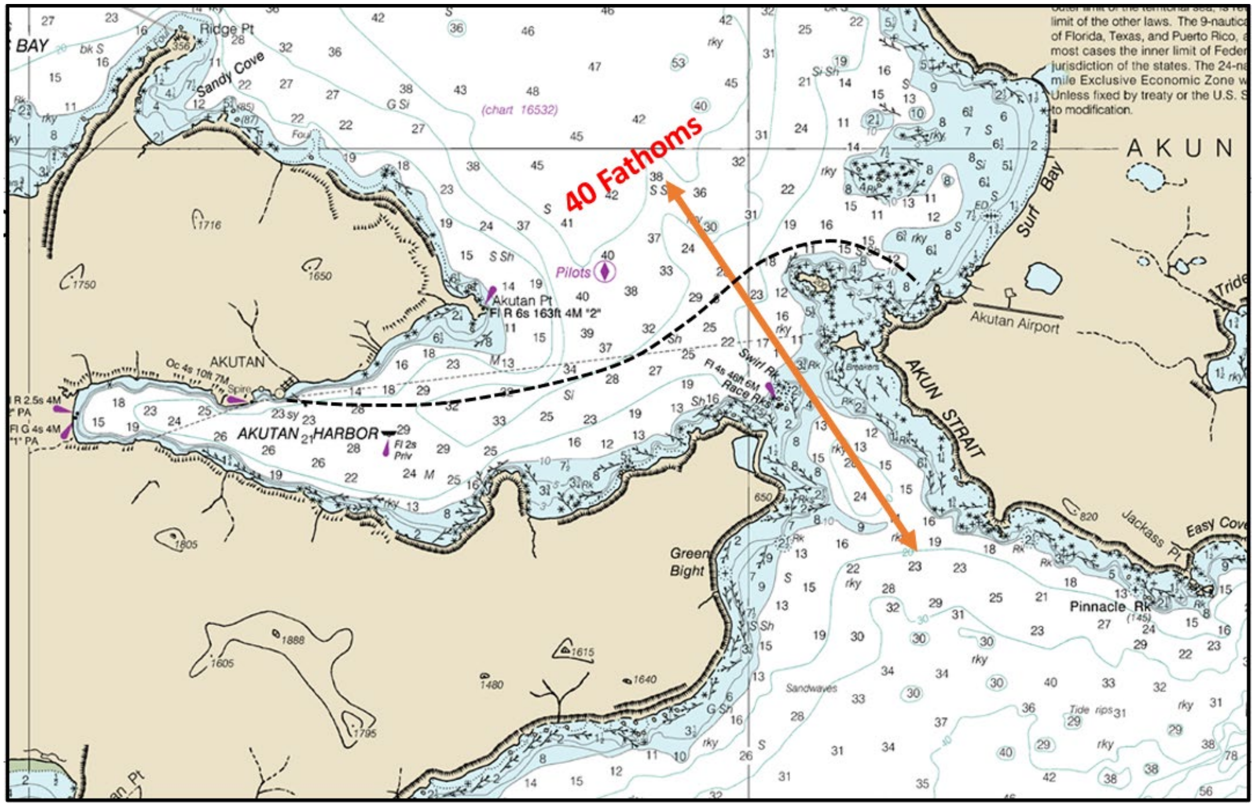


Figure 9. Tidal Current Influence through Akun Strait

3.1.4 Wave Climate

Akutan Bay is open to the Bering Sea to the north. Akun Strait gives access to the North Pacific (Gulf of Alaska) to the south, but Akun Strait is shoal and subject to strong currents. Refraction around Rootok Island (southwest of Akun Strait) and shoaling and wave breaking in Akun Strait prevent most of the wave energy generated in the Gulf of Alaska from penetrating into Akutan Bay but can cause a confused and severe breaking wave environment within Akun Strait. While these features protect Akutan Bay from Pacific swell from the south, it is subject to Bering Sea swell arriving from the north. Akutan Bay opens into Akutan Harbor extending along an east-west axis towards the west (Figure 10). A full wave analysis is presented in Appendix A: Hydraulics & Hydrology.

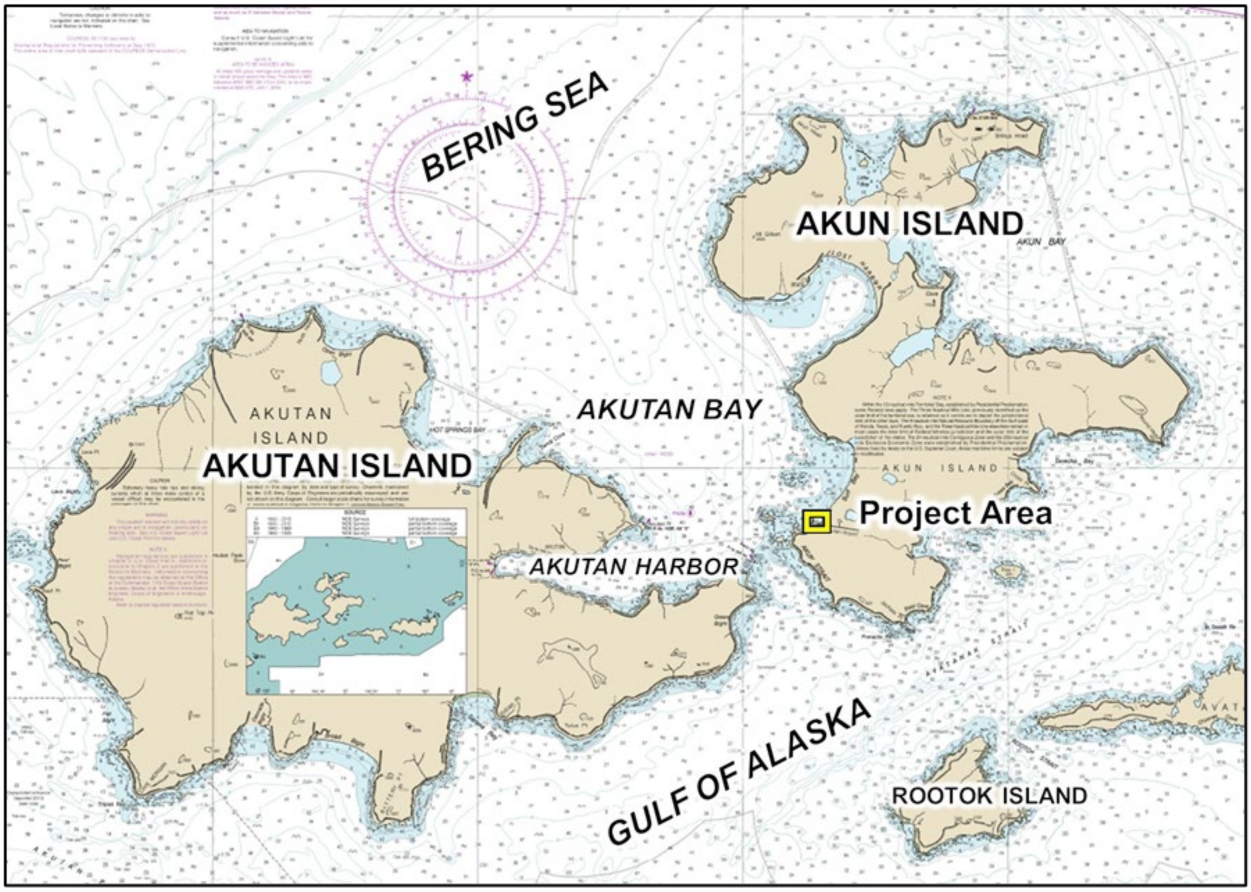


Figure 10. Wave Climate Features

3.1.5 Relative Sea Level Change

The Corps of Engineers requires that planning studies and engineering designs consider alternatives that are formulated and evaluated for the entire range of possible future rates of relative sea level change (RSLC). The low, intermediate, and high RSLC scenarios for the representative station were evaluated for impact on dredging and breakwater design.

The two closest tide stations, Unalaska and Sand Point, were compared based on tide, vertical land movement, and physiography to see which was most representative of RSLC for the project. The result of the analysis (detailed in Appendix A: Hydraulics & Hydrology) was that Unalaska (9462620) was most representative. The recommended period of record for RSLC analysis is 40 years, and the period of record for Unalaska is 50 years (1965 to 2015). Unalaska tide station is located approximately 35 miles southwest of the project site.

The USACE 2013 low, intermediate, and high RSLC scenarios for Unalaska tide station are shown in Figure 11 and Table 2 below. Low and intermediate RSLC estimates predict that the isostatic rebound rate will be greater than the sea level rise rate, resulting in an overall sea level drop between completion of construction in 2032 and the 50-year project life in 2082. This would affect harbor depth and underkeel clearance of the ferry. The high RSLC estimate predicts that the isostatic rebound rate will be less than the sea level rise rate and that sea level would rise. This would affect armor stone damage and breakwater stability. The suite of RSLC scenarios were evaluated separately for dredging and breakwater design. See Appendix A: Hydraulics & Hydrology for more information.

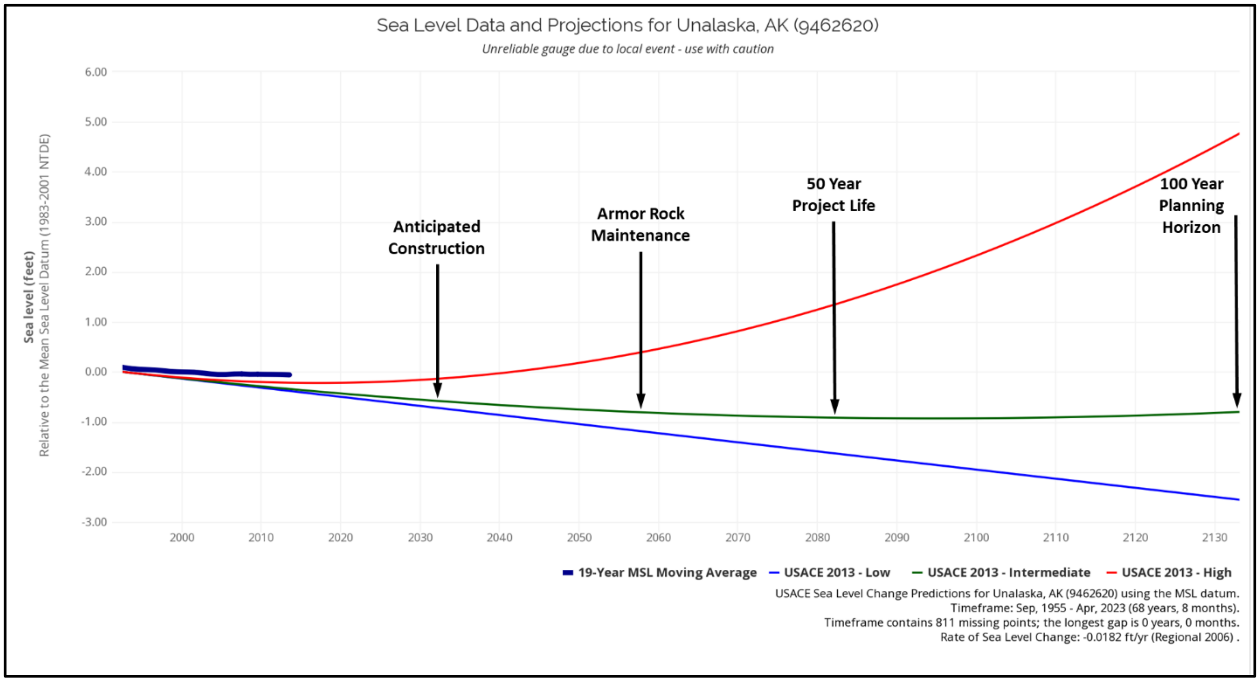


Figure 11. RSLC Projection Graphs for Unalaska.

Table 2. RSCL Projection Values for Unalaska.

Year	Description	USACE Low	USACE Intermediate (Feet MLLW)	USACE High
1992	USACE RSLC Projection Begins	0.00	0.00	0.00
2032	Anticipated Construction	-0.73	-0.60	-0.14
2042	Maintenance Dredging	-0.91	-0.69	+ 0.02
2052	Maintenance Dredging	-1.09	-0.77	+ 0.24
2057	Armor Rock Maintenance	-1.18	-0.81	+ 0.38
2062	Maintenance Dredging	-1.27	-0.84	+ 0.54
2072	Maintenance Dredging	-1.46	-0.89	+ 0.92
2082	50 Year Project Life	-1.64	-0.92	+ 1.37
2132	100 Year Planning Horizon	-2.55	-0.81	+ 4.72

To maintain the project depth at year 50, 1 foot of dredging will be incorporated in the entrance channel, turning, and mooring design depths at construction. This would ensure project depth is maintained at year 2082 for the intermediate RSLC scenario and year 2050 for the high RSLC scenario. If the high scenario is realized, the project would lose 0.64 feet of underkeel clearance at year 2082. The harbor would still function, but ferry operation may be reduced due to the decrease in underkeel clearance. It was determined that dredging more than 1 foot for RSLC was not economical due to the uncertainty associated with RSLC. The additional 1 foot of dredging is a reasonable assurance for RSLC resiliency.

To maintain breakwater stability at year 50, the high RSLC scenario of +1.37 feet was included in total water level calculations used in breakwater stone size and breakwater dimension calculations. Designing the breakwater for the high RSLC scenario is prudent for this remote location given the minimal wave information available and helps increase resiliency for the project.

3.1.6 Bathymetry

Surf Bay, on the Akun Island side of Akutan Bay and just north of Akun Strait, is an open bight exposed to the west and north (Figure 12). A group of rocky islets, the highest 64 feet, is in the middle of the bay about 1 mile from shore. A group of rocks, awash at low water, is 0.3 mile north of the islets, and irregular bottom, with least depth of 2¼ fathoms, is found 0.3-mile northwest of the rocks. The channel south of the islets is clear, and anchorage can be found in 10 fathoms, 0.4 mile from shore, with good shelter in south and east weather. On the east side of Surf Bay is a sand beach about 1 mile long.

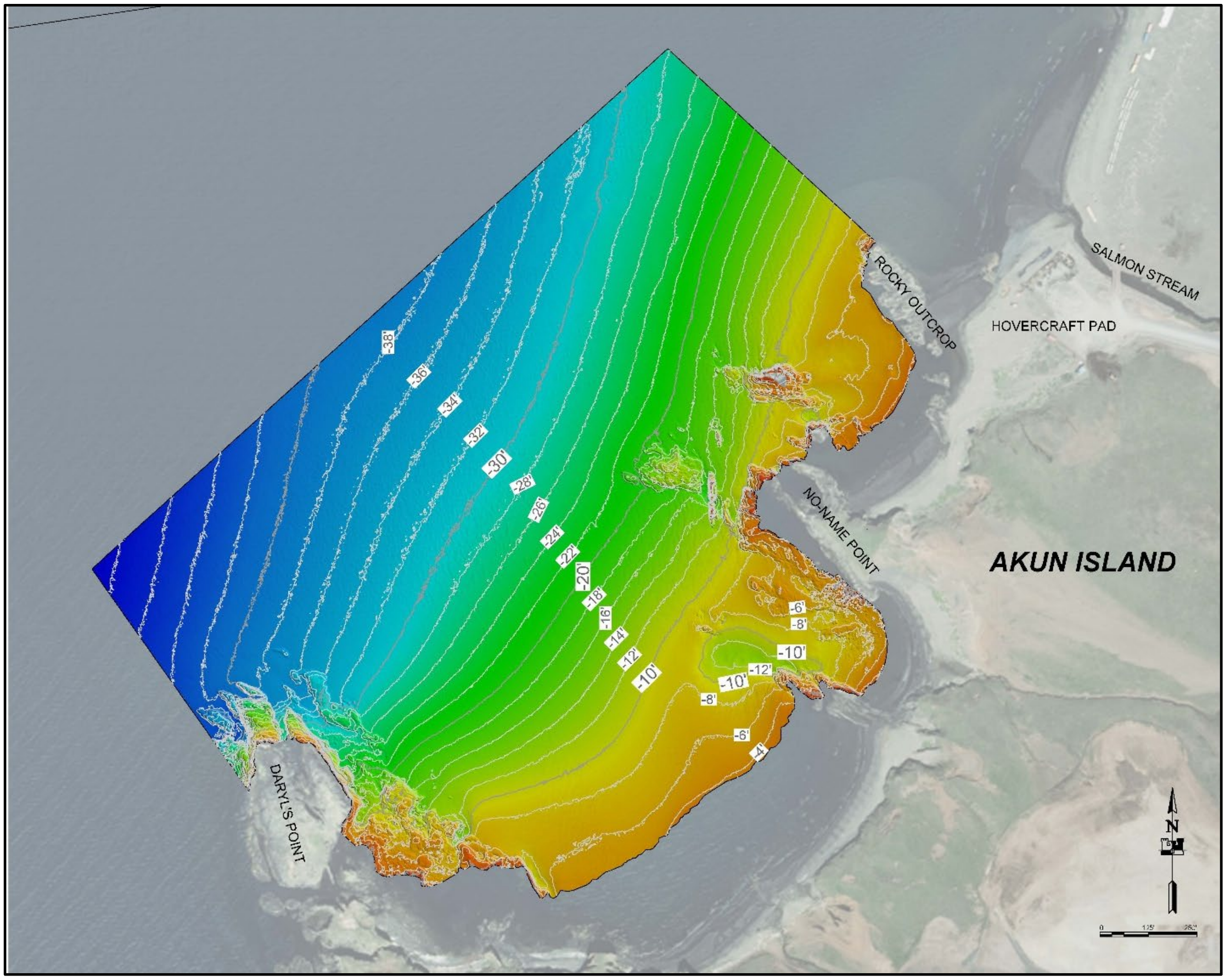


Figure 12. Bathymetry in the project area

3.1.7 Sediments

An offshore geophysical survey was conducted in August 2022 to investigate the thicknesses of sediment over bedrock within the area of proposed navigation improvements. General site conditions within the project area are expected to consist of a variable thickness of unconsolidated sediment overlying a harder layer interpreted to be bedrock. At some locations, the geophysical data also shows the presence of an intermediate strength layer below the sub- bottom elevation that could be weathered bedrock. Weak surficial sediment was not encountered, which is consistent with the relatively high-energy environment in Surf Bay.

Observations from a skiff in shallow water and underwater video indicate that the surface sediments at the harbor site alternatives are a mixture of sand and gravel with occasional rock reefs and outcrops. More information on the 2022 study as well as historical reports are discussed in Appendix B: Geotechnical.

3.1.8 Geology/Topography

Akun Island is located within the Aleutian Islands, a volcanic island arc extending southwest from the Alaska Peninsula that separates the Bering Sea from the Pacific Ocean. The Aleutian Island arc is situated along the Aleutian subduction zone where the oceanic Pacific Plate is subducted beneath the continental North American plate, which results in a volcanic arc and high rates of seismicity. During the Pleistocene epoch, glaciation blanketed the Aleutian chain. At present, the Aleutian Islands often consist of steep volcanic slopes that descend directly into the sea and glacier-carved fjords. Glacial and volcanic deposits are commonly found concurrently in the Aleutian Island surficial geology, including glacial deposits in valley bottoms and ridge tops, and modern pyroclastic deposits such as air-fall ash and ash-flow tuff.

Akun Island is located approximately 7 miles east of the Native Village of Akutan and approximately 35 miles northeast of Dutch Harbor and Unalaska. The Akutan Volcano, one of the most active volcanoes in the Aleutian Arc, sits on the western half of Akutan Island. The most recent eruption occurred in 1992 with minor ash emissions. Previous minor eruptions occurred in 1978, 1947, and 1929. The most recent major eruption occurred approximately 1,600 years ago, inundating valleys with pyroclastic-flow and lahar deposits tens of meters thick (AVO 2023; Waythomas et al. 2012). Mt. Gilbert Volcano is located approximately 5 miles north of the project site on Akun Island. Mt. Gilbert is an extinct stratovolcano with massive basalt flows and thick pyroclastic deposits from modern and ancestral volcanic activity. Volcaniclastic debris flows and lahar deposits are found at the base of the volcanic slopes and in local valley bottoms.

3.1.9 Seismicity

Akun Island, Alaska is in a region of high seismicity typical of the Aleutian Islands due in part to the proximity to active faults. A detailed discussion of the seismicity in the project area can be found in the Geotechnical Appendix. Per the UFC 3-220-01 Geotechnical Engineering Section 2-1, the criteria for minimum factor of safety for liquefaction of risk category I & II structures is greater than or equal to 1.0, and for risk category III & IV structures greater than or equal to 1.1.

3.1.10 Geotechnical Conditions

Geotechnical conditions in the project area were determined based on two historical geotechnical investigations and one geophysical survey in the vicinity. An offshore geophysical survey was conducted by WSP Golder in August 2022 to investigate the thicknesses of sediment over bedrock within the area of proposed navigation improvements. General site conditions within the project area are expected to consist of a variable thickness of unconsolidated sediment overlying a harder layer interpreted to be bedrock. At some locations, the geophysical data also shows the presence of an intermediate strength layer below the sub bottom elevation that could be weathered bedrock. Weak surficial sediment was not encountered, which is consistent with the relatively high-energy environment in Surf Bay. Details on the geotechnical conditions anticipated in the project area can be found in Appendix B: Geotechnical.

3.1.11 Water Quality

The Native Village of Akutan is located along Akutan Harbor. Akutan Harbor was originally listed on the Alaska Department of Environmental Conservation (ADEC) 1996 Section 303 (d) list of impaired water bodies for settleable solids and low dissolved oxygen. Pollutant sources consist of seafood processing and waste. The ADEC prepared a water body assessment and total maximum daily load (TMDL) to address the water quality issues within this water body, and Trident Seafoods' NPDES permit was amended to reflect this information. The harbor was removed from the Section 303(d) list in 1998 and remains as a Category 4a (impaired water with an established and EPA-approved TMDL in ADEC's 2022 Integrated Water Quality Monitoring and Assessment Report (ADEC 2022).

There are no major water quality concerns for Surf Bay; however, introduced cattle on Akun Island cause substantial slope erosion and some of the entrained soil may be retained in downslope wetlands, thus reducing stream water and substrate quality.

3.1.12 Air Quality

Akutan does not have an attainment area designation for National Ambient Air Quality Standard pollutants. Air quality in Akutan and Akun is assumed to be good, although air quality monitoring for criteria pollutants has not been conducted in the area.

3.1.13 Noise

The Akutan Airport is located on Akun Island approximately 7 miles from the Native Village of Akutan. In addition to ~12 flights per week, maintenance of airport runway surfaces and vehicles are common and introduce anthropogenic (i.e., human caused) airborne noise. Additionally, the Surf Bay Inn and associated activities contribute to airborne noise from a generator and occasional truck and all-terrain vehicle (ATV) traffic. Both facilities use diesel generators as primary sources of power.

Anthropogenic underwater noise in Surf Bay is likely from distant vessel traffic and occasional small skiffs that use the area. A few times a year a landing craft might arrive with larger items for the airport or other upland needs. Farther out in Akutan Bay and Akutan Harbor, underwater noise is primarily from commercial vessel traffic from a combination of tugboats, supply vessels and commercial fishing boats and occurs year-round.

Underwater noise is also likely present in the area between Akutan and Akun from the helicopter. This noise can penetrate the underwater environment in the area under the aircraft and out to a narrow cone on each side of the aircraft.

Natural sources of airborne noise include wind, rain, birds, and terrestrial mammals such as cattle and foxes. Natural sources of underwater noise include waves, rain, and marine mammals.

3.1.14 Climate Change

NOAA began publishing annual, peer-reviewed Ecosystem Status Reports (ESR) in 1999. These ESRs are developed individually for the Aleutian Islands, Gulf of Alaska, and Bering Sea and are intended to provide stronger links between Alaska ecosystem research and fishery management and spur new understanding of the connections between ecosystem components by bringing together the results of diverse research efforts. The 2022 ESR for the Eastern Bering Sea (Siddon et al. 2022) states that the extended warm phase in the Bering Sea, which started in approximately 2014, ended in 2022 (Figure 13).

Measurements such as ocean temperatures and sea ice extent showed a relaxation to average conditions over the last year (since fall 2021). Several broad-scale climate indices that track trends across the North Pacific aligned, resulting in cooler conditions. A positive state of the North Pacific Index and Arctic Oscillation, as well as a continued La Niña, meant a return to more average sea surface temperature conditions for the EBS shelf. In fact, sea surface temperatures of the shelf were average to cool for most of the year. However, summer 2022 warming brought above-average temperatures over the shelf.

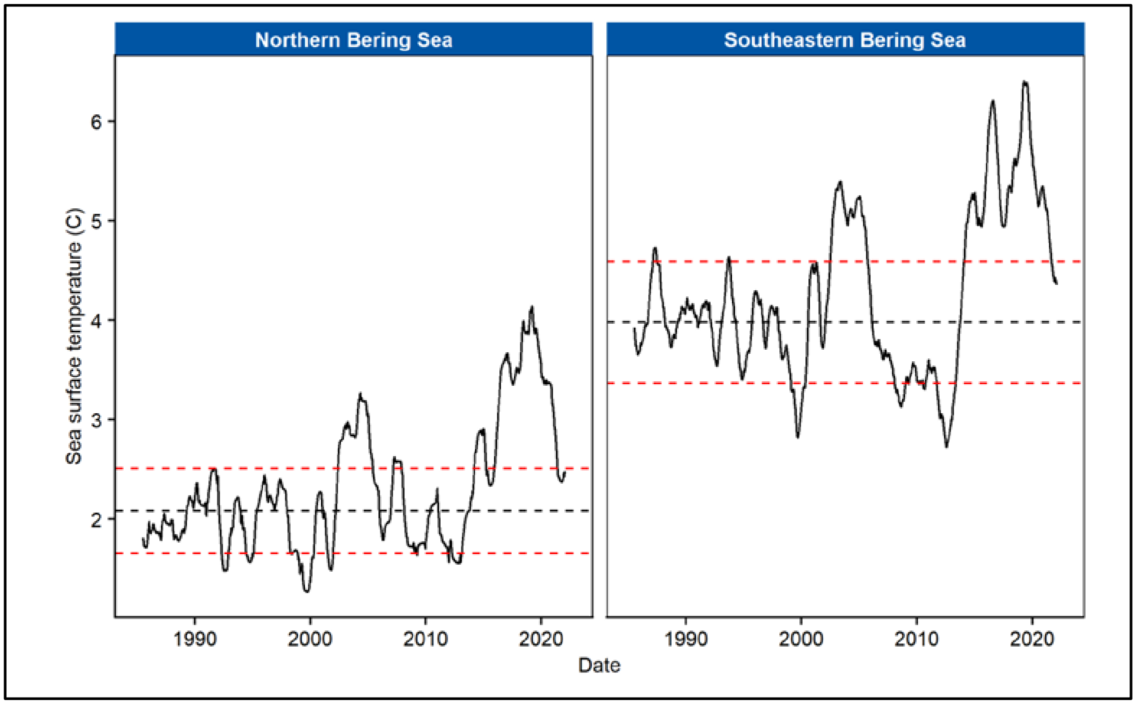


Figure 13. Sea surface temperature in the Bering Sea.

In the Eastern Aleutian Islands, sea surface temperatures during 2022 were not as high during winter as in the western and central Aleutians (Ortiz et al 2022). The marine heat wave periods were also of lower intensity and shorter, primarily restricted to summer. However, sea surface temperatures were the second highest (after 2014) since 1900 during the warm months, May – October (Figure 14).

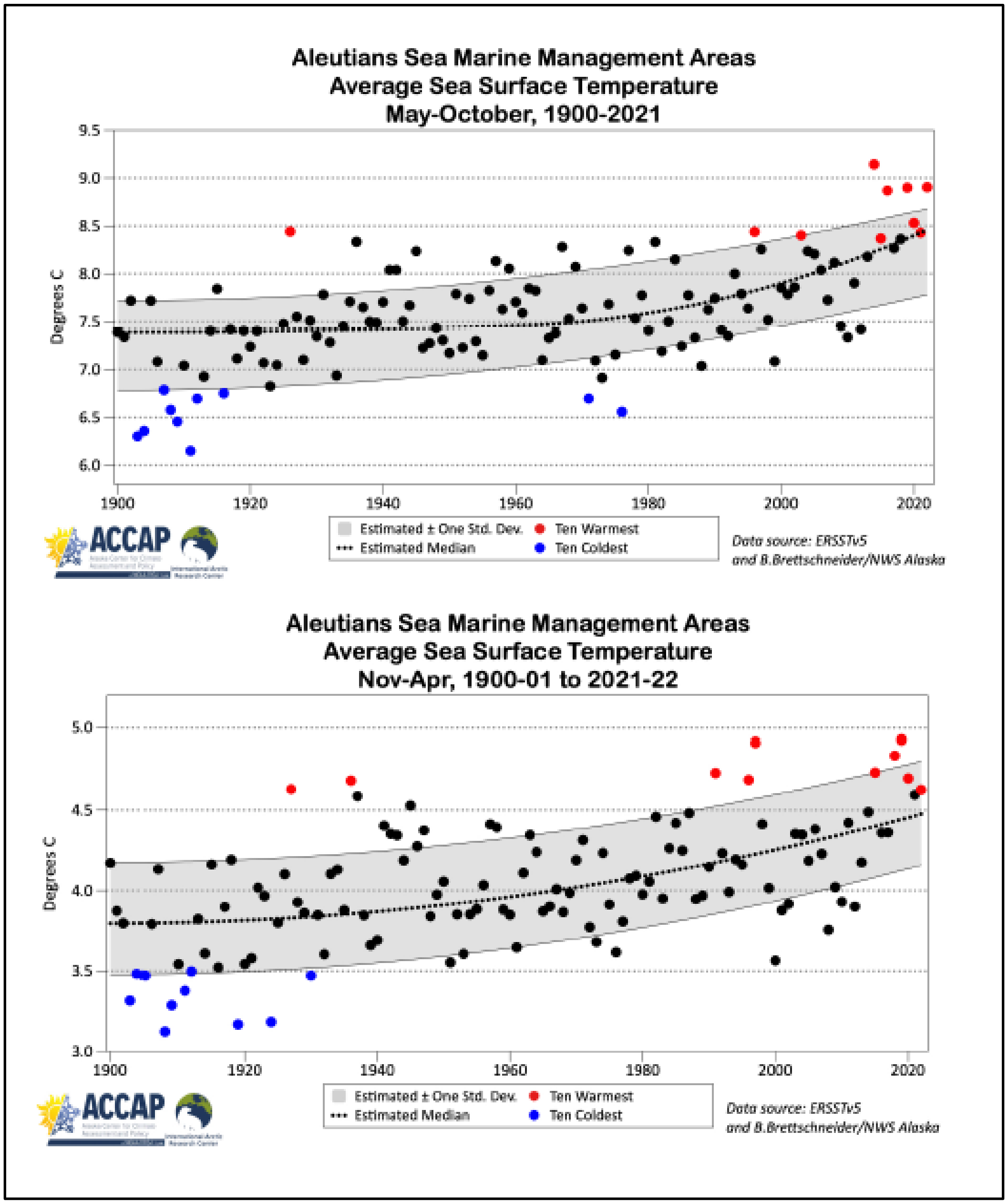


Figure 14. Seasonal sea surface temperatures for the Aleutian Islands

According to the Fourth National Climate Assessment (Wuebbles, et al., 2019), a warming trend relative to average air temperatures has been recorded from 1925 through 1960. A trend of increasing temperatures starting in the 1970's has been identified and is projected to continue throughout the state of Alaska. The largest temperature increases have been found in winter months with average minimum temperature increases of around 2° F statewide. Carbon emission models project variable increases in statewide temperatures across the state (Figure 15).

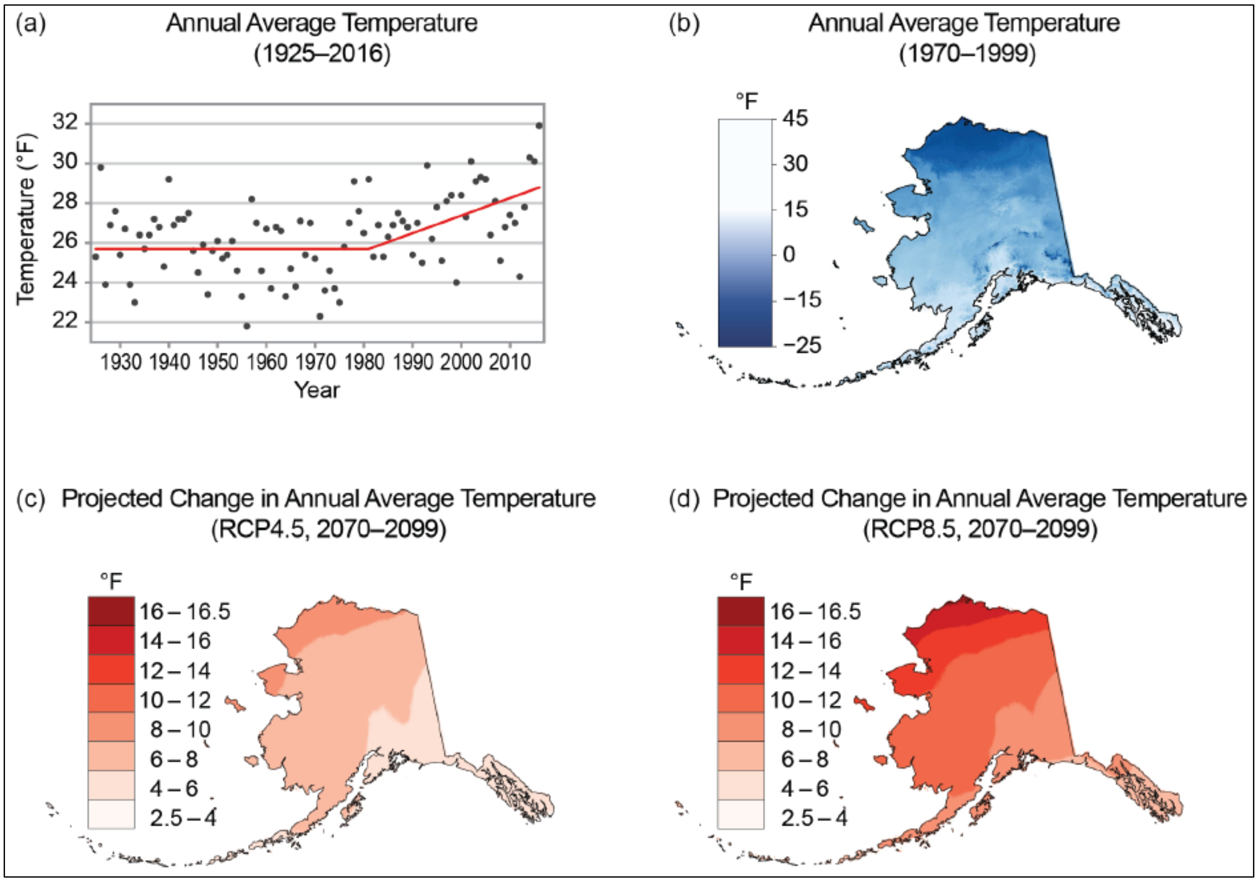


Figure 15. Average Annual Air Temperature.

Note: Annotation truncated from report: (a) Alaska statewide annual temperatures for 1925–2016. The record shows high variability from 1925 to 1976, but from 1976–2016 a clear trend of +0.7°F per decade is evident. (b) 1970–1999 annual average temperature. (c) Projected changes from climate models in annual average temperature for end of 21st century (compared to 1970–1999 average) under a lower scenario. (d) The map is the same as (c) but for a higher scenario.

3.2 Natural Environment

3.2.1 Marine Environment

A few relatively distinct habitat types are present along the shorelines of Surf Bay, Akun Island. Along some areas, the habitat changes significantly between intertidal and subtidal zones. Intertidal habitats in Akutan Harbor were previously (Pentec 2006) categorized as: bedrock (sloping or horizontal), boulder/cobble, cobble/gravel, coarse sand/gravel, and mixed-fine (cobbles in and on a silty sand matrix). Of these, only bedrock/boulder and sand were present in Surf Bay.

Rocky habitats around Surf Beach on Akun Island support a biota that is generally similar to that reported by the limited number of other studies in the eastern Aleutians (e.g., Pentec 2004) at mid- and upper intertidal elevations. In general, species diversity of both fauna and flora was low and consisted of species with broad geographic distributions and wide environmental tolerances. Species diversities were moderate on more exposed rocky substrata on the points separating the major drainages but lower on lower elevation rock that is adjacent to sand bottom areas where sand movement can intermittently bury or abrade attached biota. In contrast, diversity on the wave-exposed benches and boulders tended to be higher. Floating and submerged kelp beds were widespread in the area, and no eelgrass (*Zostera marina*) was observed. The sand beaches of Surf Bay represent a little studied habitat type in the Aleutian Islands that may have unrecognized ecological functions such as sand lance (*Ammodytes* spp.) spawning.

3.2.1.1 Marine Fish and Invertebrates

Surveys conducted by Alaska District biologists from 2021–2023 field seasons provided insight into the seasonal presence and relative abundance of nearshore marine biodiversity near the project area on Akun Island. This investigation incorporated contemporary molecular analysis using environmental DNA (eDNA) to thoroughly assess the biotic environment. The goal was to provide a baseline taxonomic assessment of the nearshore community that could be used to determine potential impacts from project alternatives.

Figure 16. eDNA sampling locations on Akun Island.

Taxonomic assessment of the nearshore community at two sites (Figure 16) in the project area using eDNA detected a diverse range of fish species, and two non-target mammal species (Table 3). Site 1 was located near rocky intertidal habitat harbor near the hovercraft pad and exhibited a wider range of species present. The physical habitat features at Site 1 was similar to habitat observed at No-name Point and Rocky Outcrop, so this single sample site is representative of those rocky habitats. Site 2 sampled the sandy beach habitat of Surf Bay. Fewer species were identified at Site 2; however, Site 2 did contain species that were not present at Site 1.

Table 3. Results of 2022 eDNA sampling on Akun Island.

FISHES			
Species	Scientific Name	SITE 1	SITE 2
Pacific sand lance	*Ammodytes personatus*	.	.
unidentified cockscomb	*Anoplarchus* sp.	`	.
Padded sculpin	*Artedius fenestralis*	.	
Tubesnout	*Aulorhynchus flavidus*	.	.
Searcher	*Bathymaster signatus*	.	
Sharpnose sculpin	*Clinocottus acuticeps*	.	
unidentified sculpin	*Clinocottus sp.*	.	
Pacific herring	*Clupea pallasii*		.
unidentified whitefish	*Coregonus sp.*	.	
Walleye pollock	*Gadus chalcogrammus*	.	.
Pacific cod	*Gadus macrocephalus*	.	.
Three-spined stickleback	*Gasterosteus aculeatus*	.	
Red Irish lord	*Hemilepidotus hemilepidotus*	.	
unidentified Irish lord	*Hemilepidotus sp.*		.
Kelp greenling	*Hexagrammos decagrammus*	.	
unidentified greenling	*Hexagrammos sp.*	.	.
Pacific halibut	*Hippoglossus stenolepis*	.	.
unidentified flatfish	*Kareius sp.*	.	
unidentified snailfish	*Liparis sp.*	.	.
unidentified sculpin	*Myoxocephalus sp.*	.	
unidentified sculpin	*Oligocottus sp.*	.	
Pink salmon	*Oncorhynchus gorbuscha*	.	
Chum salmon	*Oncorhynchus keta*		.
Coho salmon	*Oncorhynchus kisutch*	.	
Chinook salmon	*Oncorhynchus tshawytscha*		.
unidentified flatfish	*Platichthys* sp.		.
Dolly Varden	*Salvelinus malma*	.	.
unidentified rockfish	*Sebastes sp.*	.	
Pacific sandfish	*Trichodon trichodon*	.	.
		17-Jul-22	17-Jul-22

MAMMALS			
Species	Scientific Name	SITE 1	SITE 2
Sea otter	*Enhydra lutris*	.	
Harbor seal	*Phoca vitulina*	.	
		17-Jul-22	17-Jul-22

The investigation also included four seasonal marine sampling trips to determine the most appropriate in-water dredged material placement site should dredged materials not be placed in the planned upland storage site for future use by others. The sample sites are shown in Figure 17.

Figure 17. Potential marine dredged material sampling sites

A summary of the catch from 4' x 4' baited crab pots at these locations, combined for all sampling trips, is presented in Table 4. Catch in all pots was low during all seasons and was dominated by snails and sea stars. The only crab caught were in one pot (Lost Harbor, Site E) on the November 2022 sampling trip.

Table 4. Summary of biological survey data

Sample site	Water Status	Catch Summary
A	404	giant wrymouth (1), Pacific cod (1)
B	404	hairy triton snail (5), pycnopodia (2)
C	404	Pacific cod (2), hairy triton snail (7)
D	404	hairy triton snail (8), pycnopodia (1)
E	404	tanner crab (10, juvenile males), hairy triton (12)
F	103	Brittle star (270)
G	103	hairy triton snail (4), Pacific cod (1)
H	103	pycnopodia (1)
I	103	no catch
J	103	not pot fished - sand waves observed on video

3.2.1.2 Marine Mammals

According to the NMFS Alaska Endangered Species and Critical Habitat Web Mapper (NMFS 2023), marine waters surrounding Akutan provide habitat for harbor seal (*Phoca vitulina*), killer whale (*Orcinus orca*), gray whale (*Eschrichtius robustus*), harbor porpoise

(*Phocoena phocoena*); and, less frequently, northern fur seal (*Callorhinus ursinus*), Pacific white-sided dolphin (*Lagenorhynchus obliquidens*), Baird's beaked whale (*Berardius bairdii*), and Dall's porpoise (*Phocoenoides dalli*). These species, like all marine mammals, are protected under the Marine Mammal Protection Act (MMPA). Refer to Section 3.2.4 (Federal and State Threatened and Endangered Species) for information on ESA-listed species.

In January, February, and March of 2004; 92 harbor seals were observed during surveys in Akutan Harbor (HDR Alaska 2004b). Harbor seals were detected in the highest density near Race Rocks (~3.6 kilometers SW of the harbor site alternatives and outside the route between Akun and Akutan Harbor) where rocky outcroppings provide haul out sites. Winter 2006 surveys in Akutan Harbor, Akun Strait, and Surf Bay documented 18 sightings of harbor seals, mainly around Green Island (HDR 2006a, HDR 2006b). Additionally, killer whales and northern fur seals have been documented within Akutan Bay (Hoffman, personal observation). Killer whale pods were observed in Akutan Pass and Unalaska Bay in 2000 and 2001 (Schroeder 2000; Schroeder 2001). Harbor porpoises were observed in Akutan Bay during summer in 2022 (USACE, unpublished data, 2022). Marine mammal survey during June 2022 observed harbor porpoise, sea otter, harbor seal, and Stellar sea lion (Figure 18).

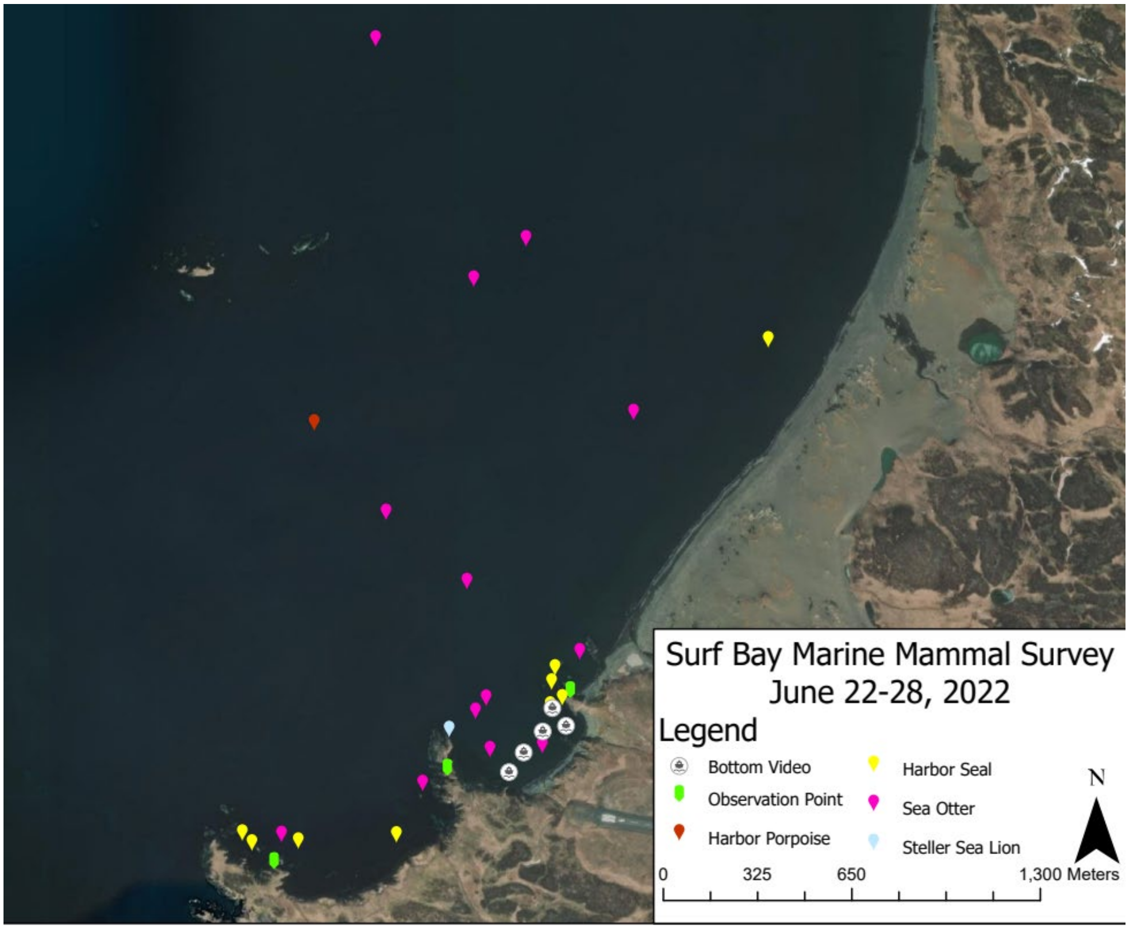


Figure 18. Surf Bay marine mammal survey results in 2022.

3.2.1.3 Marine Birds

There are many species of waterfowl present on Akun Island, such as dabbling ducks, diving ducks, and geese. Flocks of emperor geese (*Anser canagicus*) and harlequin ducks (*Histrionicus histrionicus*) were observed near Surf Bay and in Akun Straits during winter surveys. Common merganser (*Mergus merganser*) and common goldeneye (*Bucephala clangula*) were documented in the nearshore areas of Surf Bay. Various gull species, specifically the glaucous-winged gull (*Larus glaucescens*), could be expected in the project area (Byrd 2005). A variety of waterfowl species have been observed at Surf Bay Lake and in other smaller lakes on Akun and Akutan Islands. These species include mallard (*Anas platyrhynchos*), green-winged teal (*Anas crecca*), common goldeneye (*Bucephala clangula*), bufflehead (*Bucephala albeola*), red-breasted merganser (*Mergus serrator*), common merganser (*Mergus merganser*), tundra swan (*Cygnus columbianus*), greater scaup (*Aythya marila*) and northern pintail (*Anas acuta*) (Byrd 2005). Ground bird nesting is likely limited on Akun Island due to disturbance by feral cattle and fox predation. There is a puffin (*Fratercula* spp.) colony on the cliffs on the south side of Lost Harbor about 6 kilometers north of the harbor alternatives.

Akun Island, including Green Island, contains several small seabird colonies. Double-crested cormorant (*Nannopterum auritum*), horned puffin (*Fratercula corniculata*), tufted puffin (*Fratercula cirrhata*), pelagic cormorant (*Urile pelagicus*), red-faced cormorant (*Urile urile*) and whiskered auklet (*Aethia pygmaea*) have been identified in the seabird colony at Akutan Point. According to USFWS, more than 50,000 tufted puffins are known to nest at Green Island near Surf Bay (USFWS 2007). While passing the north side of Green Island in June 2023, several hundred tufted puffins were observed in the shallow water adjacent to Green Island, but there were no nesting seabirds visible on the north side of the island (Hoffman, personal observation). It is likely that all or most of the nesting on Green Island occurs on the south side of the island where there is no line of sight to the project alternatives on Akun Island. According to the NOAA Fisheries, there are sea bird colonies located at Big Head and south of Green Bight (USACE 2004).

There are two relevant marine birds listed under the Endangered Species Act: the Steller’s eider (*Polysticta stelleri*) and the short-tailed albatross (*Phoebastria albatrus*). Refer to Section 3.2.4 (Federal and State Threatened and Endangered Species) for information on ESA-listed species.

3.2.2 Terrestrial Environment

3.2.2.1 Terrestrial Mammals

Tundra vole (*Microtus oeconomus*), common shrew (*Sorex cinereus*) and red fox (*Vulpes vulpes*) are the only terrestrial mammals native to Akutan and Akun Island (Peterson, 1967). Other mammals occurring in the project area that were introduced include Arctic ground squirrel (*Urocitellus parryii*), northern collared lemming (*Dicrostonyx groenlandicus unalascensis*), Arctic fox (*Alopex lagopus*), and domestic rabbits (*Oryctolagus* spp.). Akun Island is home to approximately 1,200 feral cattle (*Bos taurus*) that range freely across the island. The cattle were introduced in 1965 and are currently owned by the Akutan Corporation (Reedy 2016). It is unknown whether rats, specifically the Norway rat (*Rattus norvegicus*), inhabit Akun Island.

3.2.2.2 Terrestrial Birds

Many resident and migratory North American avian species reside on the Aleutian Islands. Several Asian lineages of Holarctic avian species, such as the common teal (*Anas crecca crecca*) and Eurasian wigeon (*Mareca penelope*), are casual vagrants to the area. Songbird species, such as gray-crowned rosy-finch (*Leucosticte tephrocotis*), song sparrow (*Melospiza melodia*), Pacific wren (*Troglodytes pacificus*), common redpoll (*Acanthis flammea*), common raven (*Corvus corax*), and snow bunting (*Plectrophenax nivalis*), are common resident species observed on Akun Island. Other migratory songbird species present on Akun Island during the boreal summer include fox sparrow (*Passerella iliaca*), savannah sparrow (*Passerculus sandwichensis*), American pipit (*Anthus rubescens*), and Lapland longspur (*Calcarius lapponicus*). Game bird species on Akun Island are limited to the rock ptarmigan (*Lagopus muta*), a year-round resident found in the uplands of the project area (Armstrong 1995). In Alaska, all birds except for state managed game bird species are protected under the Migratory Bird Treaty Act (MBTA).

The bald eagle (*Haliaeetus leucocephalus*) is a common resident species observed in the eastern Aleutian Islands. On Akutan and Akun Island, they are opportunistic foragers often scavenging fish carcasses. They often rest on the surrounding harbor infrastructure, such as crab pots and outbuildings. On Akun Island, one active bald eagle nest was observed near Daryl's Point (Figure 19). On 1 June 2023, there was an eagle sitting within the nest and was likely incubating due to the body position in the nest (Hoffman, personal observation). This nest is approximately 1,200 feet from the three alternative sites.

Figure 19. Location of bald eagle nest observed on Akun Island

3.2.2.3 Terrestrial Vegetation

Plant communities near Surf Bay (on Akun Island) can be categorized into the plant community types listed below:

- Shoreline Meadows
- Heath-grass-forb Meadows
- Graminoid-forb Meadows
- Ericaceous Dwarf Scrub

- Mesic Forb
- Mesic Graminoid
- Wet Graminoid

Previous wetlands determinations were conducted near the project area (Figure 20). For more detailed information, please see the Akutan Airport Preliminary Jurisdictional Determination (HDR 2003b) and the Akun Island Alternative Preliminary Jurisdictional Determination (HDR 2005b).

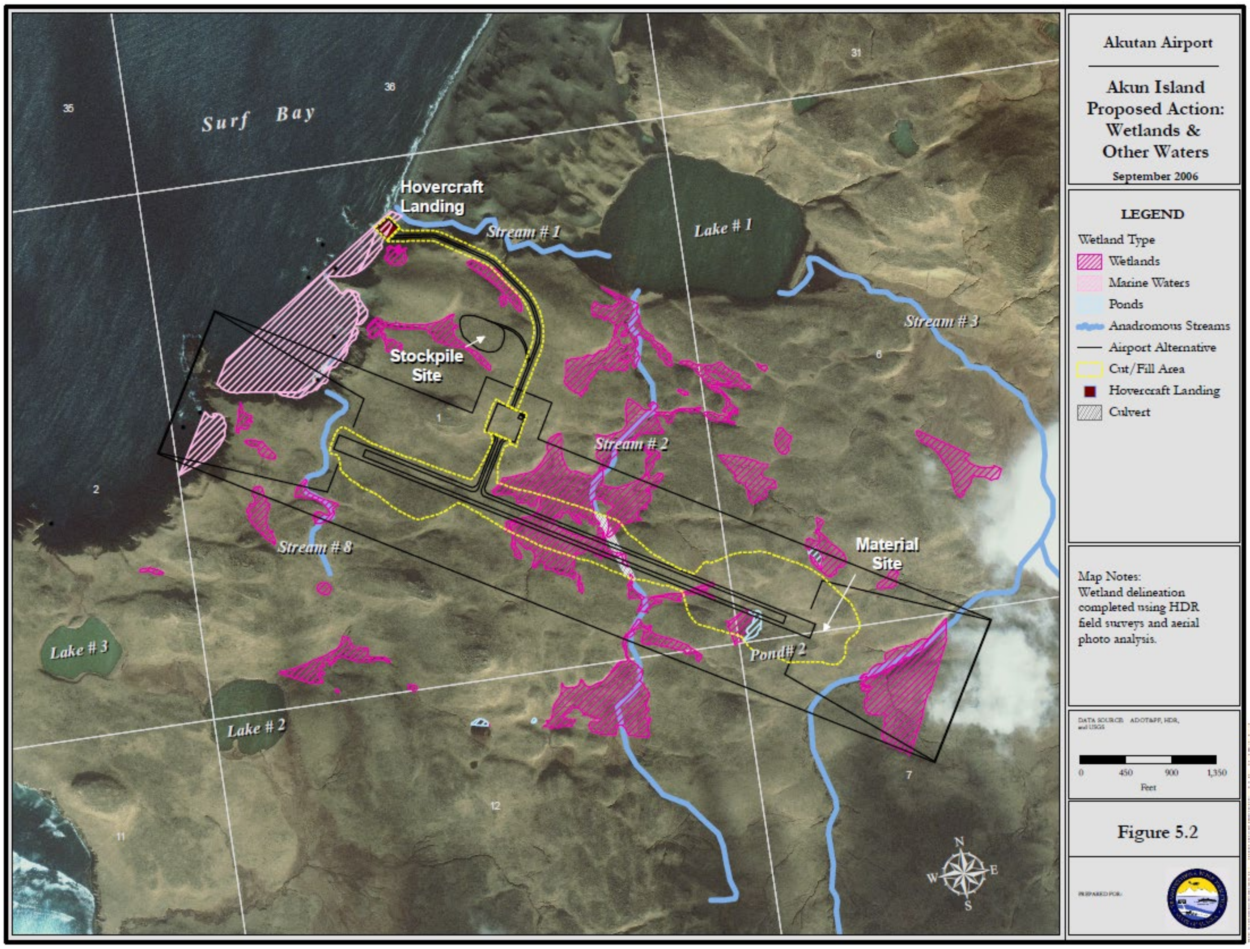


Figure 20. Wetlands in the Akun Island Project Area (HDR 2005b).

3.2.3 Essential Fish Habitat

NOAA Fisheries identifies Akutan Harbor and Surf Bay as Essential Fish Habitat (EFH) for nine species of groundfish, three species of crab, and four Pacific salmon species as listed below:

- Pacific cod (*Gadus macrocephalus*)
- Walleye pollock (*Theragra calcogramma*)
- Atka mackerel (*Pleurogrammus monopterygius*)

• Yellowfin sole (*Pleuronectes asper*)
• Flathead sole (*Hippoglossoides elassodon*)
• Rock sole (*Lepidopsetta bilineata*)
• Alaska plaice (*Pleuronectes quadrituberculatus*)
• Sculpins (*Cottidae* spp.)
• Skates (*Raja* spp.)
• Red king crab (*Paralithodes camtschaticus*)
• Golden king crab (*Lithodes aequispinus*)
• Tanner crab (*Chionoecetes bairdi*)
• Coho salmon (*Onchorynchus kisutch*)
• Chum salmon (*Onchorynchus keta*)
• Pink salmon (*Onchorynchus gorbuscha*)
• Sockeye salmon (*Onchorynchus nerka*)

There are nine streams, three lakes, and two stream-connected ponds that have been identified on Akun Island. No known anadromous fish studies had previously been conducted on Akun Island. Notwithstanding this fact, NOAA Fisheries has been consulted regarding the effects of the proposed action on these streams, and their conservation recommendations have been incorporated into the preferred alternative. Three streams and one lake were found to support anadromous fish populations in the Akun Island project area during field surveys conducted for this project. These were Stream #1 (Lower Surf Creek), Stream #2 (and associated tributaries and ponds), Stream #3 (Upper Surf Bay Creek), and Lake #1 (Surf Bay Lake – Salmon Stream). Anadromous fish in these areas include sockeye, pink, and coho salmon (HDR 2005a).

During USACE's environmental studies on Akun Island, eDNA samples were taken from the Surf Bay area (Section 3.2.1.1). It should be noted that several of these species are present in the list above, while others area absent. This result is likely due to seasonal or sampling availability and should be regarding as representative of those species present at the time of sampling.

3.2.4 Federal and State Threatened and Endangered Species

Species listed under the Endangered Species Act and designated Critical Habitat are presented in Table 5. Some species are listed only over their Distinct Population Segment (DPS). Common species are discussed further in subsequent sections.

Table 5. Listed species and designated critical habitat in the project area.

ESA Species	Listing Status	Managing Agency
Steller sea lion - Western DPS	Endangered	NMFS
Fin whale	Endangered	NMFS
Humpback whale	Endangered	NMFS
North Pacific right whale	Endangered	NMFS
Sperm whale	Endangered	NMFS
Western N Pacific Gray whale	Endangered	NMFS
Sunflower Sea Star	Proposed	NMFS
Steller's eider	Threatened	USFWS
Short-tailed albatross	Endangered	USFWS
Northern sea otter - SW Alaska DPS	Threatened	USFWS
Critical Habitat in project area		
Steller sea lion - Western DPS		NMFS
Humpback whale Western N Pacific DPS		NMFS
Northern sea otter - SW Alaska DPS		USFWS

3.2.4.1 Steller's Eider

The Alaska breeding population of Steller's eider (*Polysticta stelleri*) was listed as a threatened species under the ESA in 1997. Steller's eider are also listed as a Species of Special Concern (SSC) by the Alaska Department of Fish & Game (ADF&G) and protected by the MBTA. Steller's eiders are known to occur in Akutan Harbor during the winter months. No critical habitat is present in the project area. Surveys were conducted by HDR Alaska, Inc. in January, February, and March 2006 to determine the distribution and abundance of Steller's eider in Akutan Harbor, Akun Strait, and Surf Bay along the proposed hovercraft routes. Numbers were highest in January (136), with declines in February (88) and by March only 13 Steller's eider were observed. Preferred habitat appeared to include protected areas within 165 ft to 330 ft of the shoreline. The location of Steller's eider flocks appeared to change frequently to maximize protection from the wind. Steller's eider were most abundant immediately off the Native Village of Akutan and on the southeast end of Surf Bay.

A boat-based waterfowl survey for Steller's eider was completed in February 2023. Marine nearshore habitat was surveyed at 4 knots along the route shown in Figure 21. February 2023 Steller's eider survey route starting in Lost Harbor on Akun Island, transiting Akutan Bay, and ending near the old whaling station in Akutan Harbor on Akutan Island.

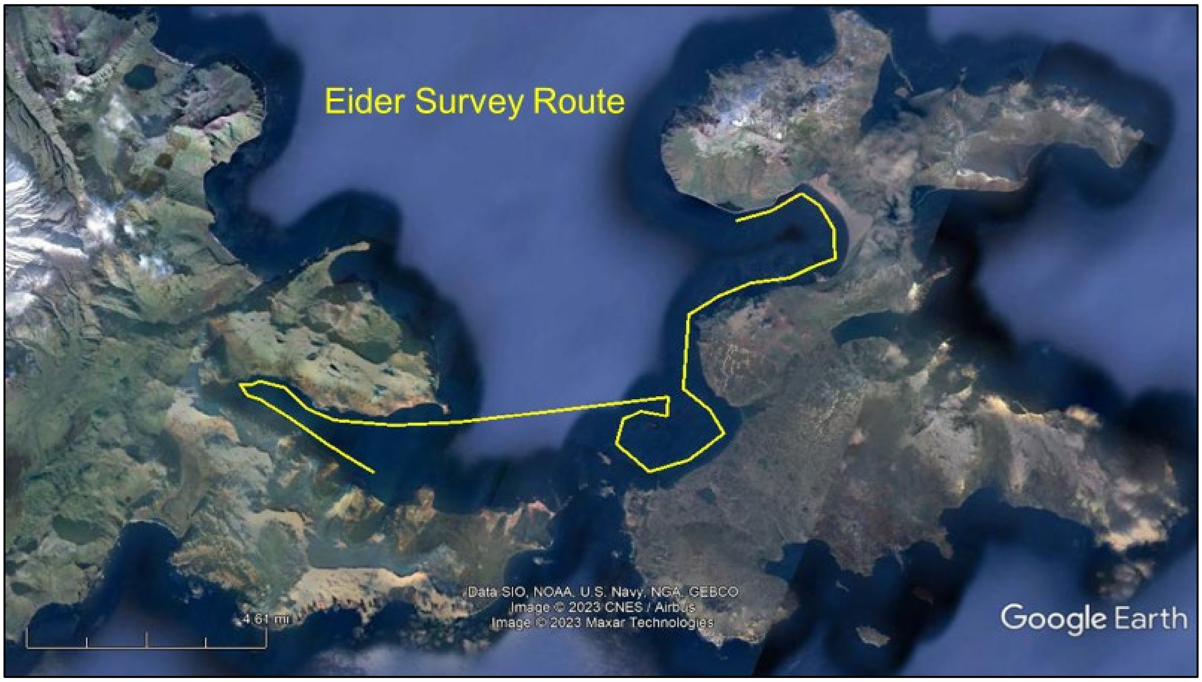


Figure 21. February 2023 Steller's eider survey route

During this survey, the only Steller's eiders observed were at the head of Akutan Harbor and inside the small boat harbor. There were 8 Steller's eiders inside the boat harbor and 24 along the southwest side of Akutan Harbor. Figure 22 shows the areas where these eiders were encountered in yellow polygons.

Figure 22. Steller's eider locations in yellow polygons

3.2.4.2 Northern Sea Otter

Along with being listed as threatened under the ESA and as a SSC by the ADF&G, sea otters (*Enhydra lutris*) in the United States are also protected from hunting and harassment by the MMPA of 1972. There is critical habitat for northern sea otter (*Enhydra lutris kenyoni*) in the waters of Surf Bay, Akutan Bay, and Akutan Harbor. Work is currently underway to characterize important breeding and feeding habitat for northern sea otters in Alaska. Groups of up to 20 otters were observed on several occasions in nearshore areas near the Whaling Station and crab pot storage area in Akutan Harbor during surveys conducted in 2004 (HDR 2004b). During surveys conducted in winter 2006, the number of otters observed was highest in January (22 otters), with declines in February (17 otters), and by March only 7 otters were observed (HDR 2006a). Preferred habitat appears to include protected areas in Akutan Harbor near the village of Akutan and along nearshore habitats at Akun and Green Island. Sea otters were commonly observed in small groups of 1 to 3 otters near all the harbor site alternatives during summer 2022 USACE observations. As all three alternatives are close together, otter numbers were similar at each site as they tended to move around through the general area.

3.2.4.3 Steller Sea Lion

Steller Sea Lion (*Eumetopias jubatus*) is listed as endangered under the ESA, and are an SSC by the ADF&G. This species is also protected under the MMPA. According to NOAA Fisheries, there are no haul-outs or rookeries for Steller sea lion in Akutan Harbor. The nearest major rookery to the project area is at Cape Morgan, and the nearest haul-out site is at Lava Reef. Critical habitat for Steller sea lion has been identified at Billings Head on Akun Island and Cape Morgan on Akutan Island. These locations are at least 10 miles from the closest project component (Eagleton 2007), but the project area still falls within designated critical habitat. Steller sea lion frequent the nearshore areas of Akutan Harbor and have been observed in association with the Trident Seafoods facility wastewater outfall. Steller sea lion have been observed along the northern nearshore areas of Akutan Harbor and near Akutan Point during winter surveys (HDR 2004b, HDR 2006a). Sea lions were uncommon near all the harbor site alternatives during summer 2022 USACE observations. During five days of surveys in June 2022 only one Steller sea lion was observed approximately 1,500 meters away from the nearest harbor site alternative.

3.2.4.4 Humpback Whale

Humpback Whale (*Megaptera novaeangliae*) is listed as endangered under the ESA and by ADF&G and protected by the MMPA, occur infrequently inside Akutan Harbor. There is designated critical habitat in the project area for the Western North Pacific DPS of humpback whales. Humpback whale occurrence is associated with large schools of herring (*Clupea* spp.), which are present in Akutan Harbor during the summer when they are preying on sand lance (*Ammodytes* spp.) (Byrd 2001). According to NOAA Fisheries, humpback whales may inhabit the waters around Akutan Harbor (Smith 2004b). Residents have reported that humpback whales have entered Akutan Harbor, presumably to forage on large schools of fish (USFWS 2002c). Humpback whales in the project area are composed of the endangered Western North Pacific Stock (~2%), the threatened Mexico DPS (~7%) and the remaining ~91% are from the Hawaii DPS which is not ESA-listed.

Humpback whales were not observed during any field efforts conducted for this project.

3.2.4.5 Short-tailed Albatross

The Short-Tailed Albatross (*Phoebastria albatrus*) is listed as an endangered species under the ESA and is protected under the MBTA. The bird is also listed as endangered by the ADF&G. This species is widely distributed across the temperate and sub-temperate North Pacific, and can be seen in the Gulf of Alaska, along the Aleutian Islands, and in the Bering Sea. Short-tailed albatross is not associated with harbor or protected near shore marine waters, and no critical habitat has been designated for this species. Short-tailed albatross was not observed in the project area during field surveys conducted in 2004 or 2006 (HDR 2004b, HDR 2006a) nor USACE field work in 2022–2023.

3.2.4.6 Other Listed ESA Species

Other ESA listed marine mammals in the project area include fin whale (*Balaenoptera physalus*), North Pacific right whale (*Eubalaena japonica*), sperm whale (*Physeter macrocephalus*), and Western North Pacific gray whale (*Eschrichtius robustus*). While these species are likely less common in the area, there is a chance they could occur infrequently in small numbers. None of these species were observed on project related surveys.

3.2.5 Special Aquatic Sites

“Special aquatic sites” means wetlands, mudflats, vegetated shallows, coral reefs, riffle and pool complexes, sanctuaries, and refuges as defined at 40 CFR 230.40 through 230.45.

Intertidal waters form narrow bands below high tide line along Akutan Harbor. Most of the intertidal waters in the Akutan Island project area are rocky and support mussels, barnacles, and rockweed. The intertidal waters of Surf Bay on Akun Island are generally sandy and devoid of animal or algal growth (Figure 23). In comparison, intertidal areas south of the proposed harbor site are rocky and support mussels, barnacles, and rockweed. The single wetland in the Akun Island project area is a depression near the proposed dredged material storage site. This wetland is largely formed by groundwater discharge and water from some small, incised channels. The ground water discharge that forms the wetland helps maintain small base stream flows. As this wetland is perched on high ground and the outlet flows down the steep cliff towards the harbor site the gradient is too steep, and the water is too shallow and intermittent to support any fish (resident or anadromous). Plants growing in the wetlands provide food for the cattle and small herbivores, and invertebrates supported by the plants provide food for birds. The cattle cycle nutrients back to the wetlands and promote plant growth. Organic material from the wetlands’ sedges and mosses and from the organisms that consume those plants is likely washed downstream where it supports stream and marine food webs.

Akutan and Akun Islands fall within the overarching boundary of the AMNWR. Portions of its surface landmass are owned and managed by the USFWS for conservation, protection, and the overall enhancement of fish, wildlife, plants, and their habitats for the continuing benefit of the American people. Landmasses that are part of any of the three action alternatives considered in the document are not part of the AMNWR.

An anadromous stream (AWC 302-16-10100) is located near the old hovercraft pad and drains a small lake located about 700 meters upstream (called Salmon Stream). This stream is listed for the presence of pink salmon and for having rearing Coho salmon. The stream has also been identified by subsistence users in the Native Village of Akutan as being important for harvesting sockeye salmon. This stream and lake are nearby but are not in the project footprint.

Figure 23. Intertidal and underwater habitat of Surf Bay on Akun Island.

The single wetland in the project area on Akun Island is a depression near Surf Bay Inn and is largely formed by groundwater discharge and water from some small, incised channels. The ground water discharge that forms the wetland helps maintain small base stream flows. As this wetland is perched on high ground and the outlet flows down the steep cliff towards the harbor site the gradient is too steep, and the water is too shallow and intermittent to support any fish (resident or anadromous). Plants growing in the wetlands provide food for the cattle and small herbivores, and invertebrates supported by the plants provide food for birds. The cattle cycle nutrients back to the wetlands and promote plant growth. Organic material from the wetlands' sedges and mosses and from the organisms that consume those plants is likely washed downstream where it supports stream and marine food webs.

3.3 Built Environment

Prior to the construction of the Akutan Harbor in 2012, there were two primary marine facilities in the Akutan city area, the City Dock and the Trident Seafoods' dock (Figure 24). However, these docks are working docks and not long-term moorage facilities, and do not provide protection from storm waves entering from Akutan Bay. A smaller site referred to as Skiff Harbor is located behind the City Dock.

Figure 24. Akutan Harbor Built Environment.

3.3.1 Akutan Harbor and Road

The small boat harbor at the head of Akutan Harbor is referred to as the “Akutan Harbor” and was constructed by USACE in 2012 (Figure 25). The harbor has a basin area of approximately 12 acres and currently has a single 560-foot by 16-foot float that can accommodate up to 10–12 vessels up to 165 feet in length. Electricity is available on the float, and harbormaster facilities are on site. Ownership of Akutan Harbor was transferred to AEB in 2013 and it is currently operated by the City of Akutan.


Figure 25. Akutan Harbor (small boat harbor).

A road from the Native Village of Akutan to the Akutan Harbor was partially funded by the Denali Commission, APICDA and the City of Akutan in 2022. Road design has been substantially completed and permitting work is underway. Materials were stockpiled at the site and stored in 2023. Additional funding to fully construct the road is presently under consideration by the Alaska Department of Transportation & Public Facilities under its Community Transportation Program. The road begins on the beach west of the Trident Seafood Plant and maintains a low elevation along the coastline and then crosses the wetlands and Whalebone Creek at the head of the Akutan Harbor body of water. The gravel road is approximately 1.5-miles long with a 12-foot-wide drivable surface and several vehicle turnouts.

3.3.2 City Dock

The City Dock (also referred to as the Ferry Dock) is a platform dock that was built in 1982 for the M/V *Tustumena*, a 296-foot ferry operated by the Alaska Marine Highway System (Figure 26). The 300-foot dock is constructed of concrete panels, steel pile caps and steel support piling. Abutting the back of the dock is an earth filled sheet pile bulkhead for the full length of the dock. There are two mooring dolphins with fender units on each side of the dock. In line with the western dolphins is a sheet pile wall that acts as a wave barrier for a small boat harbor, with a 50-foot extension installed in 2005. The existing fender system was raised, and new mooring dolphins were installed in 2015. A portion of this dock also serves as the breakwater protecting the existing skiff harbor at Akutan.

Figure 26. City Dock (with Skiff Harbor behind the dock face to the left).

3.3.3 Skiff Harbor

The Aleutians East Borough built a fair-weather skiff and small boat mooring facility adjacent to the City Dock in 2001 (Figure 27). The skiff harbor is partially protected by the shoreward extension of the City Dock. This facility provides moorage for a limited number of small vessels, with sheet pile walls on three sides, a wood platform dock with berthing, and an opening to the northwest. Larger vessels utilize sheet pile walls for berthing.

Figure 27. Skiff Harbor.

3.3.4 Trident Dock

The Trident Seafoods Akutan plant is located about 1/4 of a mile west of the village and has over 2,300 feet of berthing area for staging, loading, and unloading vessels (Figure 28). This facility is one of the largest fish processing plants in the United States.

Figure 28. Trident Dock.

3.3.5 Akutan Airport

Prior to 2012, Akutan was only accessible by boat and amphibious aircraft. The steep terrain on volcanic Akutan Island presented engineering obstacles for a land-based airport, so in addition to four locations on Akutan Island, Akun Island was investigated as an alternative site (Figure 29).

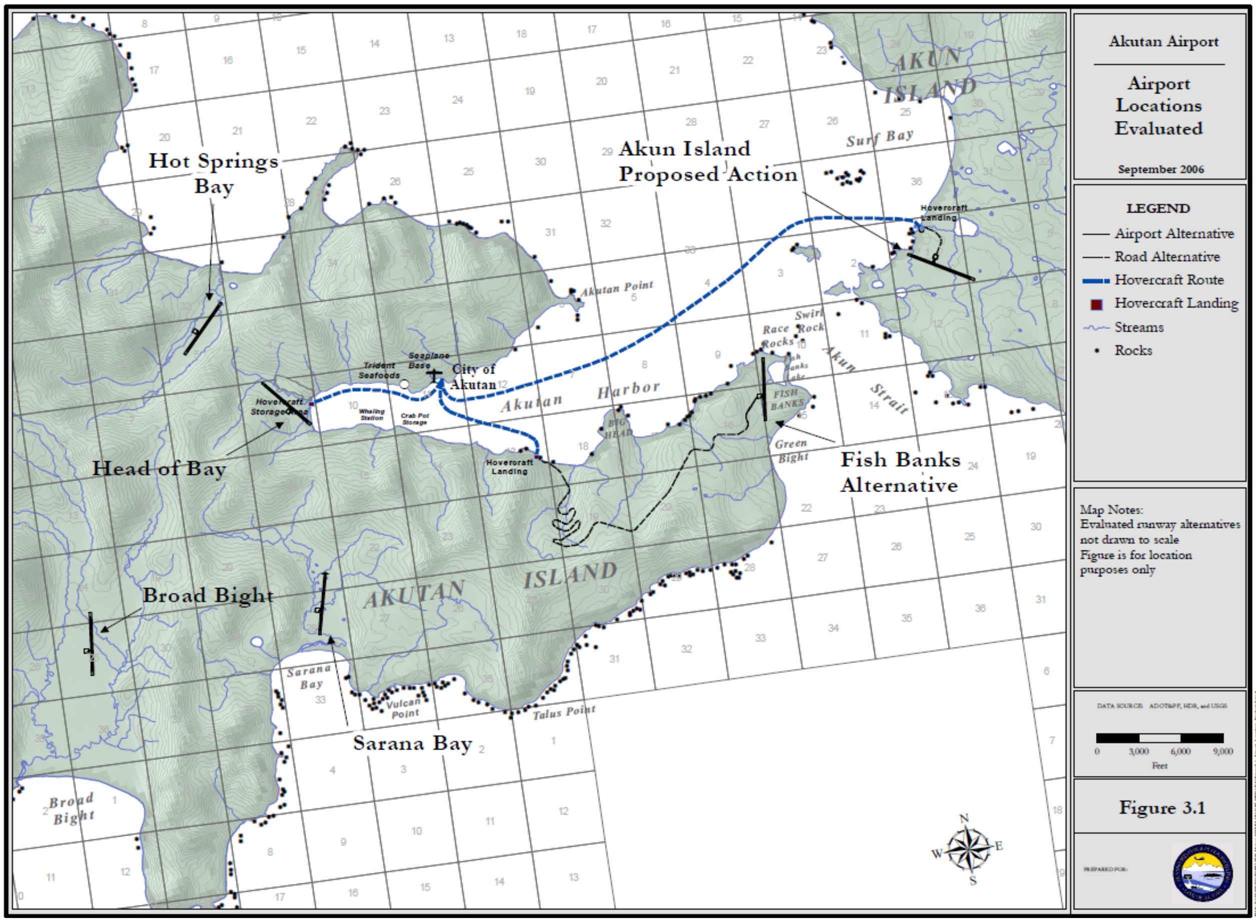


Figure 29. Akutan Airport Alternative Locations.

After almost ten years of investigation, studies, assessments, and meetings, the Akutan Airport Construction Project began on Akun Island in March of 2010. The facility includes a 4,500-foot paved runway, a taxiway, an apron, a sand storage building, a snow removal equipment building, a maintenance and storage facility, a hovercraft landing pad, an access pad, and surrounding access roads. The Surf Bay Inn on Akun Island, operated by the City of Akutan, is available to provide for stranded passengers. The Akutan Airport on Akun Island was opened in September 2012 (Figure 30).

Figure 30. Akutan Airport on Akun Island.

3.4 Socio-Economic Conditions

The written history of the Akutan area can be traced to the middle of the 18th century, after Russian explorers first entered the region. Oral histories and archaeological data indicate that the region has been occupied by the Unangan for at least 9,000 years. Detailed descriptions of the cultural history of the Akutan area can be found in Sections 1.5 and 3.4.7.1.

Presently, boardwalks connect the homes and facilities for foot and ATV traffic. Except for a 1-mile-long road that leads from the village to the Trident Seafood Processing Plant, there are no roads in Akutan. Akutan village has a limited number of community facilities and organizations including the City, Tribal, and Village Corporation offices, the historic St. Alexander Nevsky Russian Orthodox Church, a K–12 state school, the Anesia Kudrin Memorial Tribal Health Care Clinic, a jail, and a locally owned bar (Akutan Roadhouse Bar).

3.4.1 Population and Demographics

In 1880, the U.S. Census reported a human population of 65 at Akutan. There was an increase in the population of Akutan after World War II, when many of the surviving Unangan residents from Biorka, Kashega, and Makushin joined the community when the military refused to allow them to return to their original homes (Mason 2010). The population had increased to 169 by 1980, after which Trident Seafoods constructed a seafood processing plant in Akutan. Since then, the population has increased to 1,589 individuals in 2020, with the population divided between year-round residents (113) and transient fish processing workers (1,476) who live in bunkhouses on the Trident

Seafoods campus (Table 6). Those residing in the village of Akutan totaled less than 8 percent of the overall inhabitants of the island in the year 2020.

Table 6. Akutan Population by Residence Type, Census Years 1990 through 2020.

Census Year	Group Quarters* Population	Akutan Population	Total Population
1990	501	88	589
2000	638	75	713
2010	937	90	1,027
2020	1,476	113	1,589

Source: State of Alaska, Division of Community and Regional Affairs and Department of Labor and Workforce Research and Analysis Section, in addition to Fall et al 2012.

According to Alaska Department of Fish and Game subsistence household surveys for 2009, an estimated 88.9 percent of the 40 households of the Native Village of Akutan had an Alaska Native as head of household, with the total estimated population of Alaska Natives being 81.1 percent (Fall et al. 2012). Census records reflect a smaller distribution of Alaska Native in the overall population (12.15%) due to the migratory workers of Trident Seafoods being included within the estimates. While many population statistics encompass both populations, there is little interaction between the two populations on the island.

The large numbers of individuals living in group quarters in Akutan, and the Aleutian Islands in general, make populations very difficult to forecast. Business decisions by Trident Seafoods and shifts in seafood harvesting could greatly impact long-term population in Akutan, decreasing the accuracy of any attempt to forecast the population at the Akutan Island level. The population projection for the Aleutians East Borough from 2025 through 2050 shows a slight decline (0.1%), primarily due to forecasted birth and death rates, rather than migration. However, historical populations of Akutan Island have shown population increases, largely due to the processing workers. Given the uncertainty inherent in any population projection for Akutan, for purposes of this analysis the population is held static from 2021 levels and does not include Trident Seafoods workers (as the study is formulated to meet the needs of the Native Village of Akutan).

The Akutan School operates as part of Aleutians East Borough Schools and serves grades pre-kindergarten through 12. Total enrollment from 2001 through 2022 ranged from 7 to 20 students (Figure 31), with an overall increasing trend during this period (Department of Education and Early Childhood Development).

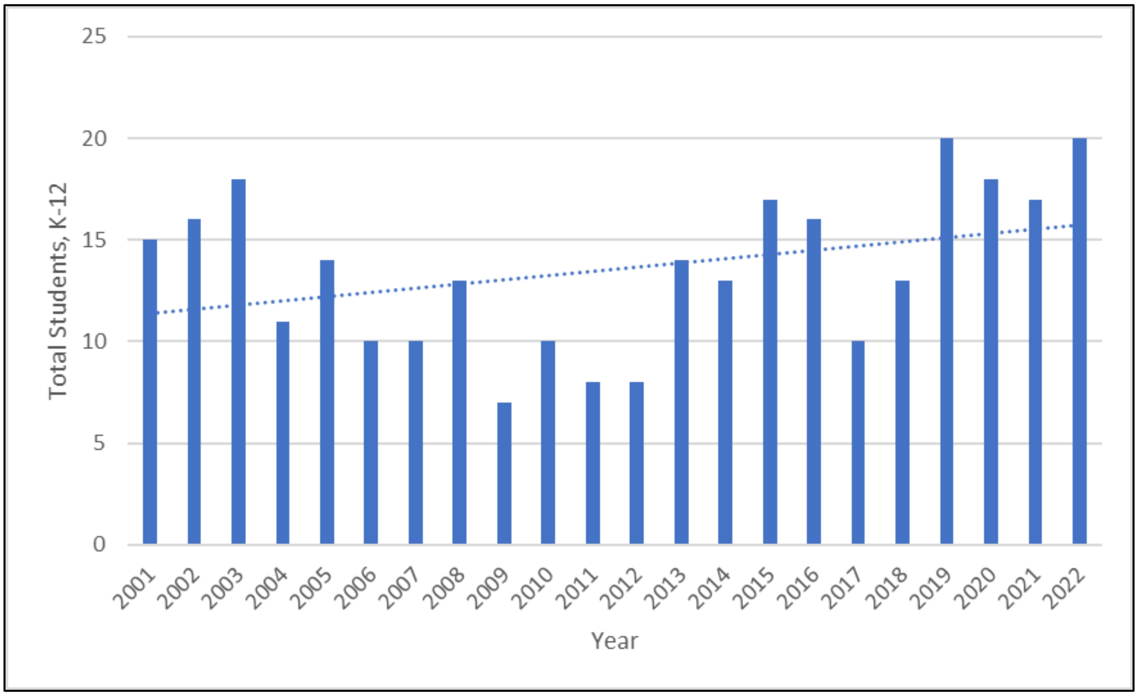


Figure 31. Akutan School Enrollment, 2001-2022.

Schools in Alaska are required to have a minimum of 10 students to receive state funding. The stable enrollment shown in Figure 31 points to a positive sign that the school at present does not face an immediate threat of closing. However, school enrollment does not necessarily fulfill all K-12 education requirements. For Alaska Natives, one's education extends to learning from community members and elders. This learning is often knowledge shared by participating together in subsistence activities connected to specific places. More detailed population information is contained in Appendix C: Economics.

3.4.2 Employment and Income

As with many statistics for the village of Akutan, employment and income data for the permanent residents specifically (rather than as a combined total with the transient processing workers) is largely unavailable. Data that is available combines both the resident and non-resident populations and is highly variable depending upon the season.

According to the 2021 American Community Survey (U.S. Census 2021), the median household income in Akutan is $32,750, with 22.4 percent of people living below the federal poverty line. This compares to the state of Alaska with $77,845 and 10.5 percent of people, respectively. Per capita income in Akutan is $34,515, compared to the US at $38,332. However, when considering only the American Indian and Alaska Native segment of the population (which is the best available proxy for eliminating the transient workers from the dataset and more accurately describing the non-Federal Sponsor, the

Native Village of Akutan), the per capita income for Akutan drops to $15,339. This low per-capita income becomes even more of a hinderance when the high cost of living that is associated with remote Alaska is considered.

As a result of the Trident processing plant, a key industry in Akutan is commercial fishing and many of those employed are transient workers housed in a group setting on the Trident Seafoods campus. The American Community Survey (U.S. Census 2021) reports employment by industry for Akutan, which highlights the impact of manufacturing (seafood processing) in the community at 76.1 percent of employment. Public Administration is the second largest employer at 17.1 percent of the total. It is worth noting that these statistics include both the resident and transient populations, and data for the resident population alone is unavailable.

The Akutan Corporation rents apartments to visitors in the Bayview Plaza Hotel and the Salmonberry House. Business licenses for the community on Akutan consist of the Akutan Corporation, the Bayview Plaza Hotel, the McGlashan Store, the Salmonberry Inn, and the A.C. Apartments (State of Alaska DCRA Information Portal for Akutan). The Surf Bay Inn is the sole business license on Akun Island.

Commercial fishing has historically played an important role in the local economy of Akutan, although participation and income derived from fishing has been decreasing. Commercial fishing jobs (this does not include processing jobs) represented 19% of all jobs held by Akutan residents in 2008, compared to 37% of all jobs in 1990. Of all Akutan households, 33% in 2008 had at least 1 member employed in commercial fishing, compared to 73% of households in 1990. For Akutan households with any cash employment, 35% in 2008 and 75% in 1990 had members involved in commercial fishing. Of all Akutan adults who had employment in 2008, 30% worked in commercial fishing jobs (about 18 individuals), compared to 44% (44 individuals) in 1990. Commercial fishing jobs produced 26% of the earned income and 22% of all income in Akutan in 2008; in 1990, 35% of earned income and 29% of all income derived from commercial fishing (Fall et al 2012). Commercial fishing vessels homeported in Akutan range in size from 16 to 42 feet in length, with the most common length being 18 feet, for the years 2000-2023. There was a minimum of 1 vessel, and a maximum of 7 vessels, permitted per year during that period (CFEC 2023).

Akutan participates in the CDQ Program. The program was established with four goals: “(i) to provide eligible western Alaska villages with the opportunity to participate and invest in fisheries in the Bering Sea and Aleutian Islands Management Area; (ii) to support economic development in western Alaska; (iii) to alleviate poverty and provide economic and social benefits for residents of western Alaska; and (iv) to achieve sustainable and diversified local economies in western Alaska.” (NOAA). More detailed employment and income information is contained in Appendix C: Economics.

3.4.3 Existing Infrastructure and Facilities

The crab and fish processing industry developed in Akutan in the late 1940s with the use of numerous floating processors operating in Akutan Harbor. By the 1980s, Trident constructed a shore-based processing plant which largely replaced the floating seafood processors. At the time of writing, it was the largest seafood processing facility as well as one of North America's busiest fishing and shipping ports. This facility processes Bering Sea-caught seafood products year-round and during peak periods employs and houses more than 1,400 people, with imported labor from around the world.

The Trident Akutan plant sustains a year-round, multi-species frozen seafood operation capable of processing more than 3 million pounds of raw fish per day. The Trident Seafood plant in Akutan primarily processes walleye pollock and large volumes of Pacific cod, king and snow crab, halibut, and sablefish.

In addition to traditional boxed and frozen seafood items, the plant is also capable of producing surimi and can recover large volumes of secondary products including pollock roe, fishmeal, and fish oil.

More information on existing infrastructure and facilities can be found in Section 3.3, Built Environment.

3.4.4 Freight & Fuel Delivery

3.4.4.1 Freight Operations

Mail and light freight are delivered by the fixed-wing aircraft between Dutch Harbor and Akun, and then carried on the helicopter between Akun and Akutan. Two methods are used for helicopter freight. The first involves transport of cargo by placing it inside the helicopter (either in the passenger cabin or in the luggage compartment). While passengers are prioritized above mail/freight movements, when less than a full load of passengers is on board, the flight can accommodate a mix of both. The second freight method involves the transport of cargo outside the aircraft, suspended on a special hook or other type of attachment – often referred to as "sling loading." More information on freight and mail operations can be found in Appendix C: Economics.

Frozen foods, bulk freight, lumber, and other building supplies and larger items are transported directly to Akutan (bypassing Akun) via large tramp freighters or tug-and-barge operations. These trips can occur every two weeks. These heavy freight operations are unlikely to be expanded to incorporate regular deliveries of mail and light freight, or passenger transportation.

3.4.4.2 Fuel Operations

Fuel is transported to Akutan via Delta Western barges from Dutch Harbor. According to the Mayor of Akutan, the city has a 30,000-gallon fuel capacity and DOT has 8,000-gallon capacity.

There are no aircraft fueling facilities on Akun Island. The fixed-wing aircraft refuels at the Unalaska Airport, while the helicopter obtains fuel from a fuel trailer at the pad in Akutan. Fuel transported from Akutan to Akun supports airport operations including the generator and maintenance equipment. Small amounts of fuel are transported from Akutan to Akun by the helicopter (sling loads) or by skiff in drums and are transferred twice per year (spring and fall) to provide for airport operations.

3.4.5 Transportation

The maritime climate in the Aleutians influences all aspects of life. The weather is known to be harsh, and in combination with the remoteness of the region, getting to and from Akutan can be difficult. Akutan's location in the Aleutian Island archipelago limits transportation to air and maritime travel.

3.4.5.1 Alaska Marine Highway System

The Alaska Marine Highway System (AMHS) is a ferry service operated by the State of Alaska which provides transportation to coastal communities, particularly those not on the road system. The ferries of the Alaska Marine Highway cover 3,500 miles of coastline and provide service to over 30 communities and is an integral part of Alaska's highway system, reaching many communities that would otherwise be cut off from the rest of the state and nation. The AMHS is designed to provide basic transportation services to those remote communities, and vessels are designed to carry both passengers and limited vehicles.

Akutan is serviced by the AMHS Southwest Alaska route, which serves Prince William Sound, the Kenai Peninsula, Kodiak Island, and the Aleutian Islands with the M/V *Tustumena* (Figure 32), a 296-foot ferry capable of carrying 160 passengers and 34 vehicles. The Aleutian chain, including Akutan, does not have scheduled service in the winter due in part to adverse weather conditions. Beginning in 2022, the M/V *Tustumena* makes only three stops in Akutan per year: once in July, August, and September.

Figure 32. Alaska Marine Highway System, Southwest Route

3.4.5.2 Air Transportation

The existing transportation system in Akutan consists of both a helicopter and a fixed-wing aircraft. The helicopter is housed at Akutan Harbor and makes trips back and forth between the Native Village of Akutan and their airport on the island of Akun. The fixed-wing is housed in Unalaska-Dutch Harbor and makes trips back and forth between Unalaska and the airport on Akun (Figure 33).

When a fixed-wing flight is in-bound to Akutan Airport, the helicopter crew currently take a skiff from the Native Village of Akutan to the hangar where the helicopter is based, near the small boat Akutan Harbor. The crew flies the helicopter back to the Native Village of Akutan to pick up passengers. After coordinating with the fixed-wing aircraft, the helicopter flies to the airport on Akun Island to drop off outgoing passengers and pick up incoming passengers and/or freight. The helicopter then flies back to the Native Village of Akutan before returning the helicopter to the hangar at the small boat Akutan Harbor. The helicopter crew are transported back to the Native Village of Akutan via skiff. Two round trips per day are scheduled, but additional or fewer trips may be necessary.

Tickets are purchased for each leg of the flight in and out of Akutan; on the fixed wing from Akun to Dutch Harbor to Akun, and on the helicopter from Akun to Akutan back to Akun.

Figure 33. Akutan Transportation System

3.4.5.3 Essential Air Service

The Department of Transportation states that “the Airline Deregulation Act (ADA), passed in 1978, gave air carriers almost total freedom to determine which markets to serve domestically and what fares to charge for that service. The Essential Air Service (EAS) program was put into place to guarantee that small communities that were served by certified air carriers before airline deregulation maintained a minimal level of scheduled air service. The United States Department of Transportation is mandated to provide eligible EAS communities with access to the National Air Transportation System.”

Under the EAS program, the US Department of Transportation determines the “minimum level of service required at each eligible community by specifying a hub through which the community is linked to the national network, a minimum number of round trips and available seats that must be provided to that hub, certain characteristics of the aircraft to be used, and the maximum permissible number of intermediate stops to the hub. Where necessary, the Department pays a subsidy to a carrier to ensure that the specified level of service is provided. Most eligible points do not require subsidized service but as of April 1, 2009, the Department was subsidizing service at 108 communities in the contiguous 48 states, Hawaii, and Puerto Rico, and 45 in Alaska.” Both the fixed-wing service between Unalaska and Akun, and the helicopter service between Akun and Akutan are subsidized through this program (Table 7). Please note that this table does not include the annual subsidy provided by the Aleutians East Borough for the helicopter (further discussion below).

Table 7. Akutan Annual Essential Air Service Subsidies.

Approx Year*	Helicopter Annual Contract Subsidy Rate (USD $)	Fixed Wing Annual Contract Subsidy Rate (USD $)
2019	$ 846,978	$ 924,959
2020	$ 874,832	$ 951,170
2021	$ 905,439	$ 1,037,523
2022	$ 914,240	$ 1,062,726
2023*	$ 1,040,113	$ 1,550,110
2024*	$ 1,098,078	$ 1,706,657
2025*	$ 1,152,195	$ 1,860,691

Note: *Exact dates of contract period can vary. 2023-2025 annual contract rates are estimated based on EAS proposal DOT-OST-2000-7068 dated October 2022

EAS agreements must be renewed every 2–3 years, without any certainty that the agreement will be renewed. Without the funding provided by the EAS, the helicopter would be cost prohibitive and the challenges of the transportation system serving Akutan would become even more extreme. Additional information regarding costs for EAS are included in the following sections.

The EAS agreement includes a schedule of 2 round trip flights per day (morning and afternoon) 6 days per week, with no flights on Sundays.

Starting in 2012, the Aleutians East Borough committed to providing access between Akutan and the Akutan Airport (on Akun Island) for a period of 20 years which would expire in 2032. The AEB has provided a subsidy for the helicopter of an annual value equivalent to the EAS subsidy payment for the helicopter. Further subsidies would require the AEB Assembly to approve an extension prior to 2032. The other potential path starting in 2032 would be a shift of the financial burden for the helicopter to the City of Akutan. For purposes of this analysis, it is assumed that the current transportation network will be maintained regardless of the entity paying for the service.

The cost for the helicopter service is funded through a combination of Essential Air Service grant funds and the AEB under two-year contractual agreements. Under the grant, the US Department of Transportation agreed to cover 50 percent of the helicopter expenditures between Akutan and Akun. The DOT established an annual subsidy rate of $905,439 for the period from April 1, 2021, through March 31, 2022, and $914,240 for the period from April 1, 2022, through March 31, 2023, for this helicopter service. As part of that agreement, the AEB provides support services to Maritime Helicopters for operations according to an agreement with the US Department of Transportation. A breakdown of estimated annual helicopter service costs and subsidies are presented in Table 8 for the year 2023, and detailed information found in Appendix C: Economics.

Table 8. Annual Essential Air Service Helicopter Contract Rate Estimate.

Operational Costs	$ 2,181,167
5% Profit Margin	$ 109,058
Total Annual Cost	**$ 2,290,225**
Minus Total Estimated Revenue	$ 210,000
Estimated Annual Subsidy for Service	**$ 2,080,225**
Estimated DOT Subsidy - 50%	$ 1,040,113
Estimated AEB - 50%	$ 1,040,113

Source: EAS proposal DOT-OST-2000-7068 dated October 2022
Note: Operational costs include items such as skiff transportation services for the helicopter crew, hangar usage, fuel, and rent/utilities/supplies for crew along with overhead costs. Total Estimated Revenue includes both passenger ticket fees and cargo shipment fees.

3.4.5.4 Fixed-Wing Service

Access to the airport on Akun is provided by fixed-wing aircraft out of Unalaska-Dutch Harbor, Alaska. A Piper PA31-350 Navajo Chieftain is a 10-passenger twin-engine plane generally operated between Dutch Harbor and Akun Island. These flights are provided under the EAS program and include 12 weekly nonstop round trips between the Akutan Airport located on Akun Island and Unalaska, weather permitting. Flights are scheduled twice daily, six days a week (with no flights on Sundays) but the regular schedule may be altered due to demand. The airline (EAS provider is currently Grant Aviation) will also adapt their schedule to get passengers/freight moved when there is high demand or when there has been a backlog due to weather closures. In addition to scheduled flights, charter flights are also available.

Fixed-wing aircraft flights from 2020 to 2022 to Akutan airport were reported to be canceled on average 34% of the time due to weather. This is due to factors such as sustained wind or wind gusts, visibility, ceiling, and wetness of the runway. Maritime helicopters had an average of 30% of their flights canceled due to weather over the same time period. Helicopters are better able to travel through cross winds but may cancel due to fog at Akutan Island. Note that these statistics reflect weather cancellations of scheduled trips, and the fixed-wing and helicopter operators frequently run “catch-up” trips during good weather.

For the contracted period of April 1, 2021, through March 31, 2023, the Department of Transportation established subsidy rate of $1,037,523 for the period from April 1, 2021, through March 31, 2022, and $1,062,726 for the period from April 1, 2022, through March 31, 2023, for this service provided by the fixed-wing aircraft.

3.4.5.5 Maritime Helicopters

Maritime Helicopters provides flight services between the Akutan Airport on Akun Island to the Native Village of Akutan. Prior to helicopter operations, a hovercraft was utilized to transport passengers back and forth from Akutan to Akun. A 4-passenger Bell 206L4 helicopter is stationed in Akutan and replaced the hovercraft in 2014, as a more reliable and affordable option when compared to the hovercraft. Passenger/trip data for the hovercraft service are unavailable.

3.4.5.6 Local Vessel Access

Skiffs are small, open, flat-bottomed boats that are commonly owned by residents of Akutan and used for both commercial and subsistence harvesting. Currently, skiffs are launched on rocky beach areas around the Native Village of Akutan or from a narrow ramp near the Skiff Harbor. Larger vessels capable of commercial fishing seek transient moorage at the Skiff Harbor and at the Akutan Harbor.

Residents use their skiffs to cross from Akutan to Akun Island during optimal weather conditions, most commonly during summer months. Current practice is for skiffs to cross over to Akun Island during the slack tide, or transit north of Akun Strait before heading south to Akun Island to avoid standing waves and strong tidal currents off the west coast of Akun Island. Information related to currents, tidal rips, and wave climate is available in Sections 3.1.3 and 3.1.4.

On Akun Island, skiffs are tied or dragged onto the beach. However, due to a lack of protected moorage skiffs are not generally left unattended on Akun Island and at least one community member often stays behind with the vessel. This prevents that individual from engaging in subsistence or other activities on Akun Island with the remainder of their group. Wave conditions near Surf Bay can prohibit skiffs from accessing Akun Island even when conditions allow passage between Akutan and Akun Islands.

3.4.6 Subsistence Use

Subsistence is the non-commercial, traditional, and customary harvest of renewable resources for food, clothing, fuel, transportation, construction, arts, crafts, sharing, and customary trade. These uses of wild resources are of important cultural and economic value in rural Alaska.

Essential in many Alaskan communities, subsistence activities in Akutan are an important source of food and cultural traditions. The Native Village of Akutan is a mixed subsistence-cash economy. The term “mixed economy” has special implications in rural areas of Alaska. In the Alaska-style mixed economy, households typically follow a pattern of activity that combines employment for cash with traditional fishing and hunting. Subsistence gathering contributes to the household food supply and provides building material, fuel, and raw material for tools, clothing, and arts and crafts.

Cash income from employment (most often limited to seasonal income) is used to obtain modern technology to support the gathering of wild resources. Use of modern equipment, such as snowmachines, power boats, nets, rifles, and traps, enables individuals to continue to participate successfully in traditional activities across greater distances.

Most Akutan households harvest subsistence resources from the Akutan/Akun Islands area (Figure 34) and, due to sharing practices, all permanent year-round residents use wild resources (Reedy et al 2012). The most frequently harvested species are halibut, sockeye salmon, Steller sea lion, Pacific cod, feral cattle, coho salmon, pink salmon, harbor seal, and ducks. Residents also harvest clams; game birds; eggs; berries, including blueberries, salmonberries, and crowberries; and marine invertebrates, including chitons, king and tanner crab, and octopus. Fishes account for over half of the subsistence harvest in Akutan. Besides halibut, cod, and salmon, other fish species harvested include greenling, flounder, sole, herring, black rockfish, sculpin, and trout (USACE 2004).

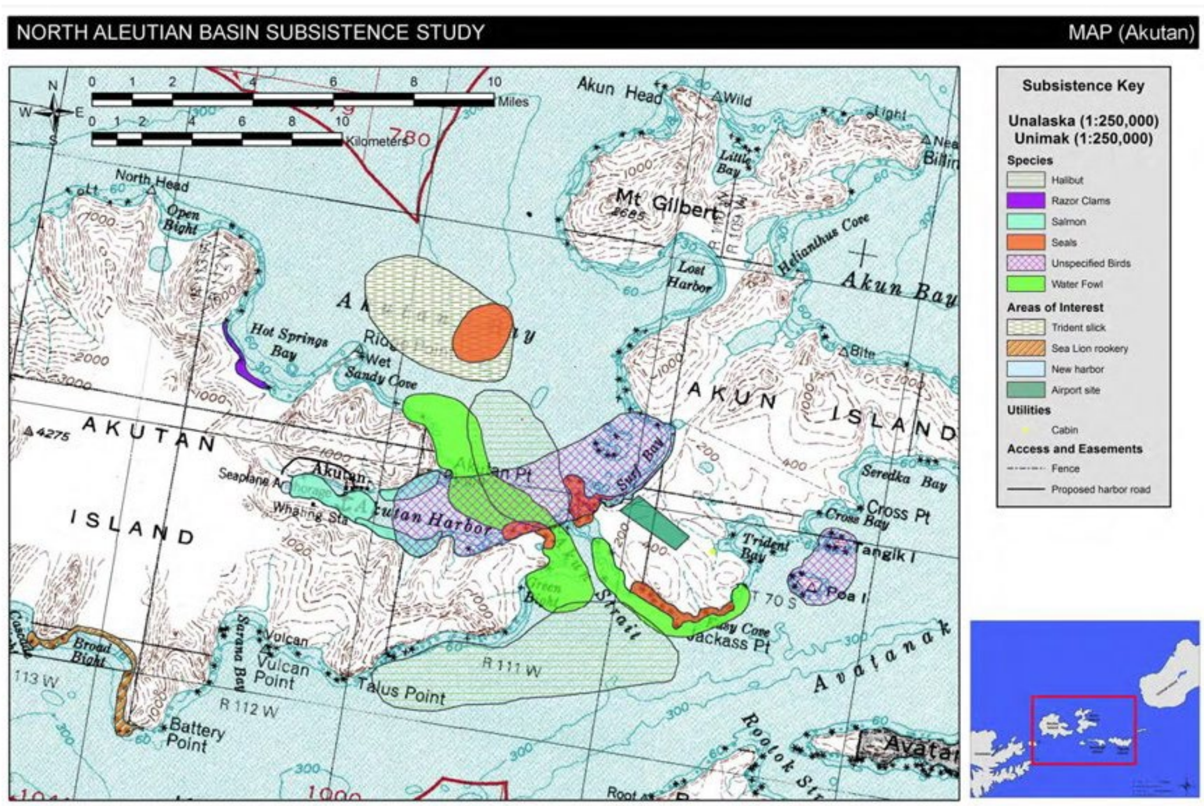


Figure 34. Subsistence on Akutan & Akun Islands

In a 2008 study, 100% of Akutan households received and used ("used" refers to if a household ate, processed, harvested, or received a resource from other households) at least one wild resource for subsistence (Schmidt 2018). In addition, 97% of households engaged in fishing, hunting, or gathering activities, and 86% of households shared at least 1 resource with other households. Akutan households used an average of 17 resources and a maximum of 42 resources per household. On average, households attempted to harvest 10 kinds of resources (with a maximum of 41) and succeeded in harvesting an average of 9 resources (with a maximum of 38 harvested). On average, households gave away 8 resources to others and received on average 12 resources.

Harvests amounts and species vary from year to year due to a variety of factors. For example, salmon harvests depend heavily on which species of salmon is running and can vary from year to year. Plant harvests can vary based on rain amounts and temperatures. To compensate for this variability between years, harvest species and amounts have been estimated through a variety of survey efforts by the state of Alaska and other institutions and average harvest levels have been identified. Data gathering for these efforts consisted of repeated in-depth household subsistence use surveys and mapping.

In 2008 (which is considered a representative year by ADF&G), the Native Village of Akutan harvested nearly 27,000 pounds of wild foods, averaging 327.3 lbs. per capita. This compares to a 2015/16 survey done by the University of Alaska Institute of Social and Economic Research (Schmidt 2008) that estimated Akutan subsistence harvests at 439 pounds per capita. Detailed harvest information is available for 2008. In that year, salmon made up the largest portion and contributed 45% of the harvest and averaged 146 lbs. per person; followed by fish other than salmon (25%, 80 lbs.); shellfish (10%, 34 lbs.); marine mammals (8%, 26 lbs.); wild plants and berries (5%, 16 lbs.); land mammals (4%, 15 lbs.); and birds and eggs (3%, 10 lbs.).

3.4.7 Cultural Resources

3.4.7.1 Historical Background

The early history of the Aleutian Islands remains poorly understood, despite decades of archaeological research. The cultural phases used by archaeologists and historians (CRC 2016) were created by combining individual datasets collected from across many different islands (Table 9). These cultural phases will continue to be revised as new data become available. The eastern Aleutian Islands have been occupied by the Unangan for at least 9,000 years (Knecht and Davis 2001).

Table 9. Known cultural phases in the eastern Aleutian area.

Cultural Phase	Dates	Cultural Materials Description
Early Anangula Phase	9000–7000 BP	Large stone blades, microblades, burins, scrapers, stone vessels, abraders, net sinkers, bowls, oil lamps, and ocher grinders.
Late Anangula Phase	7000–4000 BP	Bifacial retouched tools, stemmed projectile points, “bell-shaped” scrapers, bipointed and leaf-shaped projectile points, composite fishhooks, gorges, eyed needles, and bi-laterally barbed harpoon points.
Margaret Bay Phase	4000–3000 BP	Bone socket pieces, wedges with drill holes, bone bi-points, unilateral barbed harpoons, labrets, ground slate tools, ground jet ornaments, stemmed stone points, bullet shaped points, scrapers, polished adzes, fine pressure flaked stone, and incised artwork.
Amaknak Phase	3000–1000 BP	Toggling harpoons, foreshafts, wide variety of knife and scrapers, with stylistic additions to barbing styles, highly decorated hunting equipment.
Late Aleutian Phase	1000–200 BP	Ground slate tools replaced almost all chipped stone tools, with continuation of bone tools from earlier phases.

3.4.7.1.1 Russian Period

The Russian Period begins in AD 1741, when the Bering Expedition first arrived in the Aleutian Islands. Russian fur traders first entered the Krenitzin Islands, which includes Akun Island, in 1766, when Captain V. Shoshin of the *Sv. Prokopii i Ioann* made landfall on Unalaska Island and sent hunting crews out to the east. Shoshin took hostages from Akutan, Akun, and Avatanak Islands. In 1767, Captain Afanasii Ocheredin of the *Sv. Pavel* ordered one of his crew foremen, Matvei Polozkov, to explore the area. Polozkov established his main camp on Akun Island but left contingents on Akutan and other islands in the Krenitzin group (Black 1999).

All six islands of the Krenitzin group were inhabited by Unangan communities as late as 1790. Akun boasted seven villages in 1790 (Agida, Chulka, Saa, Kadan Iinaguk, Kazhik, Sinnagak, and Nukaginax), with an estimated population of 548 to 685. But by 1821, only three islands in the Krenitzin group remained populated: Akutan, Avatanak, and Akun islands. The population on Akun Island had been reduced to only one village. The village at Chulka on Akun Island was the residence of the Russian-American Company *baidarshchik*, or crew chief, who was responsible for the entire Krenitzin group. In 1838, a smallpox epidemic decimated the regional population, but both Akutan and Akun continued to be prosperous (Black 1999, 2004). In 1843, a Russian Orthodox chapel, dedicated to the Dormition of the Mother of God, was built on Akun Island (Smith and Petrivelli 1994).

3.4.7.1.2 American Period

The American Period begins in 1867 with the purchase of Alaska from Russia by the United States of America. Eleven years later, the Western Fur and Trading Company opened a trading station at a protected location in Akutan Harbor, which attracted Unangan from elsewhere in the region, including Akun Island. In the late 19th century, Lucien Turner of the U.S. Signal Service wrote that the “Akun Aleut who dwell on the island of that name are so intimately connected with the Akutan people that they may be considered as one people” (Turner 2008:57). In the 1878 Greenbaum Census, Akutan village had a population of 86 people, while Akun village (known as ‘Chulka’ or ‘Artelnovsky’) only had a population of 38 people (Turner 2008). Although Chulka on Akun continued to be used as a seasonal hunting camp for many years, Akutan had become the sole village occupied year-round by 1879 (Black 1999; McGowan 1999; Smith and Petrivelli 1994; Turner and Turner 1974). It is unclear when Chulka was abandoned or when Akun Island no longer had a permanent, year-round settlement, but depopulation seems to have occurred during the late 19th century.

3.4.7.2 Known Cultural Resources

USACE conducted a literature review of the region and found that numerous archaeological surveys and excavations have been conducted on Akun Island (Bank 1974; CRC 2006, 2010, 2016; Holland 1992; Morrison 2016; Spaulding & Pierce 1954; Turner 1972, 1974, 2002; Turner & Turner 1974). Cultural resources have been recorded within and around the project area (Figure 35). This includes the Surf Bay Archaeological District (UNI-00103), which is eligible for listing in the National Register of Historic Places, and the Sanaĝan site (UNI-00125) which contributes to the Surf Bay Archaeological District in the Alaska Heritage Resources Survey (AHRS 2023).

Until the archaeological investigations conducted in support of the Federal Aviation Administration’s airport construction on Akun Island began in 2005, the only archaeological excavations that had occurred on the island consisted of limited testing of the Chulka site (UNI-00002), Islelo site (UNI-00013), and Amatanan Village site (UNI-00056). The Surf Bay Archaeological District (UNI-00103), which is more than 1,000 acres, was identified in 2005. The District comprises 11 archaeological sites and multiple small surface lithic scatters. The Sanaĝan site (UNI-00125) is one of the archaeological sites within the District. It is located on the ridge leading up to No-name Point and is the oldest known site on Akun Island. Subsurface shovel tests and a single 1x1-meter test unit excavated in 2008 recovered materials that were radiocarbon dated to approximately 5,000 BP (CRC 2016). No underwater shipwrecks or other submerged cultural resources are known to be in the project area (BOEM 2011, NOAA 2016).

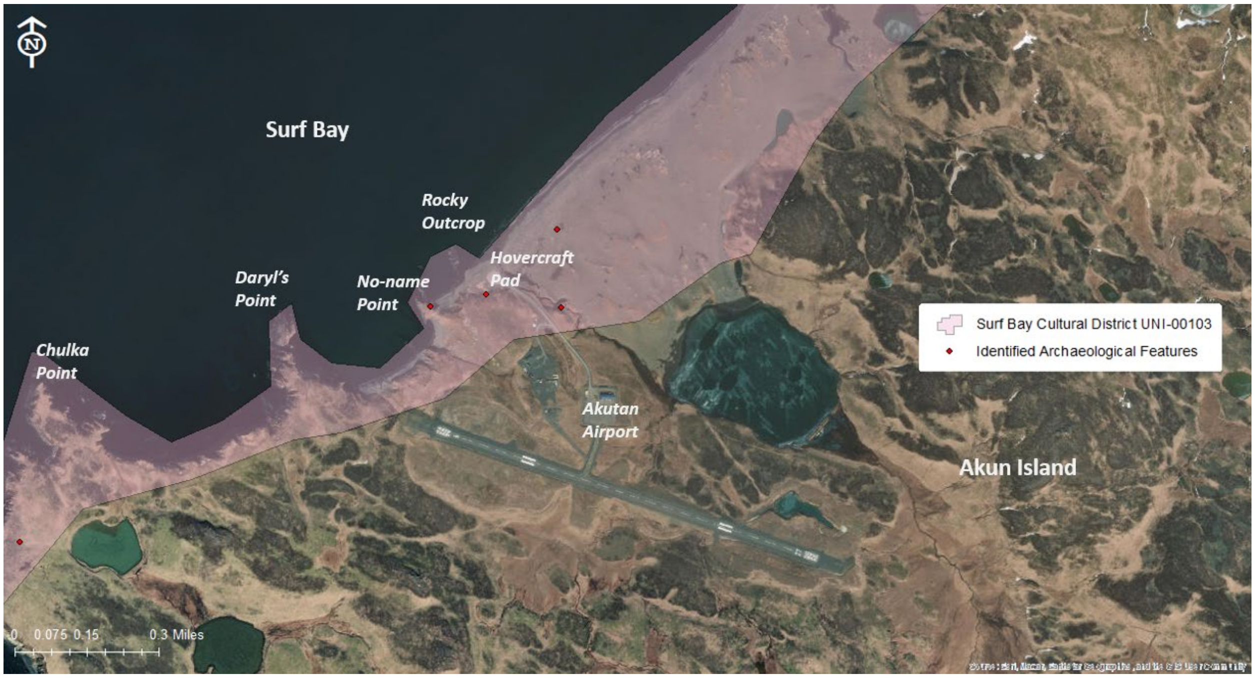


Figure 35. Surf Bay Archaeological District and approximate locations of known archaeological features.

3.4.8 Environmental Justice and Protection of Children

Executive Order (EO) 12898, February 11, 1994, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," directs Federal agencies to identify and address any disproportionately high and adverse human health or environmental effects of their actions on low-income, minority, and tribal populations, to the greatest extent practicable and permitted by law. An Environmental Justice analysis typically includes the following elements:

- Identification of any minority and/or low-income status communities in the project area;
- Identification of any adverse environmental or human health impacts anticipated from the project; and
- Determination of whether those impacts would disproportionately affect minority and/or low-income communities.

An executive order associated with Environmental Justice is EO 13045, April 23, 1997, “Protection of Children from Environmental Health Risks and Safety Risks,” which directs Federal agencies to identify and address environmental health and safety risks that may disproportionately affect children, to the greatest extent practicable and permitted by law. This analysis typically includes a determination of whether the identified adverse environmental or human health impacts anticipated from the project would disproportionately affect children.

EO 14096, April 21, 2023, “Revitalizing our Nation’s Environmental Justice for All,” directed Federal agencies to advance environmental justice by implementing and enforcing the nation’s environmental and civil rights laws as well as investing in communities. EO 14096 builds upon EO 12898 and reaffirms the Federal government’s commitment to Environmental Justice. Federal guidance on implementation of this EO is anticipated later in 2023.

In accordance with the Assistant Secretary of the Army for Civil Works Memorandum on Implementation of Environmental Justice and the Justice40 Initiative, March 15, 2022, USACE employs the Council on Environmental Quality’s Climate and Economic Justice Screening Tool (CEJST) and the Environmental Protection Agency’s (USEPA) Environmental Justice Screening and Mapping Tool (EJScreen) to provide a consistent government-side identification of communities with environmental justice concerns.

Both EJScreen and CEJST use the Aleutians East Borough Census Tract (Block Group 020130001001) as their unit of analysis. EJScreen lists the total population of this block group as 958, while CEJST lists the total population as 3,385. Both use percentiles to indicate how local residents compare to everyone else in the nation or state. For example, the “58 percentile” for “Low Income” shown in Table 10 means that people living in the Aleutians East Borough have an income level equal to or higher than 58 percent of people living in the United States. In general, an indicator is of concern in an environmental justice analysis if it is at or above the 90th percentile (CEJST 2023).

3.4.8.1 Identification of Minority or Low-Income Populations

The population of the City of Akutan is 1,584 people as of the 2020 census; however, the year-round resident population is only 113 people. This year-round resident population includes both minority and low-income populations (DCRA 2023). In 2009, it was estimated that 81.1 percent of the year-round resident population was Alaska Native (Fall et al. 2012). The U.S. Census Bureau identifies 157 people living below poverty level in Akutan, but it is not clear what the income and poverty levels of the year-round resident population are (DCRA 2023). Although none of the socioeconomic indicators associated with the Aleutians East Borough block group are above the 90th percentile when compared to the nation (Table 10), it is important to note that the Federal government considers all Alaska Native Villages to be disadvantaged communities (CEJST 2023) and that the AEB is too large of a statistical unit to be accurate for the Native Village of Akutan.

Table 10. Socioeconomic Indicators for the AEB (EJScreen 2023).

Indicator	Compared to Nation	Compared to State
Demographic Index	81 percentile	89 percentile
People of Color	85 percentile	92 percentile
Low Income	58 percentile	70 percentile
Unemployment Rate	23 percentile	13 percentile
Limited English Speaking	69 percentile	78 percentile
Less Than High School Education	68 percentile	86 percentile
Under the Age of 5	34 percentile	23 percentile
Over the Age of 64	17 percentile	22 percentile

3.4.8.2 Identification of Existing Adverse Environmental or Human Health Risks

The existing environmental and human health risks for the Aleutians East Borough only included one risk that was at or above the 90^{th} percentile (Table 11). This was the "Lack of Indoor Plumbing" risk under the Housing category. Many of the identified risk, however, had surprisingly low percentiles. For example, the "Diabetes" risk under the Health category for Akutan was identified as being in the 63^{rd} percentile. Considering that multiple studies have indicated that Alaska Natives have some of the highest rates of diabetes in the nation (OMH 2023), this CEJST result may be inaccurate.

The "Transportation Barriers" risk under the Transportation category, which is especially relevant to this project, also had a surprisingly low percentile. CEJST defines transportation barriers as the "average of relative cost and time spent on transportation." Considering the extremely high costs of transportation in the Aleutians East Borough, it is suspect that the risk is listed as only in the 30^{th} percentile in comparison to elsewhere in the nation. The barrier transportation data was provided to the Council on Environmental Quality by the U.S. Department of Transportation (DOT); it is unclear whether their data include marine and air travel, which are the primary modes of transportation in the Aleutians East Borough. The "underlying indicators and sources" in the DOT's definition of disadvantaged communities, which appears to be the data used by CEJST for their transportation barriers risk, includes variables including "drive time" and vehicle ownership (DOT 2023).

Table 11. Existing Environmental Conditions and Human Health Risks for the AEB (CEJST 2023).

Category	Existing Risk	Compared to Nation
Climate Change	Agriculture Loss Rate	*No data*
	Building Loss Rate	1 percentile
	Population Loss Rate	55 percentile
	Flood Risk	*No data*
	Wildfire Risk	*No data*
Energy	Energy Cost	83 percentile
	Particulate Matter 2.5	*No data*
Health	Asthma	14 percentile
	Diabetes	63 percentile
	Heart Disease	31 percentile
	Low Life Expectancy	1 percentile
Housing	Housing Cost	19 percentile
	Lack of Green Space	*No data*
	Lack of Indoor Plumbing	94 percentile
	Lead Paint	25 percentile
Legacy Pollution	Abandoned Mine Land	No
	Formerly Used Defense Site	Yes
	Proximity to Hazardous Waste Facilities	0
	Proximity to Risk Management Plan (RMP) Facilities	74 percentile
	Proximity to Superfund Sites	0
Transportation	Diesel Particulate Matter	0
	Transportation Barriers	34 percentile
	Traffic Proximity and Volume	*No data*
Water & Wastewater	Underground Storage Tanks and Releases	5 percentile
	Wastewater Discharge	*No data*

To calculate an environmental justice index (Table 12), EJScreen uses a formula to combine a single environmental factor with the demographic index (which averages low income and people of color populations). Explanations of what each index means can be found online at the USEPA's website "Overview of Environmental Indicators in EJScreen" (EPA 2023). Unfortunately, that data that are incorporated into EJScreen, like CEJST, appear to be flawed. For example, EJScreen's air quality indices fail to account for Akutan's use of low-separation incineration at the only multi-waivered permit facility in Alaska (Karen Pletnikoff, pers. comm. 10 July 2023).

It is critical to note that while the data from both tools is reported here, these tools do not provide information at a data level useful for many areas in Alaska, especially in remote Alaska Native communities in the Aleutian Islands.

Table 12. Environmental Justice Index for the AEB (EJScreen 2023).

Index	Compared to Nation	Compared to State
Particulate Matter 2.5	N/A	N/A
Ozone	N/A	N/A
Diesel Particulate Matter	0	17 percentile
Air Toxics Cancer Risk	0	0
Air Toxics Respiratory HI	2 percentile	0
Traffic Proximity	N/A	N/A
Lead Paint	60 percentile	85 percentile
Superfund Proximity	0	3 percentile
RMP Facility Proximity	91 percentile	98 percentile
Hazardous Waste Proximity	0	44 percentile
Underground Storage Tanks	52 percentile	59 percentile
Wastewater Discharge	N/A	N/A

4. FUTURE WITHOUT-PROJECT CONDITIONS

This section provides forecasting of conditions that are expected to persist in the Akutan and Akun Islands, Alaska, in the absence of navigation improvements. The Future Without Project Condition (FWOP) forms the basis from which alternative plans are formulated and impacts are assessed. The period of the analysis is 50 years, beginning with the base year of 2033, the year of expected construction completion and the start of accrual of project benefits.

4.1 Physical Environment

Under FWOP, there are no anticipated changes expected to the physical environment in the project area. Changing sea conditions and potential sea level rise (Section 3.1.15, "Climate Change") could result in unknown changes to the storm conditions and increased wave height at Surf Bay and throughout the Aleutian Islands generally.

4.2 Natural Environment

The Aleutian Islands are a dynamic ecological region. While there is no way of knowing with certainty what the future condition of the ecological baseline at Akun Island without the implementation of the project would be, the reasonable continuation of existing processes helps guide these assumptions. Given the limited development on Akun Island and the logistical difficulty of completing large-scale construction projects in the Aleutian Islands, there are limited opportunities for projects at the proposed project site in the foreseeable future. In the absence of this type of anthropogenic influence, the Akun Island site is expected to maintain its current ecological function. The presence of feral cattle has caused erosion around the project area and the salmon stream. The Akutan Corporation has secured funding to restore beach grass to the area in 2024.

4.3 Built Environment

The FWOP conditions for the Built Environment mirror those under the existing conditions. It is assumed the Akutan Harbor, City Dock, Skiff Harbor, the Trident Dock, and the Akutan Airport facilities that support maritime and air service to Akutan would continue to operate at the same level as has been experienced in the past. It is also assumed that the road from Trident to the Akutan Harbor, which has been designed and funded, is planned for construction in 2024.

4.4 Socio-Economic Conditions

The future without-project conditions mirror those under the existing conditions and would continue to impact the community's long-term viability.

4.4.1 Population and Demographics

The resident population of Akutan has remained relatively stable over time, averaging between 55 and 169 people since 1880, with a 2020 population of 113 individuals (see Section 3.1 for additional information.) Currently, there is no reason to assume significant growth or decline in the permanent resident population of the community and this population is assumed to remain static through the forecasted study period.

4.4.2 Employment and Income

As this project is formulated for the Native Village of Akutan rather than for the transient population of the Trident Seafoods processing plant, transient workers are not included the FWOP baseline. It is worth noting, however, that there is significant uncertainty related to the future of operations of the Trident plant in Akutan and the company is currently researching the feasibility of closing the Akutan-based plant and has initiated the construction of a new bunkhouse on property obtained in Captain's Bay, Unalaska. Due to market conditions in the pollock fishery in 2023/2024, the construction of a new plant in Unalaska has been halted until at least 2025 with the plant operational no sooner than 2028. Any decision on the closure of the Akutan plant has been deferred.

If Trident closed the Akutan plant, while the baseline resident population utilized in this analysis would not change, the high cost of the helicopter contract and the impact of weaknesses with the FWOP condition transportation network on long-term community viability would become even more critical after losing the fish tax.

4.4.3 Existing Infrastructure and Facilities

In future without project conditions, it is assumed that the residents of Akutan will continue to utilize the existing maritime and upland infrastructure and facilities on Akutan and Akun Islands.

4.4.4 Freight & Fuel Delivery

No shift in fuel and freight operations is anticipated under FWOP conditions. It is assumed that deliveries will continue directly to Akutan via barge, with twice annual fuel barrel deliveries to occur from Akutan to Akun via helicopter or skiff in support of airport operations.

It is not anticipated that an aircraft refueling system would be installed on Akun in FWOP conditions, as interviews with aircraft operators indicated that a fuel system on Akun would be very costly to install and maintain and would require testing to maintain aircraft fuel quality.

4.4.5 Transportation

Transportation between the Akutan airport on Akun Island and the Native Village of Akutan will continue to rely on the costly helicopter service in FWOP, which is often hindered by weather. The Essential Air Service subsidy which provides supporting funding for the helicopter must be renewed every two years, and no backup plan currently exists to maintain the transportation link to the community if that subsidy were to not be renewed. This is considered unlikely and the FWOP assumption is that the subsidy (and service) is maintained. The Coast Guard will continue to be called in for medical emergencies when weather conditions prevent fixed-wing flights to Akun. Air transportation to medical appointments off island will continue to be delayed, and Postal Service deliveries of medicines needed from Anchorage will continue to be delayed because of the delays in mail from Anchorage. Delays in delivery of medications can reduce the quality of life and can cause worsening medical conditions.

4.4.5.1 Alaska Marine Highway System

For purposes of this analysis, it is assumed that AMHS service to Akutan continues at the same level as has been experienced in the past.

4.4.5.2 Fixed Wing Service

It is assumed that in FWOP conditions the fixed-wing service from Dutch Harbor to Akun will continue to operate similarly to the existing conditions.

While participation in the EAS subsidy must be renewed every two to three years, no changes to the EAS fixed wing service are anticipated under FWOP conditions. In support of these assumptions, the current carrier (Grant Aviation) applied for an expanded service period of 3 years (beyond the typical 2-year service period) to EAS for the service window starting in 2023, showing interest in maintaining the service to the island. In addition, a similar but competing regional carrier also expressed interest in the service contract. The EAS contract has been awarded to Grant Aviation for three years, running through 2026.

4.4.5.3 Helicopter Operations

It is assumed that in FWOP conditions the helicopter service will continue to operate similarly to the existing conditions.

In FWOP, the required skiff-based transit to and from the hangar will be eliminated since a road to the Akutan Harbor is being constructed.

While participation in the EAS subsidy must be renewed every two years, no changes to the EAS helicopter service are anticipated under FWOP conditions. Maritime Helicopters (similarly to Grant Aviation) applied for and was awarded an extended 3-year EAS contract, supporting the assumption that they plan to remain providing service to the community in FWOP.

As was stated in section 3.4.1.2, the Aleutians East Borough committed to providing access between Akutan and the Akun for a period of 20 years after the opening of the Airport, which would expire in 2032. At that time, the borough assembly would need to approve an extension if one was desired. The other potential path starting in 2032 would be a shift of the financial burden for the helicopter to the City of Akutan. For purposes of this analysis, it is assumed that the current transportation network will be maintained regardless of the entity paying for the service.

4.4.5.4 Local Vessel Access

It is assumed that in FWOP conditions the residents of Akutan will continue to choose to utilize their personal vessels to access Akun Island at a similar rate when compared to historical and existing conditions.

4.4.6 Subsistence Use

Subsistence is a long-term practice that is critical to the culture and traditions of Akutan residents, and shifts tend to be measured in terms of generations rather than years and significant shifts are not anticipated.

4.4.7 Cultural Resources

The cultural resources at Surf Bay have been subjected to natural erosional forces from wind as well as wave and storm damages for thousands of years. The feral cattle on Akun Island also cause ground disturbances which impact cultural resources. These issues may continue to impact cultural resources on Akun Island. It is not anticipated that these conditions would change in the FWOP.

4.4.8 Environmental Justice and Protection of Children

There are no anticipated changes in FWOP conditions related to Environmental Justice and the Protection of Children over the existing conditions.

4.5 Summary of Without Project Condition

A key point of uncertainty is the future of the Trident Seafoods plant in Akutan. Due to multiple reasons including this uncertainty, the population of transient workers that service the plant are not considered as part of this analysis. However, if Trident Seafoods were to cease operations in Akutan the fish tax would no longer be received by the community or the Aleutians East Borough, making the high cost of annual helicopter service even more prohibitive.

Under the FWOP condition, absent federal action to provide navigation improvements to Akutan, transportation cost inefficiencies and negative impacts to the Native Village of Akutan are expected to continue at a level rate.

There are no anticipated changes expected to the physical, natural, or built environment in the project area.

5. FORMULATION AND EVALUATION OF ALTERNATIVE PLANS

5.1 Plan Formation Rationale

Plan formulation is the process of building alternative plans that meet planning objectives and avoid planning constraints. Alternatives are a set of one or more management measures functioning together to address the study objectives. A management measure is a feature or activity that can be implemented at a specific geographic location to address one or more planning objectives. A feature is a "structural" element that requires construction or assembly on-site, whereas activity is defined as a "nonstructural" action.

5.2 Plan Formulation Criteria

Alternative plans were formulated to address study objectives and adhere to study constraints. As part of Federal guidelines for water resources projects, there are general feasibility criteria that must be met. According to the USACE ER 1105-2-61 for planning, USACE projects must be analyzed with regard to the four criteria defined in Section 2.7.

In addition to these criteria used for all potential USACE water resource development projects, a study-specific CE/ICA metric of Access Capability between sites has been identified. Access Capability directly impacts waterborne transportation for Akutan, particularly given the integral significance that the ability to access their airport has to the long-term viability of the community.

5.3 Management Measures

During the November 15-16, 2021, planning charrette in the Native Village of Akutan, sixteen measures were identified. Using the criteria discussed in Section 2.7, "National Evaluation Criteria," the project delivery team (PDT) evaluated the following structural and nonstructural measures. All ideas from charrette attendees are identified in Table 13 and Table 14. The PDT screened the considerations proposed at the charrette and determined if they qualified as a measure that would address the problem in Section 2.1 and were screened on the basis of meeting the study objectives described in Section 2.4. Discussion is provided in Sections 5.3.1 and 5.3.2 to explain if each item was considered a measure to address the problem and why the measures were either carried forward or screened from further consideration. Considerations that did not qualify as a measure were not considered further. These measures were combined to form the alternatives outlined in Section 5.7, "Description of Alternative Plans."

5.3.1 Nonstructural Measures

Nonstructural measures are those measures that reduce the consequences of vessel delays and utilize currently available resources. Five nonstructural measures were developed during the planning charrette and compared to the study objectives (Table 13).

Table 13. Nonstructural Considerations Identified at the Charrette.

Measure Name	**Study Objectives**		
	Provide sustainable, safe, reliable access to Akutan Island.	Improve key service operations such as mail and medical supplies between Akun Island and Akutan Island.	
Nonstructural (under USACE authorities)	**Does the measure meet the study objectives?**		**Measure carried forward?**
Meteorological equipment	No	No	No
Procedural control for harbor accessibility / limitation	No	No	No
Investigate a modern seaplane to go back to pre-2012 operations	Yes	No	No
A bridge from Akutan Island to Akun Island	Yes	Yes	No
Lightering passengers/cargo to Akutan Harbor (if no road)	Yes	Yes	No

After the charrette, the PDT reviewed the nonstructural considerations identified at the meeting and determined whether these were measures or opportunities that could be realized with implementation of a harbor improvement project. The following list details the various nonstructural considerations identified during the charrette and how they were screened or carried forward for further consideration.

- Meteorological equipment is currently available in the Akutan/Akun area. A NOAA tide gauge is located Unalaska, with established benchmarks at Surf Bay and

Akutan. The Akutan Airport (7AK) provides real-time meteorological data as well as a live web camera.

- Procedural controls for harbor accessibility are required at any developed harbor.

- The Grumman Goose was a twin-engine “flying boat” with amphibious capability; it could land in the water and taxi up onto land with retractable wheels. Grumman built a total of 345 Gooses in the 1940s. Two were operated by PenAir out of Dutch Harbor, Unalaska Island, until 2012. Maintenance issues and the availability of spare parts necessitated their retirement. Amphibious seaplanes capable of 4–12 passenger loads exist; however, most are single-engine aircraft which are not suitable for operations in the Aleutian Islands due to safety requirements.

  Additionally, the use of amphibious floatplanes instead of amphibious flying boats are not recommended for commercial use in this region. The Federal Aviation Administration’s Akutan Airport EA states that “A land-based airport is needed to provide safe and reliable access to the city of Akutan, Alaska, before aircraft currently providing service to this location (i.e., the Grumman Goose) are no longer operational. The Grumman Goose is presently the only aircraft that can access Akutan. Other aircraft, such as a Cessna with floats, are not durable enough to land in the harbor, and there are no other belly-landing sea planes that are certified for passenger use in the United States. However, the Grumman Goose is no longer being made (production ceased in 1945) and this aircraft is becoming increasingly difficult to maintain in airworthy status” (FAA 2007:ix).

- A bridge between Akun and Akutan would require construction of at least 10 miles of new roads and a 1.5-mile-long bridge across the Akun Strait. Rocky cliffs on both Akutan and Akun islands and harsh weather conditions would make constructing and maintaining this infrastructure difficult. A bridge would be several orders of magnitude more expensive than a ferry connection to Akun.

- Lightering was initially considered for passengers/cargo transported between the Native Village of Akutan and the Akutan Harbor. A road from the Native Village of Akutan to the Akutan Harbor has been funded and designs have been developed. Permitting for the road is underway with materials to be stockpiled in 2023 and construction to be completed in 2024, so while this measure was initially carried forward it is no longer a consideration as goods would be able to be transported over the road once it is constructed.

5.3.2 Structural Measures

Structural measures are generally those measures that improve access to Akutan and require construction and new materials. The structural measures discussed during the charrette are shown in Table 14.

Table 14. Structural Measures Identified at the Charrette.

Measure Name	Study Objectives		
	Provide sustainable, safe, reliable access to Akutan Island.	Improve key service operations such as mail and medical supplies between Akun Island and Akutan Island.	
Structural	**Does the measure meet the study objectives?**		**Measure carried forward?**
Rock Breakwater	Yes	Yes	Yes
Protected Moorage	Yes	Yes	Yes
Dredging	Yes	Yes	Yes
Blasting	Yes	Yes	Yes
Jetties	Yes	Yes	Yes
Road	Yes	Yes	Yes
Docks	Yes	Yes	Yes
Harbor support facilities	Yes	Yes	Yes
New or updated seaplane base	Yes	No	No

Nine structural measures were identified during the charrette. After the charrette, the PDT screened the structural measures to determine which items should be carried forward into the initial array of alternatives. The following list details the structural measures and whether they meet the study objectives for the implementation of a project.

- Breakwaters provide protected moorage and safe maneuverability to a turning basin, docks, and harbor facilities. A breakwater would be sufficient to reduce wave action to the harbor and provide safe access. A breakwater was carried forward as a structural measure for consideration in the development of the initial array of alternatives.

- Moorage, turning basins and entrance channels are harbor navigation components that would be evaluated to improve safe maneuverability and protected moorage. These measures were carried forward and would be combined as appropriate for the development of the initial array of alternatives.

- Dredging and blasting to create navigation/entrance channels or deepen an existing channel or basin for safe maneuverability would be evaluated to reach the desired depth to realize benefits for the vessels utilizing the entrance channel and basin. Dredging and blasting were carried forward and would be combined as appropriate for the development of the initial array of alternatives.

- Docks, roads, and harbor support facilities will be evaluated as local service facilities to support harbor usage with implementation of the proposed project. These measures would be combined as appropriate depending on harbor configuration and vessel class access in the initial array of alternatives to realize harbor benefits.

- A new or updated seaplane base does not meet the objective of improving key services between the Akutan Airport on Akun Island and the Native Village of Akutan.

5.4 Design Vessel

A conceptual design vessel is utilized to identify baseline requirements that satisfy the purpose the vessel will be serving (ferry service). These requirements can include passenger capacity, passenger comfort and seasickness, and cargo type or capacity. The dimension (length, beam, draft) of the design vessel is used in defining the required mooring and berthing facilities. The characteristics required in the design vessel are heavily influenced by wave/tide conditions when transiting currents generated by Akun Strait, between Akutan and Akun Islands. Passenger counts and freight requirements are not a limiting characteristic since any vessel that can handle the marine conditions in the Akun Strait will meet the passenger/freight capacity of the fixed wing. Changes in demand could impact trip counts in FWOP, but the FWP design vessel size is already minimized and is not likely to be further reduced.

Initial design vessels up to 95 feet were considered. Feedback during the charrette was that this size of vessel would make crossing Akun Strait most comfortable for passengers. The size of vessel was gradually reduced to 58 feet to minimize the harbor requirements for a vessel that was able to safely operate in that environment. The design vessel was also evaluated to match the operating parameters of the fixed-wing aircraft to minimize the cost of the harbor design and ferry operation. A ferry length of 58 feet was evaluated to fulfill this condition most closely. The harbor facilities were designed using conservative assumptions about the maneuverability of the 58-foot vessel. The ferry vessel is not restricted to 58 feet and a longer vessel may be utilized at the pilot’s discretion based on vessel handleability, wind, and currents. The entrance channel and turning basin dimensions are based on USACE conservative design guidelines, and a competent pilot could utilize the harbor with a vessel longer than 58 feet.

Considering the design vessel draft, many 58-foot fishing vessels in Alaska have drafts ranging from 8 to 13 feet. A shallower draft of 8 feet allows the ferry to travel faster, reducing the amount of time passengers are exposed to waves that induce motion sickness. But a shallower draft vessel will experience greater motion in the waves which decreases passenger comfort. The shallower draft design vessel of 8 feet was chosen based on fishing vessels of this draft being available for purchase in Alaska and the advantage of minimizing harbor dredging depths. As with vessel length, a ferry vessel with a draft deeper than 8 feet may be utilized at the pilot's discretion based on vessel handleability, waves, and tides.

Considering the design vessel beam, 26 feet is wide compared to other 58-foot fishing vessels in Alaska. The large beam was chosen for design to provide flexibility for the chosen ferry vessel. If a larger ferry vessel than the design vessel is chosen, it is unlikely this vessel would have a beam wider than 26 feet.

The type of design vessel selected for this study can be represented by the F/V *Magnus Martens*, a 58-foot twin screw steel monohull with a 26-foot beam and an 8-foot draft (Figure 36). Vessels similar to the F/V *Magnus Martens* operate across Alaska, including in the Aleutian Islands. During the charrette, local fishermen stated that a 58-foot vessel would be the minimum recommended length to cross Akun Strait safely. It is anticipated that the ferry vessel would be a converted commercial fishing vessel, although a crew boat similar to those used in the oil and gas industry is also a possibility.

Figure 36. Design Vessel F/V *Magnus Martens* (photo: fredwahlmarine.com).

Evidence of the capability of the design vessel is demonstrated by the types of vessels used in commercial fishing in Alaskan waters. The North Pacific Fishery Management Council reported than in 2010, of the 2,736 vessels participating in federal managed fisheries off Alaska, 80% of those vessels were less than 60 feet in length (Witherell, Fey, & Fina, 2012). The Alaska Fisheries Development Foundation reported than in 2017, of the over 9,000 commercial fishing vessels licensed to operate in Alaska, 93% of those vessels were under 59 feet in length (AFDF, 2019). Longliners for groundfish, sablefish, and halibut frequent the Aleutian Islands and Bering Sea, the majority of which range from 30 to 59 feet in length. Vessels of 58-foot length were reliably found for sale online using Alaska marine brokerages.

It should be noted that this design vessel will be referred to as a ferry, operating between Akutan and Akun Islands, and should not be confused with the AMHS ferry M/V *Tustumena* described in Section 3.4.1.0.

5.4.1 Vessel Operational Conditions

Operational conditions are described using the Beaufort Sea State (SS), a visual scale for estimating wind speed and sea state. The design vessel is assumed to safely operate in Beaufort Sea State 4 (SS4) conditions which include a significant wave height of 3 feet, maximum wave height of 5 feet, and sustained windspeeds of 7 to 10 knots. The 2015 conceptual vessel study for Akutan Airport presented that a 55-foot ferry with a 22-foot beam and 3.5-foot draft should routinely operate in SS4 (Alton Bay Design, 2015). The Bristol Harbor Group suggested that the design vessel for this project could conduct operations SS4 and possibly up to SS5 (significant wave height of 6 feet and maximum wave height of 8 feet and windspeeds of 17 to 21 knots) with a competent boat and pilot (Eling, 2023). The contracted ferry may be smaller than the design vessel and passenger comfort should be taken into account. Therefore, SS4 was used for the analysis with SS5 provided for information only.

A statistical analysis was conducted to compare the amount of time successful trips could theoretically be conducted at Akutan Airport for various methods of transportation craft (Table 15). These included the existing Bell 206L4 helicopter, a larger Bell 412 helicopter, the existing Piper PA31-350 Navajo Chieftain, and the proposed 58-foot ferry vessel. See Appendix A: Hydraulics and Hydrology for more information.

$$(1 - Ferry\ Cancelation\ _{FWP}) - (1 - Helicopter\ Cancelation_{FWOP}) = Improvement\ in\ Access$$

$$(1 - 0.223) - (1 - 0.304) = 0.081 = 8.1\%\ Improvement\ in\ Access$$

Table 15. Percent of Time of Inoperability.

	Craft	Weather	Mechanical	Total
Anticipated	Bell 206L4 Helicopter[1]	27.1%	0.9%	27.9%
Reported	Bell 206L4 Helicopter	29.6%	0.9%	30.4%
Scaled	Bell 206L4 Helicopter	29.6%	0.9%	30.4%
Anticipated	Bell 412 Helicopter[2]	24.9%	0.9%	25.8%
Scaled	Bell 412 Helicopter	27.2%	0.9%	28.1%
Anticipated	Piper PA31-350 Navajo Cheiftain[3]	31.4%	2.8%	34.2%
Reported	Piper PA31-350 Navajo Chieftain	34.4%	2.8%	37.2%
Scaled	Piper PA31-350 Navajo Chieftain	34.4%	2.8%	37.2%
Anticipated	58-foot Ferry (SS4)[4]	19.6%	0.9%	20.4%
Scaled	58-foot Ferry (SS4)	21.4%	0.9%	22.3%
Anticipated	58-foot Ferry (SS5)[5]	11.0%	0.9%	11.8%
Anticipated Scaled	58-foot Ferry (SS5)	12.0%	0.9%	12.8%

[1] Weather percentage includes winds greater than 30 knots, visibility less than 1 mile, ceiling less than 719 feet.

[2] Weather percentage includes winds greater than 35 knots, visibility less than 1 mile, ceiling less than 719 feet.

[3] Weather percentage includes crosswinds greater than 20 knots or winds greater than 40 knots, visibility less than 2 miles, and ceiling less than 719 feet.

[4] Weather percentage includes Beaufort Sea State 4 (SS4) conditions include significant wave heights greater than 3 feet originating from 290° to 330°degrees and tides less than 0 feet MLLW during marginal sea states.

[5] Weather percentage includes Beaufort Sea State 5 (SS5) conditions include significant wave heights greater than 6 feet originating from 290° to 330°degrees and tides less than 0 feet MLLW during marginal sea states.

The percent of time of inoperability was the preferred metric of comparison between the craft given the available meteorological data and the level of reasonable assumptions made for the operations of each type of craft. However, by not considering the timing of the delay to result in a cancelation, the anticipated values are over inflated. To help compensate for the optimistic data, a scaling factor was applied to the ferry weather operability. The scaling factor was the average of the helicopter and fixed-wing ratio of reported weather delays divided by the calculated anticipated weather delays. The resulting final values for comparison are listed as Scaled in Table 15.

Accessibility metrics for fixed-wing and helicopter aircraft were based on Akutan Airport station data including wind speed, wind gust, wind direction, visibility, sky level coverage, and sky level altitude. The Akutan Airport instrument approach procedure (IAP) charts list the minimum descent altitude (MDA), or the minimum altitude to which the pilot may descend on approach without visuals. Calculations are based on the higher ceiling values of the east approach. For an east approach, the MDA ceiling is 719 feet and visibility 1 ¼ miles (FAA, 2023). The visibility reduction by helicopters for Akutan Airport is no less than 1 mile, with no reduction for ceiling. Note that these are minimum values, and the authorized MDA may be further restricted for the pilot or the aircraft.

Winds of 40 knots or greater will cause cancelations of flights into Unalaska Airport and Akutan Airport. The maximum allowable tailwind or crosswind for hover operations of the existing Bell 206L4 helicopter are 30 knots and a larger Bell 412 helicopter are 35 knots. The maximum available crosswind for the existing Piper PA31-350 Navajo Chieftain is 20 knots.

Accessibility metrics for the ferry were based on WIS Station 82327 data filtered to 290° to 330° to reflect the limited window of Bering Sea energy that could affect the ferry due to the coverage provide by the islands of Akutan and Akun as well as the island chain to the south. Applicable data used for the analysis included wave height and direction.

Fixed-wing flights currently arrive at Akutan Airport at 10:20 and 15:30 and depart at 10:35 and 16:05. It is assumed that all methods of airport transportation would cease during twilight hours of 23:00 to 06:00 April 1 to October 31 and 20:00 to 09:00 November 1 to March 31. The twilight hours were removed from all analysis except tide. Tide was not found to have a statistically significantly difference between daylight and twilight hours, so the unmodified value was used.

Delays due to mechanical/maintenance for the fixed-wing and helicopter were reported by the carriers from 2020 to 2023. A ferry would not inherently have more or less mechanical issues than a helicopter as the environmental operating conditions differ and the age and condition of the contracted ferry are unknown. Due to the uncertainties associated with mechanical/maintenance delays and the relatively small value of 0.9% (Maritime helicopter cancelations average from 2020 to 2022), mechanical/maintenance cancellations were assumed to be the same for the ferry vessel.

The proposed harbor depth of -14 feet MLLW is designed to be accessed at tides greater than 0 feet MLLW. Approximately 1% of the time, a combination of marginal sea state conditions nearing SS4 in the harbor entrance channel occurring at tides lower than 0 feet MLLW would cause the harbor to be inaccessible. This percentage is included in the ferry calculations. At other times, calmer sea states occurring at tides lower than 0 feet would result in a smaller ship response to waves, and the additional depth allowance would compensate for the lower tide. Additionally, if the drop in relative sea level does not occur, the additional 1 foot of dredging incorporated for relative sea level rise at construction would reduce the 1% joint tide probability to 0.15%.

5.4.2 Skiff Operational Conditions

Improvement in access anticipated by the project was also determined for skiffs. Akutan airport station wind data was used to evaluate conditions at the project site in which skiffs can land. It was found that approximately 20% of the time, conditions under SS3, wind speeds under 7 knots, occur at the project site. During these conditions, skiff operators could likely access Akun without the harbor project, although at least one community member typically stays behind with the vessel. Approximately 19% of the time, SS3 conditions, wind speeds of 7 to 10 knots, occur at the project site. During these conditions, skiff operators may be able to make the crossing from Akutan but would likely not be able to safely land on the beach due to waves. A broad comparison between the two conditions is that approximately 50% of the time, a skiff operator could theoretically make the crossing to Akun but not be able to land on Akun without the protection provided by the project.

WIS station 82327 directionally filtered from 290° to 330° was used to estimate how often skiff operators could safely make the crossing to Akun. It was found that approximately 9% of the time, SS3 or lower conditions, wind speeds 10 knots or lower and significant wave heights 2 feet or lower, occur in the crossing to Akun. During these conditions, skiff operators would likely be able to make the crossing from Akutan to Akun. Additional factors such as tides and currents, skiff size, and operator judgement would also affect the decision to cross and are not reflected in the statistics.

Evaluating the percent of time that skiff operators can make the crossing to Akun but only land due to the protection provided by the harbor, the project would provide an estimated 4.5% improvement in skiff access of Akun. This was determined using the following simple formula.

$$(Akutan\ to\ Akun\ Crossing) * (Land\ at\ Akun_{FWP}) = Improvement\ in\ Access$$
$$(9\%) * (50\%) = 4.5\%\ Improvement\ in\ Access$$

5.5 Site Selection

Two locations with suitable site characteristics needed to be identified for this study: existing docking facilities at Akutan utilized for loading and unloading passengers and freight, and potential harbor location sites on Akun Island. In each scenario, the ferry vessel would be berthed in the small boat Akutan Harbor.

5.5.1 Akutan Ferry Vessel Loading Sites

Docking facilities at Akutan were described in Section 3.3, Built Environment, and include Akutan Harbor, Skiff Harbor, City Dock, and Trident Dock. Initial screening of these four locations indicated that the City Dock and Akutan Harbor would be carried forward as potential sites for passenger and freight operations.

The Skiff Harbor is at capacity with local small vessels that can be berthed near the Native Village of Akutan. There are extensive facilities at Trident; however, these are working docks involved in commercial fishing operations and are privately owned.

The City Dock is large enough for the design vessel and has sufficient draft, however, there may be modifications needed to the dock to accommodate the ferry vessel as envisioned for this project. At a minimum, the catwalk with mooring dolphins could be replaced to the appropriate elevation to facilitate boarding and freight/cargo transfer to the ferry vessel.

The Akutan Harbor is an option that may need to be modified for freight/cargo transfer. The ferry would be moored in the small boat Akutan Harbor when not in use. The Akutan Harbor is currently accessible only by skiff but will be accessible by road in 2024.

5.5.2 Akun Island Harbor Sites

Nine potential harbor sites were identified during the charrette. These sites, labeled “A” through “I” in Figure 37, were identified; three at Nick’s Camp, two at No-name Point, two at Darryl’s Point, and two at Chulka Point.

Subsequent screening led to the elimination of seven sites by the PDT: three at Nick’s camp (A, B, C), both sites west of Darryl’s Point (F,G), and both Chulka Point sites (I, H).

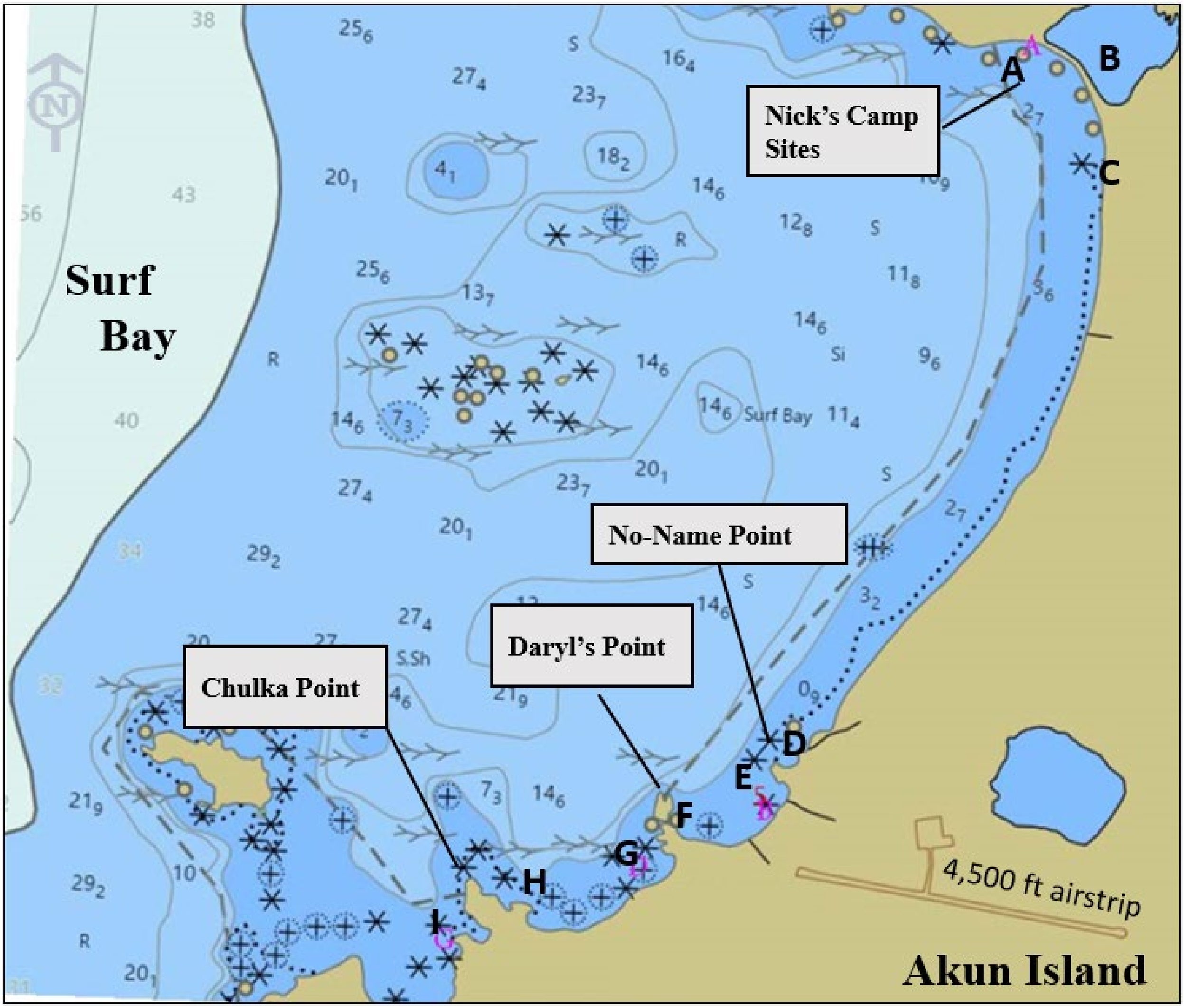


Figure 37. Potential harbor sites identified on Akun Island.

5.5.3 Akun Sites Screened Out

5.5.3.1 Nick's Camp (Sites A, B, C)

Three alternative sites were located approximately 2 miles northeast of the airport at Nick's Camp. This location was advantageous because of its protected location to the northwest, likely removing the requirement for a breakwater. Sites A and C are offshore and would require either a long dock to reach deep water for turning and mooring basin, or a short dock with extensive dredging. Site B involved dredging out the lake and an entrance channel to deep water, with revetments on either side of the lake opening. During the charrette, the team observed shallow water in the lake, even in the middle. Fine sediment around the lake is deposited by the river inlet at the lake's east end and would likely require dredging of Site B on a regular basis.

Ultimately, all the locations at Nick's Camp were ruled out because they would require a lengthy road of approximately 2 miles either over rolling tundra or along the beach and through a cliff face. The project delivery team walked the potential alignment of the road during the charrette, and it was determined that the terrain was too challenging to continue pursuing this location.

5.5.3.2 Daryl's Point (Sites F, G)

Daryl's Point was identified during the charrette as a potential harbor location. Akutan residents reported that the rock peninsula provides wave protection for Site F, and the area is naturally deep with a sandy bottom at approximately -30 feet MLLW. This site would require much longer road access. Site F is also located inside the Akutan Airport Runway Protection Zone (RPZ). Permanent structures such as breakwaters would have height limits or be not allowed within the RPZ. Therefore, Site F was not carried forward for further analysis. The hillside behind Daryl's Point is also very steep (Figure 38).

Figure 38. View towards Airport from Daryl's Point.

Site G is located on the backside of Daryl's Point and does not have the same level of protection from the rock peninsula. Additionally, road access would need to go over the 60-foot-high cliff of Daryl's Point.

5.5.3.3 Chulka Point (Sited H, I)

Chulka Point sites H and I were quickly ruled out for several reasons. Chulka Point is located farther from the airport than sites D through G, and beaches are surrounded by tall cliffs that would be difficult to access by road. Chulka Point is located closer to the

Akun Strait and is subject to higher wave energy than sites to the northwest. Additionally, the backside of Chulka Point (Site I) experiences large tidally generated waves.

5.6 Preliminary Alternatives Considered

During a screening exercise, the PDT reduced the list of 9 locations to the two most viable (D,E) due to their proximity to the airport and potentially favorable natural wind and wave protection afforded by rocky points.

Three alternatives for building harbors at two sites in Surf Bay were developed using the above measures carried forward. The three preliminary alternative plans developed for this study are shown in Table 16. Also included is the FWOP condition and a fourth alternative developed during the Feasibility study review process.

Table 16. Preliminary alternatives considered.

Alternative	Description
	FWOP – Bell 206 Helicopter
1	Harbor Southwest of No-name Point (without blasting)
2	Harbor South of No-name Point (with blasting)
3	Harbor North of No-name Point (with blasting)
4	Larger Helicopter (Bell 412)

The GNF structural measures at each location consist of a breakwater, entrance channel, and a turning basin. Local Service Facilities (LSF) include a rubble mound causeway, sheet pile dock, turning dolphins, a small mooring basin, an upland area, and a road to connect the harbor with existing facilities at the Akutan Airport on Akun Island. Alterations to existing facilities to serve as a berthing location for passenger or freight loading on Akutan Island may also be necessary (see Section 5.5.1). Also, although not an LSF feature, the NFS will provide the ferry vessel or service.

The FWOP assumption is that the same helicopter (a Bell 206) will be utilized through the study period. However, the potential to upgrade to a larger helicopter was explored to address some of the community's needs.

5.7 Description of Alternative Plans

The structural and nonstructural measures carried forward were combined to form an array of alternatives. See Appendix A: Hydraulics & Hydrology for further information on alternative plan design.

5.7.1 Akutan Facilities

Any facility upgrades necessary on Akutan Island will be the same for Alternatives 1 – 3. The sites considered were discussed in Section 5.5.1. At this time, it is assumed that the ferry vessel will moor in the Akutan Harbor when not in use. Before each ferry trip, the crew to pilot the ferry vessel would transit to the ferry at the Akutan Harbor using the road that has been funded and is currently in development. Two options exist for loading passengers and freight. Either the vessel and crew would travel back to the City Dock where passengers and freight will board the vessel, or passengers and freight would travel to the Akutan Harbor where loading would occur. The ferry will then travel to the proposed harbor on Akun and offload passengers and freight to meet a connecting flight on a fixed-wing aircraft. The ferry will travel back to either the City Dock or the Akutan Harbor with any passengers, freight, and crew from Akun Island. Once all runs for the day are completed, the ferry will be moored at the Akutan Harbor.

Upgrades would be needed to the City Dock to accept the ferry vessel. At a minimum, the catwalk with mooring dolphins could be replaced to the appropriate elevation for easy boarding of the ferry vessel.

5.7.2 No Action

Existing conditions in Akutan will remain the same without the development of navigation improvements. The current transportation method (helicopter) between the Akutan Airport on Akun Island and the Native Village of Akutan will be expensive and inefficient. Residents of Akutan would continue to experience reliability concerns for airline passengers, medical supplies, and freight.

5.7.3 Alternative 1: Harbor Southwest of No-name Point (without blasting)

This alternative is located at Site E. The harbor would be sized to accommodate a design vessel with a length of 58 feet and draft of 8 feet. The 715-foot-long rubble mound breakwater would protect a 120 foot by 120 foot turning basin. The mooring basin is located inside the turning basin, described below. The entrance channel and turning basin dredge depths are -17 feet MLLW and -14 feet MLLW respectively. It is anticipated that blasting would not be required for the turning basin or entrance channel at this location. The entrance channel would vary from a minimum width of 60 feet to a maximum width of 120 feet (Figure 39 and Table 17).

Table 17. Alternative 1 Features.

		Unit	Dimension
Breakwater	**Armor Stone Weight**	(tons)	10.5
	Armor Stone Thickness	(feet)	10.2
	Crest Height	(feet MLLW)	16.5
	Crest Width	(feet)	15.5
	Length	(feet)	715
Entrance Channel	**Width Straight**	(feet)	60
	Width Bend	(feet)	120
	Depth	(feet MLLW)	-17
Turning Basin	**Width**	(feet)	120
	Length	(feet)	120
	Depth	(feet MLLW)	-14
Quantities	**Armor Stone**	(cubic yards)	33,600
	Harbor Dredging	(cubic yards)	23,800
	Road Excavation	(cubic yards)	59,500

Local service facilities required would include a 560-foot-long by 12-foot-wide rubble mound causeway, sheet pile dock, 60-foot by 40-foot mooring basin with mooring dolphins, 7,000 square foot pad for loading/unloading freight, and a 1,100-foot-long road connecting the harbor areas with the existing hotel pad. The road would have an average grade of 9.4%. The road would consist of a 12-foot-wide surface with 6 inches of aggregate surface over 2 feet of borrow material. Two 6% grade shoulders would extend 2 feet from the edge of road. Two 2H:1V slope drainage ditches would extend from the shoulders before daylighting to existing ground at a 1.5H:1V slope.

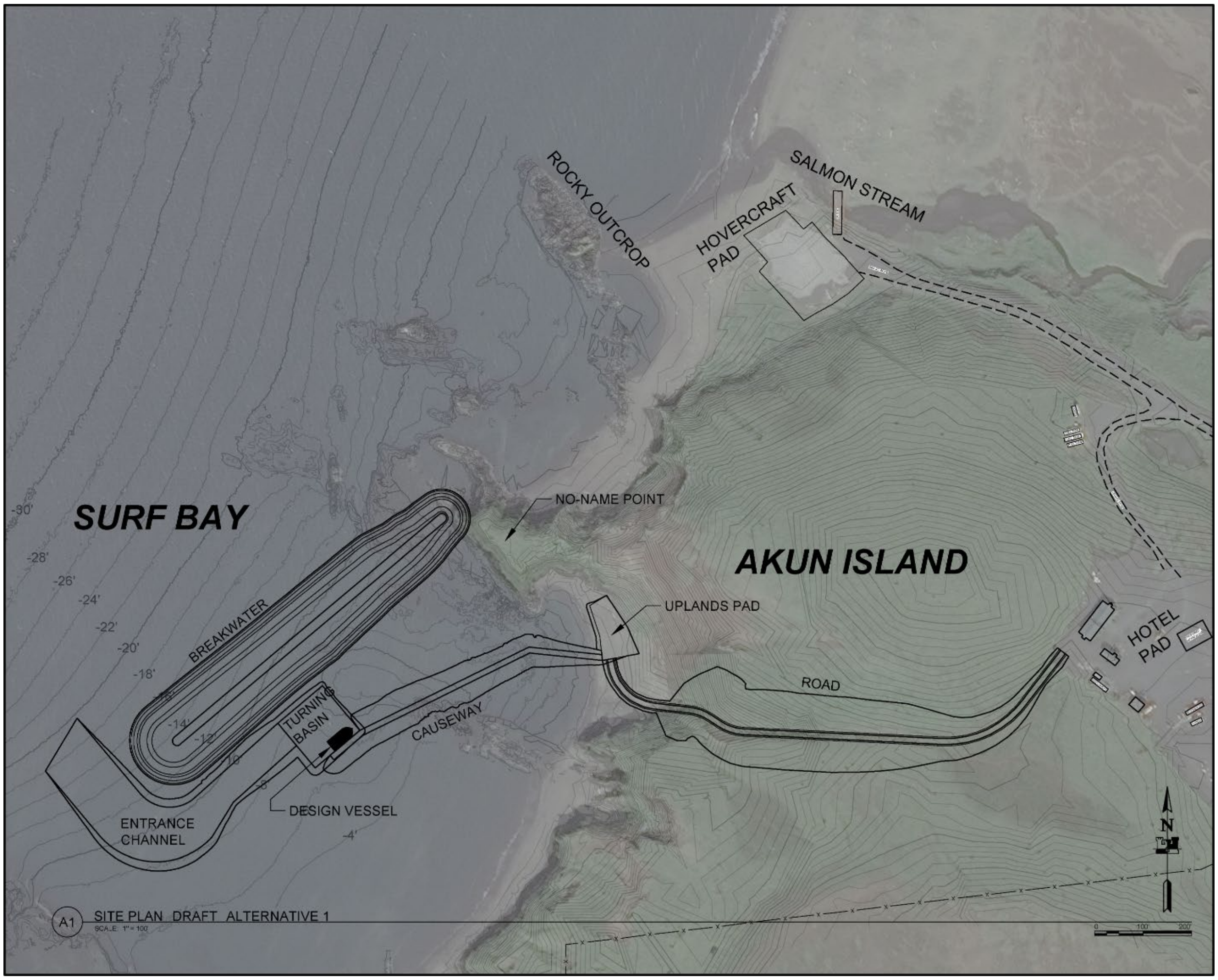


Figure 39. Alternative 1: Harbor Southwest of No-name Point (without blasting)

5.7.4 Alternative 2: Harbor South of No-name Point (with blasting)

The harbor would be sized to accommodate a design vessel with a length of 58 feet and draft of 8 feet. The 400-foot-long rubble mound breakwater would protect a 120-foot by 120-foot turning basin. The turning basin encompasses the mooring basin, described below. The entrance channel and turning basin dredge depths are -17 feet MLLW and -14 feet MLLW respectively. It is anticipated that blasting would be required for the turning basin and entrance channel at this location. The entrance channel would vary from a minimum width of 60 feet to a maximum width of 120 feet (Figure 40 and Table 18).

Table 18. Alternative 2 Features.

		Unit	Dimension
Breakwater	**Armor Stone Weight**	(tons)	6.5
	Armor Stone Thickness	(feet)	8.8
	Crest Height	(feet MLLW)	15.5
	Crest Width	(feet)	13.2
	Length	(feet)	400
Entrance Channel	**Width Straight**	(feet)	60
	Width Bend	(feet)	120
	Depth	(feet MLLW)	-17
Turning Basin	**Width**	(feet)	120
	Length	(feet)	120
	Depth	(feet MLLW)	-14
Quantities	**Armor Stone**	(cubic yards)	12,700
	Harbor Dredging	(cubic yards)	27,400
	Road Excavation	(cubic yards)	59,500

Local service facilities required would include a 560 foot long by 12-foot-wide rubble mound causeway, sheet pile dock, 60-foot by 40-foot mooring basin with mooring dolphins, 7,000 square foot pad for loading/unloading freight, and a 1,100-foot-long road connecting the harbor areas with the existing hotel pad. The road would have an average grade of 9.4%. The road would consist of a 12-foot-wide surface with 6 inches of aggregate surface over 2 feet of borrow material. Two 6% grade shoulders would extend 2 feet from the edge of road. Two 2H:1V slope drainage ditches would extend from the shoulders before daylighting to existing ground at a 1.5H:1V slope.

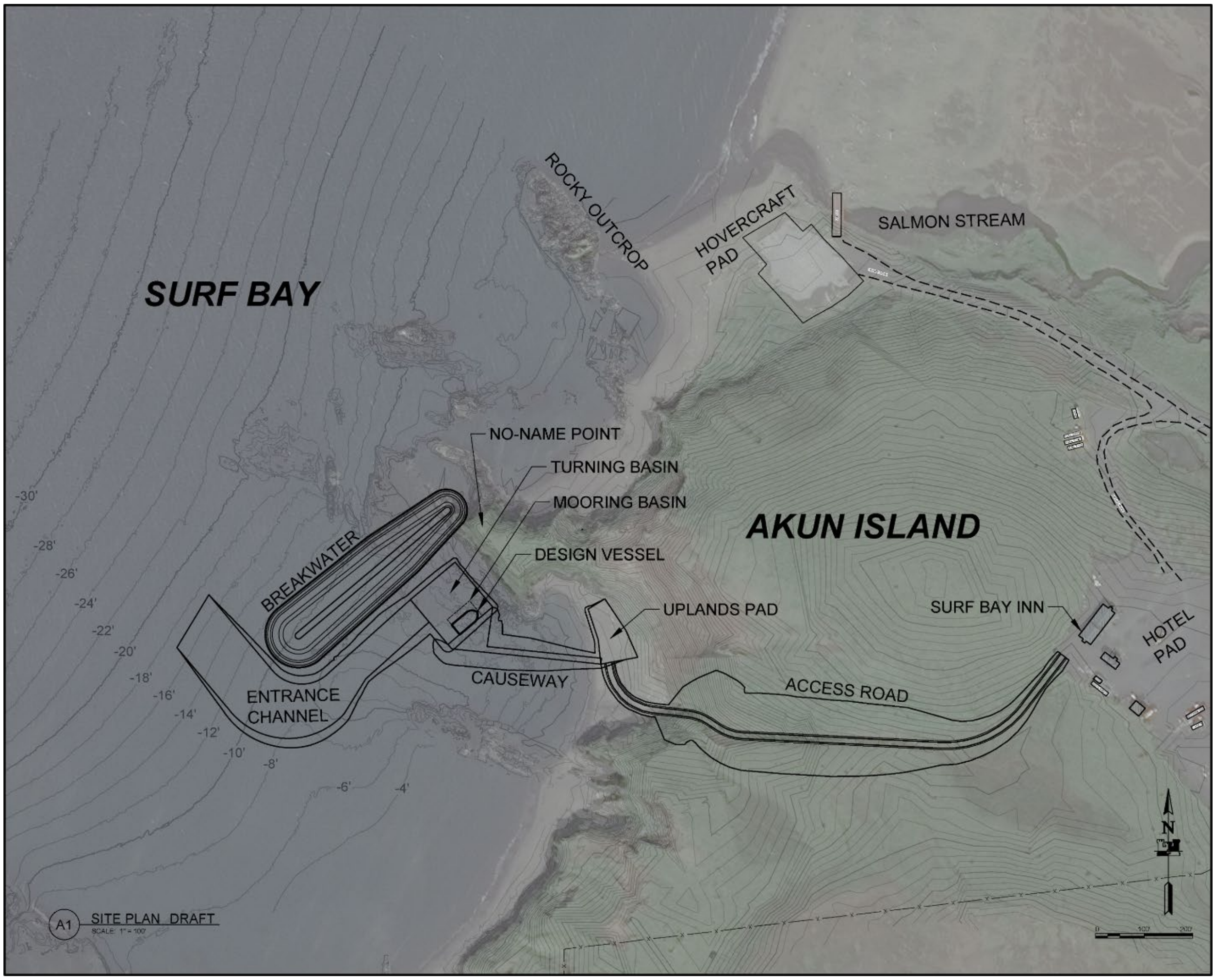


Figure 40. Alternative 2: Harbor South of No-Name Point (with blasting)

5.7.5 Alternative 3: Harbor Located North of No-name Point (with blasting)

The harbor would be sized to accommodate a design vessel with a length of 58 feet and draft of 8 feet. The 400-foot-long rubble mound breakwater would protect a 120-foot by 120-foot turning basin. The entrance channel and turning basin have a dredge depth of -17 feet MLLW and -14 feet MLLW respectively. It is anticipated that blasting would be required for the turning basin or entrance channel at this location. The entrance channel would have a minimum width of 60 feet to a maximum width of 120 feet when turning around the nose of the breakwater (Figure 41 and Table 19).

Table 19. Alternative 3 Features.

		Unit	Dimension
Breakwater	**Armor Stone Weight**	(tons)	11.5
	Armor Stone Thickness	(feet)	10.6
	Crest Height	(feet MLLW)	17
	Crest Width	(feet)	16
	Length	(feet)	400
Entrance Channel	**Width Straight**	(feet)	60
	Width Bend	(feet)	120
	Depth	(feet MLLW)	-17
Turning Basin	**Width**	(feet)	120
	Length	(feet)	120
	Depth	(feet MLLW)	-14
Quantities	**Armor Stone**	(cubic yards)	14,700
	Harbor Dredging	(cubic yards)	23,000
	Road Excavation	(cubic yards)	600

Local service facilities required would include a 320 foot long by 12-foot-wide rubble mound causeway, 60-foot by 40-foot mooring basin with mooring dolphins, and a 250-foot-long road connecting the harbor areas with the existing hovercraft pad. The existing hovercraft pad would function as an area for loading/unloading freight. The road would have an average grade of 3.3%. The road would consist of a 12-foot-wide surface with 6 inches of aggregate surface over 2 feet of borrow material. Two 6% grade shoulders would extend 2 feet from the edge of road. Two 2H:1V slope drainage ditches would extend from the shoulders before daylighting to existing ground at a 1.5H:1V slope.

The shoreline along Alternative 3 is flanked by narrow headlands of volcanic rock (Golder, 2022). This provides some natural protection but will make dredging difficult as the rock extends under the water surface throughout the area.

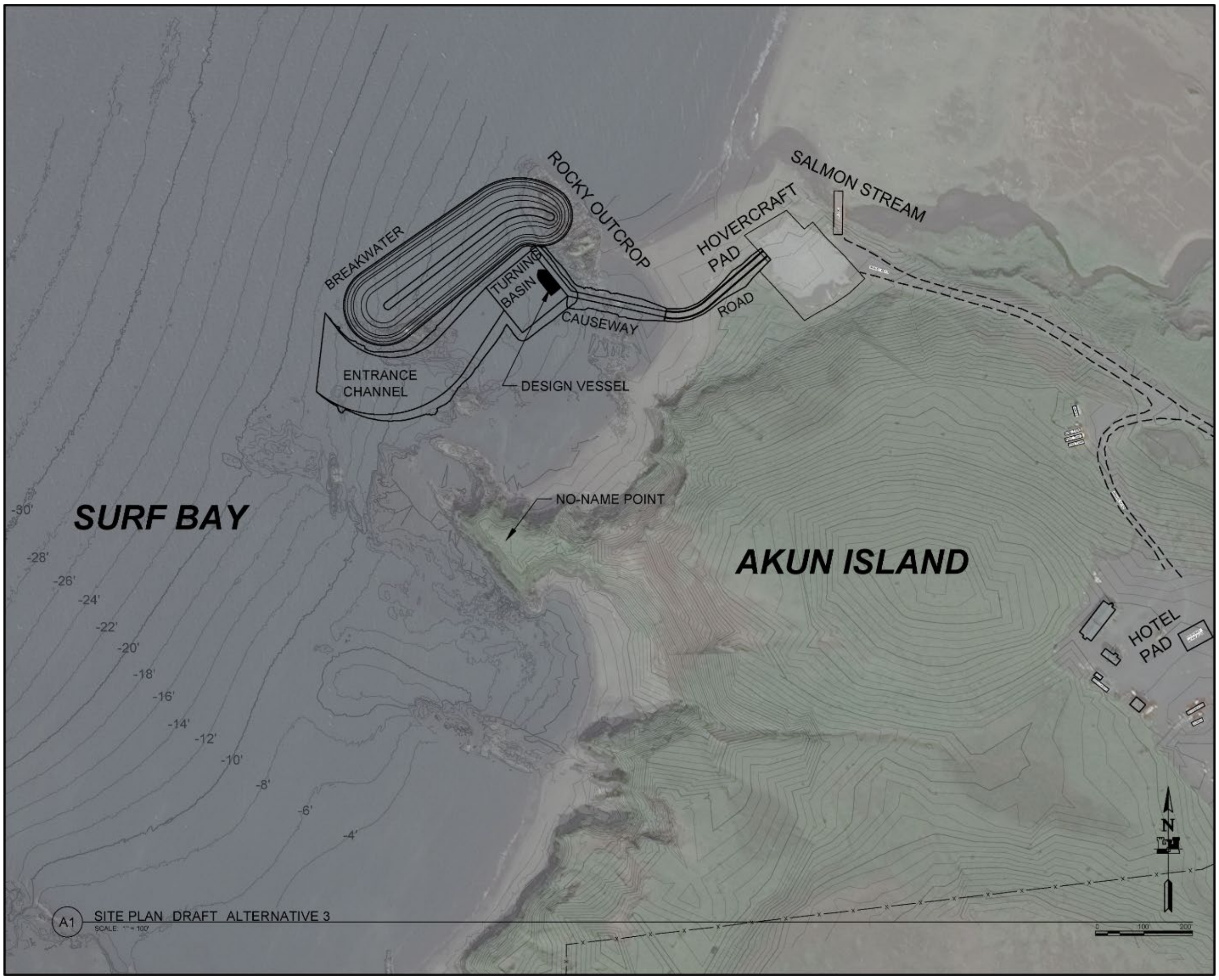


Figure 41. Alternative 3: Harbor North of No-name Point (with blasting)

5.7.6 Alternative 4: Larger Helicopter

During the Feasibility study review process, consideration of a larger helicopter was suggested as a non-structural alternative to constructing a harbor. The current contractor, Maritime Helicopters, does have a larger helicopter and provided cost and specifications of the existing and larger helicopters (Table 20). The Bell 412 can transport 11 passengers and 2,400-pound payload.

Table 20. Helicopter Size Comparisons

Machine	Bell 206L3	Bell 412
Hourly Cost (FY24$) *	$1,475 an hour	$4,575 an hour
Estimated Annual Contract Cost	$2.3 million ($1.7 million of which are direct transportation costs)	$4.4 million ($3.3 million of which are direct transportation costs)
Fuel Use	38 gallons per hour	110 gallons per hour
Payload	• 4 passengers • Max payload approximately 800 pounds	• 11 passengers • Max payload approximately 2,400 pounds
Speed	Average speed is 100 knots	Average speed is 120 knots

Source: Maritime Aviation.
* Costs can vary from year to year, does not include fuel.

5.8 Alternatives Carried Forward

All alternatives, plus the No Action alternative, were carried forward into detailed analysis. These alternatives were further analyzed to establish their benefits across the four accounts (Section 6.4).

6. COMPARISON AND SELECTION OF PLANS

6.1 With-project Condition

The following section describes anticipated conditions at Akutan, assuming that a project would be constructed. The anticipated benefits of navigational improvements that provide safe, reliable, and efficient (cost-effective) navigation and mooring for a ferry vessel to transport passengers and cargo between the Akutan Airport on Akun Island and Native Village of Akutan located on Akutan Island are the basis for the economic analysis. The period of the analysis is 50 years, beginning with the base year of 2033. The FY24 Federal discount rate of 2.75% is used to discount benefits and costs.

Alternatives 1 and 2 utilize the same location. Alternative 1 explores the tradeoff of having the harbor located further offshore and in deeper water to utilize soft material dredging equipment rather than blasting. The cost savings of avoiding blasting are not expected to outweigh having a larger breakwater with heavier armor stone and a longer dock to reach the mooring basin. Only a slight decrease in dredge quantity is realized by Alternative 1 as it is in a similar depth as the harbor in Alternative 2; however, the dredged materials are likely to be different where blasting is used.

Alternative 2 attempts to optimize quantities of dredging for the entrance channel and turning basin by bringing them closer to shore than Alternative 1. This also decreases the length, height, and armor stone size required for the breakwater. Dock length also decreases as the mooring basin is located closer to shore. Road access is the same as Alternative 1.

Alternative 3 explores the advantages of locating the harbor closer to the existing road infrastructure of the former hovercraft landing site versus a less optimal harbor location. This harbor location is anticipated to be less accessible than Alternatives 1 and 2 due to the proximity of rocky outcrops. Additionally, this location is much closer to the salmon stream and has a much greater potential for disturbance of this resource as compared to the other alternatives. There is also a piece of private property in the uplands near the hovercraft pad which would need to be avoided.

Alternative 4 is a non-structural solution which would not rely on constructing a harbor. The larger helicopter would carry more passengers (11 compared to 4) and freight than the current helicopter (2,400 compared to 800 pounds). It is also slightly faster; however, moving larger items such as subsistence gear, subsistence harvest, and fuel would remain difficult. The cost is approximately 3 times the rate per hour of the current helicopter.

6.1.1 Assumptions

The resident population of Akutan has remained relatively stable over time, averaging between 55 and 169 people since 1880, with a 2020 population of 113 individuals. Currently, there is no reason to assume significant growth or decline in the permanent resident population of the community and this population is assumed to remain static through the forecasted study period.

This project is formulated to meet the transportation needs of the visitors and residents of the Native Village of Akutan. In existing and FWOP conditions, the primary method of transportation for Trident Seafoods workers is via Trident Seafoods vessels going directly from Dutch Harbor on Unalaska Island to their plant on Akutan Island. Other individuals (i.e., VIP guests, onboard observers for commercial fishing vessels, processing plant inspectors) use the Akutan Airport on Akun Island; and the subsequent Akun Island to Akutan Island transportation link via helicopter. Given the August 2023 announcement that Trident will be constructing a plant in Unalaska in the near future, it is likely changes to the levels of Trident Seafoods passengers to Akutan will occur; however, the primary formulation of FWP conditions is to meet the needs of the Native Village of Akutan. Therefore, shifts in transportation demand by Trident Seafoods employees and visitors does not directly impact FWP benefits.

The AEB has indicated that they do not want to purchase a ferry vessel and will be contracting for ferry services. Therefore, it is assumed that a contract for a marine ferry will be managed similarly to the FWOP condition contract for the helicopter.

Annual trip counts to be made by a ferry in FWP conditions is not critical to this analysis, as it is assumed the trips will be adjusted to meet the transportation needs and weather windows similar to the FWOP condition helicopter service.

Alternatives 1-3 would accommodate a similar vessel class and allow for utilization of the harbor on Akun. Therefore, differences between FWP benefits are largely dependent on harbor accessibility, focus group response data, and the cost for implementing the alternatives.

Alternatives 1-3 are expected to take a total Pre-construction Engineering and Development (PED) duration of 30 months, and a construction duration of 30 months (consisting of 3 seasonal construction windows of 6 months each) with construction complete by calendar year end 2032. The base year for benefits (project year one) is estimated as 2033.

Alternatives 2 and 3 - Blasting will require an Incidental Take Authorization (ITA) under the MMPA, in the form of an Incidental Harassment Authorization (IHA) (effective up to one year) or an Incidental Take Regulation and subsequent Letter of Authorization (LOA), effective up to five years. Species in the area are managed by both the NMFS and the USFWS. These ITA applications include very detailed construction information normally not available until PED. Endangered Species Act (ESA) consultations occur near the end of the ITA application and issuance process, which means that letters of concurrence with USACE ESA determinations cannot be obtained until near the end of the ITA process. If the ITA process occurs in PED, then the ESA consultation(s) will not be completed during feasibility.

Although cultural resources surveys have been conducted on Akun Island, much of the surrounding area remains unsurveyed. There is an inherent risk for unknown cultural resources to occur at areas conducive to human occupation or activity such as promontories, spits, and deltas. Consultation, as required by Section 106 of the National Historic Preservation Act (NHPA), is underway with the residents of Akutan, the Alaska State Historic Preservation Officer (SHPO), and any other landowners or interested parties. Discussions will help identify further potentially sensitive areas based on local knowledge. Additionally, there are known cultural resources present in some potential project locations that have yet to be evaluated for eligibility on the National Register of Historic Places. Any project impacts to these resources would require formal determinations of eligibility for the NRHP, assessments of effect, and if eligible resources are determined to be adversely impacted by the undertaking, they will require a memorandum of agreement to be drafted to mitigate any adverse effects.

6.1.2 Transportation

6.1.2.1 Akutan-Akun Island Ferry Operations

It is anticipated that the Akutan-Akun Island ferry will be operated as a contract (similar to the existing helicopter contract) and that the vessel would not be owned or operated by the AEB. The ferry would travel between either the Akutan Harbor or City Dock on Akutan to Akun Island (9 and 7 statute miles, respectively) (Figure 42).

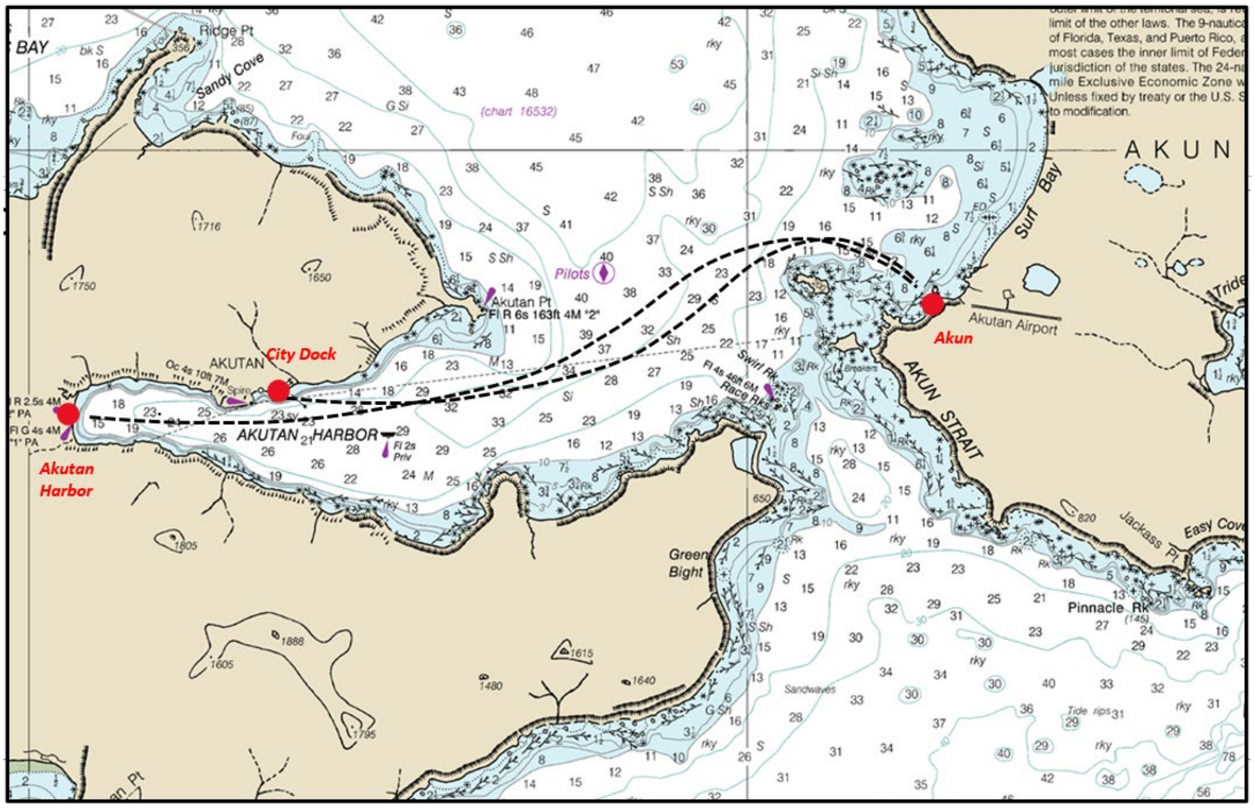


Figure 42. General ferry route between Akutan and Akun Islands

Transportation times of the ferry are estimated to take approximately 20 –50 minutes each way depending on ferry speed (Table 21), plus load and unload times. Compared to 12–18 minutes for a helicopter trip, the trip duration of the ferry would be increased. However, this would be offset by the capacity of the ferry allowing for a single trip to transport a full fixed-wing plane load of passengers (up to 10), luggage, and light freight thereby eliminating the multiple trips required by the helicopter (which transports a maximum of 4 passengers). Due to a lack of data on existing condition delay times and uncertainty, and the offset anticipated between the trip count savings for the marine ferry, transportation and delay times are not further quantified for benefit purposes.

Table 21. Estimated ferry travel times between Akutan and Akun Islands.

Akun Island TSP to:	Distance (miles)	Speed (knots)	Time (minutes)
City Dock	7	10	42
	7	15	28
	7	20	21
Akutan Harbor	9	10	54
	9	15	36
	9	20	27

6.1.2.1.1 Vessel Operating Cost Methodology

Bristol Harbor Group, under a contract with the USACE Marine Design Center (MDC), conducted a ferry vessel cost analysis. Under this effort, they gathered information under various scenarios including a new vessel build and an existing vessel conversion. For a 58-foot design vessel, the costs include an assumption of 2 crew, and a deck anti-icing system.

In addition, daily contract rates for existing applicable vessels from Prince William Sound and Unalaska/Dutch Harbor, Alaska were also gathered and ranged from $3,400 to $4,000 per day or $1.06 to $1.25 million per year, respectively. Information from the MDC estimated a total annual contract cost of $1.35 million per year for an existing vessel with no conversion. Additional information on estimated daily contract rates is available in Appendix C: Economics.

Based on this analysis, annual contract cost estimates for a 58-foot ferry are shown in Table 22.

Table 22. 58-foot Ferry Annual Total Economic Cost Estimates.

	58’ Converted	58’ Existing
Total Annual Contract Cost	$ 1,937,000	$ 1,352,000
Minus non-transportation costs	$ 581,000	$ 406,000
Annual Direct Transportation Costs	**$ 1,356,000**	**$ 946,000**

Source: Bristol Harbor Group

The 58-foot new vessel option was eliminated from further analysis as the converted and existing vessel options are much more likely. Ultimately, given that the ferry will be managed via an annual contract that will be available for bidding, the annual contract cost is unknown. To allow for this uncertainty, the remaining two cost scenarios (a converted vessel, and an existing vessel) form the basis for the transportation cost savings analysis throughout this study.

6.1.2.2 Alaska Marine Highway System Ferry

A focus group held in Akutan in October 2022 was asked whether their AMHS ferry (*M/V Tustumena*) usage would be impacted in any way (positively or negatively) in a

FWP scenario. All respondents indicated that usage of the AMHS ferry is independent of the demand for transportation between Akutan and Akun and would remain unchanged.

6.1.2.3 Fixed Wing Service

While participation in the EAS subsidy must be renewed every two years, no changes to the EAS service are anticipated under FWP conditions.

6.1.2.4 Maritime Aviation Helicopter

In all marine future with-project alternatives, it is assumed that the helicopter service in Akutan would be eliminated and replaced with the marine ferry.

6.1.2.5 Trident Seafoods Transportation Methods

Trident Seafoods in Akutan processes many species, but the primary species by volume and value is pollock from the Bering Sea. The Bering Sea pollock fishery is the largest sustainably certified fishery in the world. It is well managed and has never been closed to fishing. The annual catch limit varies based on abundance but is very stable at approximately 1,000,000 metric tons (~2.2 billion pounds) of harvest per year. A significant decline in the short- or long-term is not anticipated.

Due to uncertainty in the future operations of the Trident Seafoods Akutan processing plant this project was not formulated to incorporate benefits associated with transportation of plant employees.

6.1.2.6 Marine Transportation (Skiff Operations)

In FWP conditions, it is assumed that the residents of Akutan will continue to choose to utilize their personal vessels to access Akun Island at a similar rate when compared to historical and existing conditions, as described in 3.4.5.6. The FWP conditions would allow skiffs to tie off to areas of the dock not being utilized by the ferry, including the outside of the dock, as skiffs are not depth limited. This would eliminate the current practice of having a subsistence user stay behind to monitor the skiff. Skiffs could also be landed on the beach behind the breakwater/harbor, although an outgoing or incoming tide may still require monitoring.

Steady-State Spectral Wave (STWAVE) is a wave energy propagation model that was used for modeling coastal processes. STWAVE modeling was performed for skiff access to determine the wave climate skiffs would be expected to encounter in the harbor and beach behind the breakwater. The sheltering effect of the breakwater can more clearly be seen for both the design condition (2% Annual Exceedance Probability or 50-year wave) in

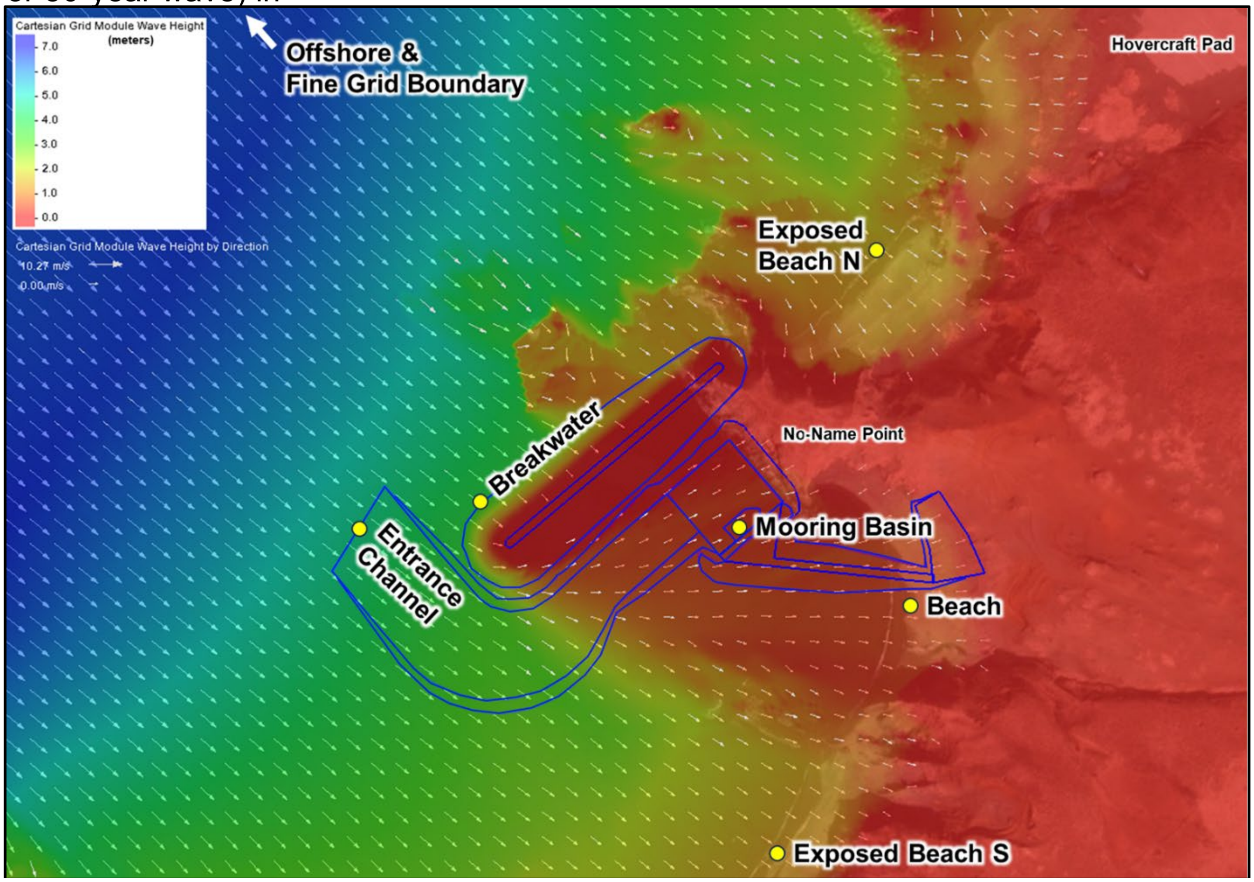


Figure 43 as well as the skiff access condition (

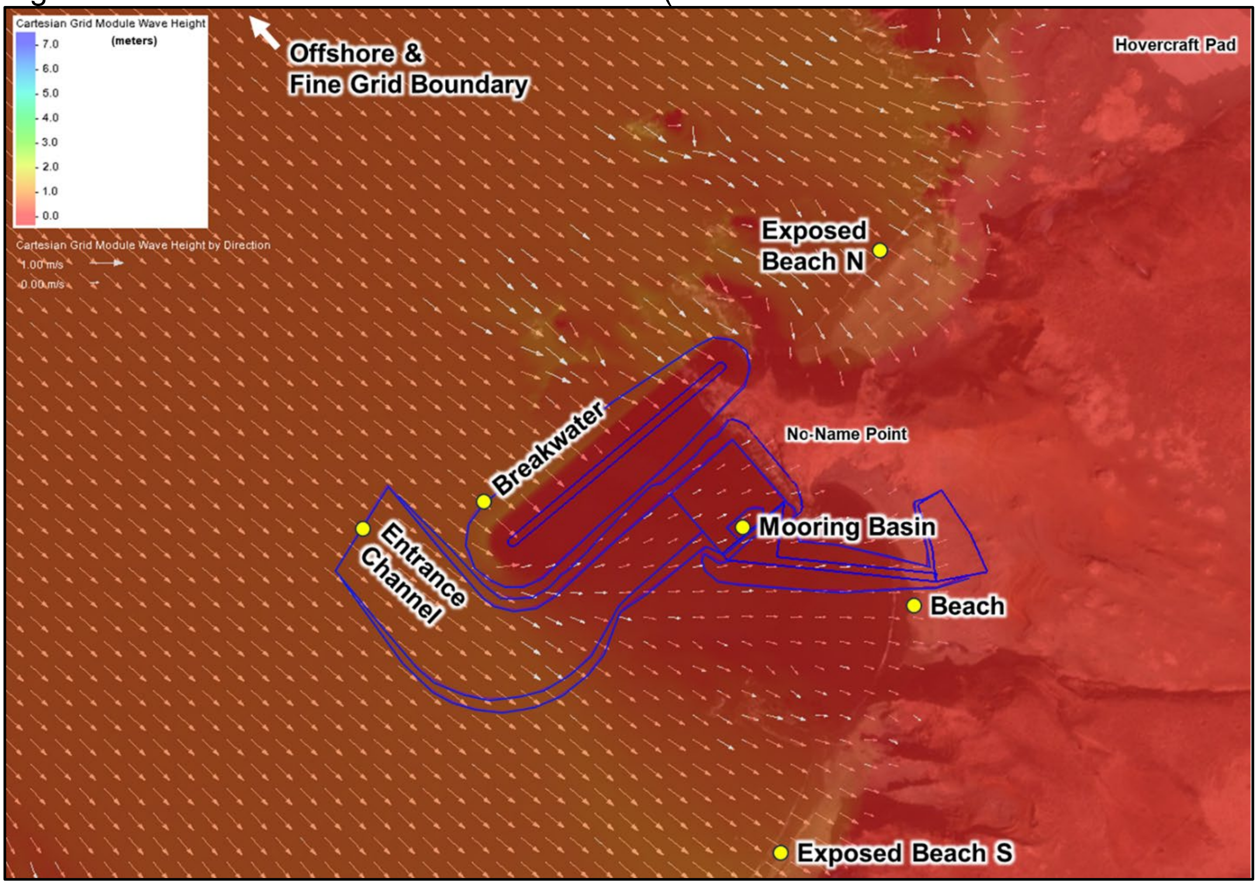


Figure 44).

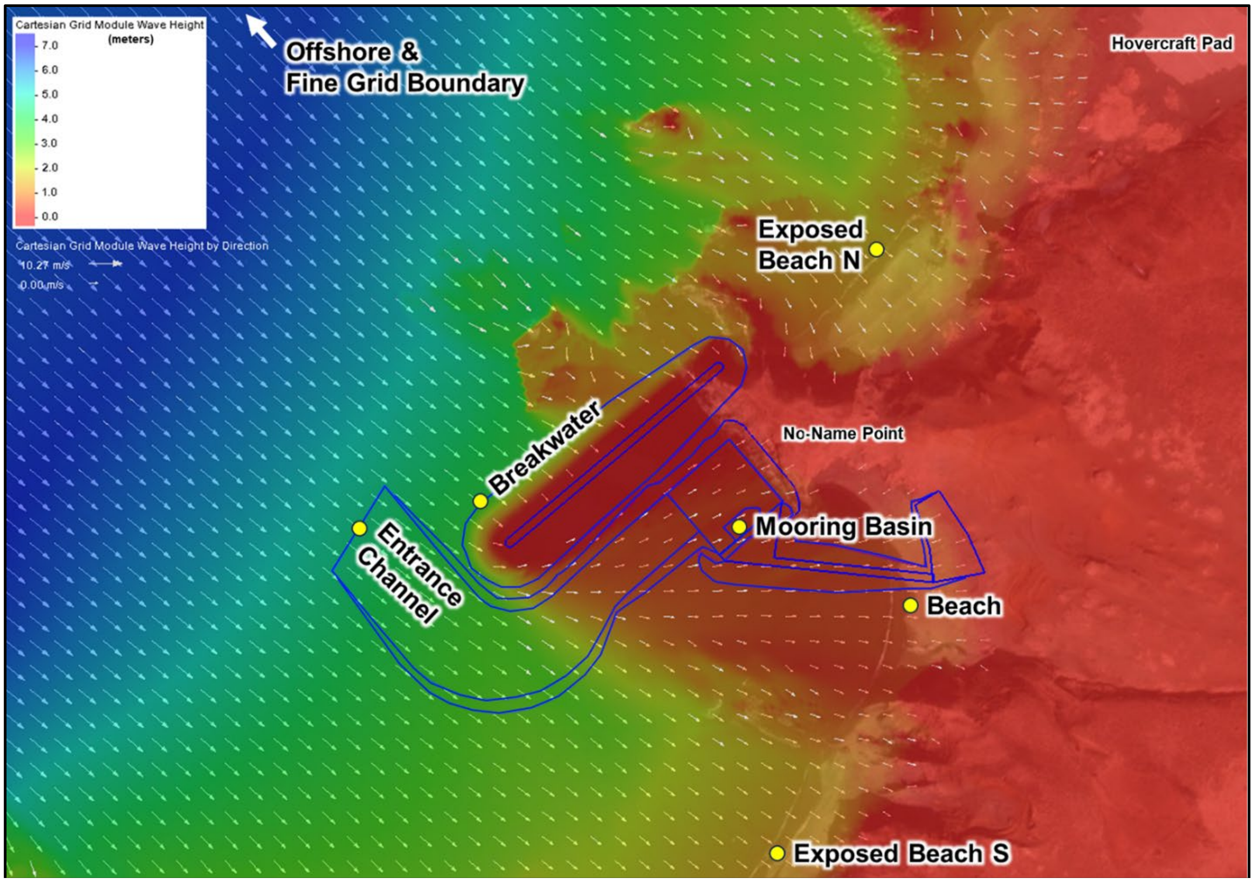


Figure 43. STWAVE Modeling for Design Condition

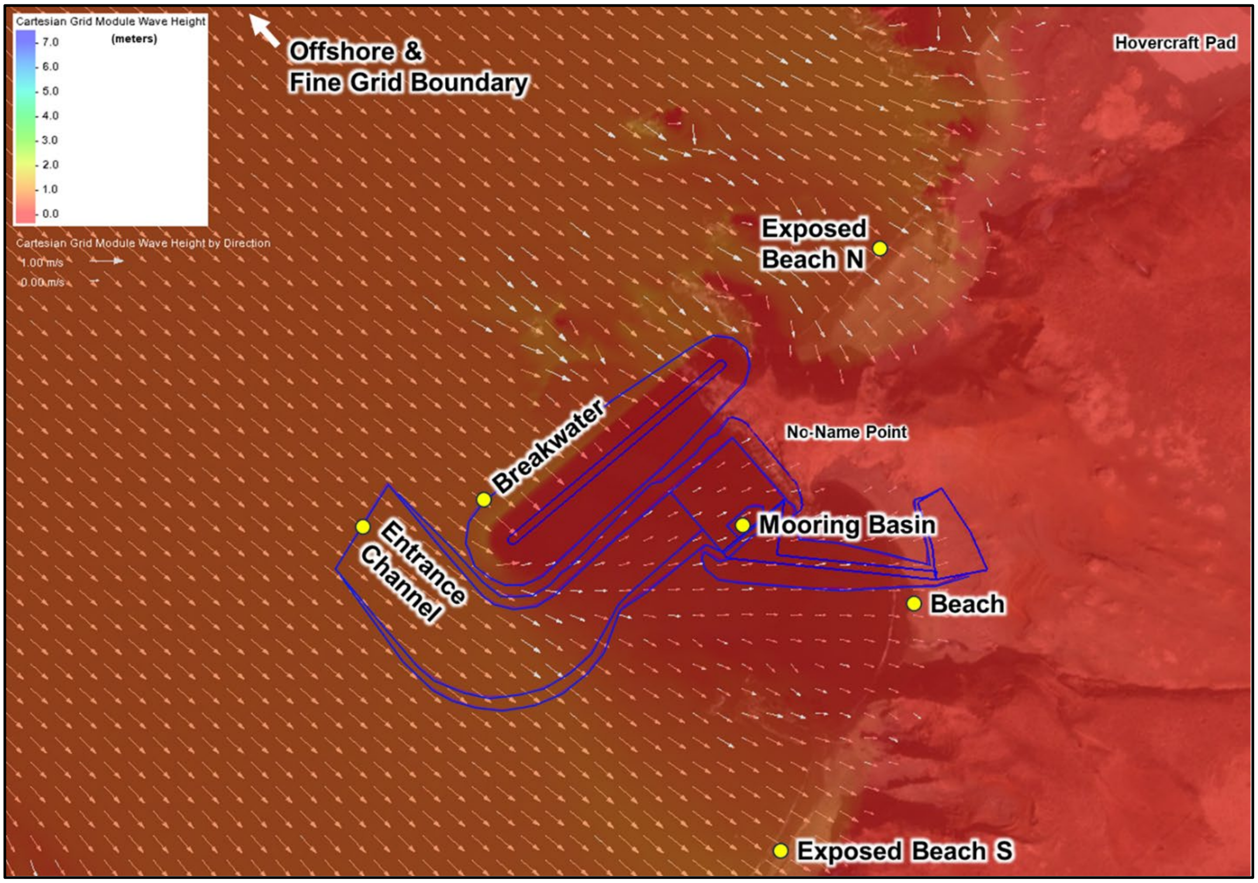


Figure 44. STWAVE Modeling for Skiff Access Condition (SS3)

The maximum operation condition for a skiff is expected to be SS3, with a significant wave height of 2 feet and maximum wave height of 3 feet and winds of 7 to 10 knots. It was found that skiff operators would encounter negligible wave heights at the mooring basin and protected beach behind the breakwater during SS3 conditions, 0.1 foot and 0.2 foot waves respectively (Figure 44). This is contrasted to the modeled 1.4 to 2.4 foot or greater wave heights at exposed beaches to the north and south of the proposed harbor. The protection provided by the harbor would provide an estimated 4.5% improvement in skiff access of Akun, see section 5.4.2 Skiff Operational Conditions for more information.

6.1.3 Fuel and Freight

In FWP conditions, there is the possibility to transfer fuel more cost effectively from Akutan to Akun to support airport operations. In FWP, it is anticipated that fuel would continue to be delivered to Akutan via barge (as occurs in FWOP conditions) with fuel barrels transferred to Akun via the marine ferry rather than the helicopter. As a result of this shift, cost savings in fuel delivery fees could potentially be expected. Fuel volumes transferred to Akun for the airport generators and snow removal equipment is minimal, and any cost savings benefits would be equally captured by all FWP alternatives and therefore is not likely to impact plan selection or significantly alter NED benefit levels.

It is not anticipated that an aircraft refueling system would be installed on Akun in FWP conditions, as interviews with aircraft operators indicated that a fuel system on Akun would be very costly to install and maintain and would require testing to maintain aircraft fuel quality.

6.1.4 Other Social Effects

The Other Social Effects (OSE) account displays plan effects on social aspects such as community resilience, public health, life safety, displacement, energy conservation, and similar effects (ER 1105-2-103). It can often be difficult to quantify a direct link between a navigation project and improvements to the viability of a community, so understanding the unique nature of remote Alaska and how transportation improvements could strengthen the resiliency of the village is critical. For example, navigation efficiency has the potential to reduce transportation cost for fuel and goods. According to the American Society for Civil Engineers Infrastructure Report Card for Alaska, “without safe and efficient access to ports and the ocean, the main regional economic driver in many of our communities is gone” (USACE 2017).

Having affordable and dependable transportation to and from the community will allow both emergency and scheduled medical transport to occur, reducing both risks to life safety and economic costs to community members who could otherwise be impacted while attempting to access medical services in hub communities such as Anchorage and Seattle. Having reliable access to medications and medical supplies could avoid occurrences of some medical emergencies entirely.

However, there are health and safety benefits to the region by having a helicopter stationed on Akutan that could be reduced if the helicopter was no longer serving the community. According to Maritime Aviation, they are frequently involved in medivac transportation (a typical scenario would involve flying a patient from Akutan to Akun where the patient is transferred to a fixed-wing ambulance.) The Coast Guard has also conducted medivacs directly from Akutan using an H-60 or H-65 helicopter. During peak commercial fishing season, the Coast Guard may station a helicopter at Unalaska or Cold Bay (35 and 140 miles away) but most frequently the nearest helicopter is stationed on Kodiak Island (575 miles away – which typically takes about 6 hours by flight). In addition, having a helicopter stationed on Akutan provides an opportunity for medivac and search and rescue (SAR) assistance to neighboring islands. Recently the helicopter was utilized to assist with a SAR operation on Unalaska following a tragic car accident. In a FWP scenario, the helicopter would likely be removed from Akutan, and life safety transportation improvements provided by the ferry could potentially be somewhat offset by increased risks to the region associated with increases in response transportation times by the Coast Guard. However, (while not directly reflected in this analysis or the FWOP conditions assumptions) if funding for the helicopter were not sustained through the study period of analysis, not only would the helicopter be removed from the region, but there would be no effective transportation option that would help fill the gaps which would leave an even more severe situation than faced in FWOP.

A summary of the OSE criteria FWOP condition, the FWP effect and the relevance to long term community viability, along with specific Section 2006 considerations are outlined in Appendix C: Economics.

6.2 Alternative Plan Costs

The USACE Alaska District cost engineers developed Rough Order of Magnitude (ROM) cost estimates for the alternatives, including those to construct and maintain facilities. Appendix D: Cost Engineering details the procedures and assumptions used to calculate the estimates. Cost risk contingencies were included to account for uncertain items such as dredged material disposal or storage methods.

PED costs are based on a percentage of the estimated construction costs. Estimates will be refined as more data is collected, but these data were not available during the initial analyses. These data will be included in subsequent revisions leading to the final Feasibility Report.

Project costs were developed without escalation and are in FY2024 dollars. The ROM costs for each alternative are displayed in Table 23.

Table 23. Alternative Plan Costs, Based on Preliminary Estimates.

Cost Description	Alternative 1	Alternative 2	Alternative 3
Mobilization and Demobilization	$3,139,560	$6,125,320	$6,125,320
Dredging (Drill/Blast/Dredge/Dispose)	$1,907,810	$10,239,710	$12,013,400
LSF: Dredge (Dredge/Dispose)	$65,520	$330,460	$1,007,100
Breakwater	$43,097,000	$14,052,100	$16,985,030
LSF: Uplands (Causeway/Access Road)	$5,970,000	$3,521,400	$3,093,900
Archaeological Monitoring & Mitigation	$566,340	$566,340	$391,684
LSF: Akutan Side: Dock	$1,000,000	$1,000,000	$1,000,000
Real Estate	$75,000	$75,000	$75,000
S&A (17.0%)	$9,476,859	$6,092,006	$6,904,794
PED (13.8%)	$7,692,980	$4,945,276	$5,605,068
Contingency (50%)	$36,495,534	$23,073,806	$26,600,648
Total	**$109,486,604**	**$70,421,417**	**$79,801,944**

PED is expected to occur over a 30-month period. Construction is expected to occur over 3 years consisting of 3 construction seasons, each 6 months in duration, with construction complete by the end of calendar year 2032. The six-month duration assumes that construction will take place in the summer months of May through October when storms are less frequent in the Aleutians. For reference, the Akutan small boat harbor construction took place over 3 seasons with durations of 4, 5, and 7 months. These assumptions inform the interest during construction calculations.

Maintenance dredging and armor rock replacements of varying degrees are assumed for each alternative. Hydraulics and Hydrology (H&H) developed the maintenance intervals and quantities for maintenance dredging and rock replacement. Cost Engineering developed the Operations, Maintenance, Repair, Rehabilitation, and Replacement (OMRR&R) costs. Maintenance dredging consists of three components: mobilization and demobilization, dredge survey, and dredging, and vary by alternative.

While not a maintenance feature, the AEB would continue to be responsible for the contract for transportation between the Akutan Harbor on Akun Island and the Native Village of Akutan until 2032.

As with benefit cash flows, costs are discounted/indexed to a base year and amortized to compare the average annual benefits. As such, the project costs detailed in the Appendix D: Cost Engineering differ slightly from those used in the benefit-cost analysis. Costs used in the benefit-cost analysis include the project's initial cost compounded to the base year using the current discount rate, interest during construction, and estimated operations and maintenance costs. The costs for the benefit-cost analysis are referred to as NED or economic costs. The economic project costs by alternative for the benefit-cost analysis are shown in Table 24.

Table 24. Alternative Cost Estimates (Present Value).

Cost Component	Alt 1	Alt 2	Alt 3
Total Project Construction Cost	$109,388,000	$70,421,000	$79,802,000
Interest During Construction	$3,217,000	$2,070,000	$2,346,000
Operations and Maintenance	$4,185,000	$3,817,000	$3,739,000
Total Economic Cost	**$116,789,000**	**$76,308,000**	**$85,887,000**
Average Annual Equivalent Economic Cost	**$4,326,000**	**$2,827,000**	**$3,181,000**

Each alternative was evaluated to determine how well it met the project objectives to provide sustainable, safe, reliable access to Akutan and to improve key service operations such as mail and medical supplies between Akun Island and the Native Village of Akutan. The alternatives also met the four P&G evaluation criteria outlined in Section 2.7 and evaluated in Section 5.6. Current laws, regulations, policy, and guidance were incorporated into the development of the alternatives to ensure acceptability, completeness, effectiveness, and efficiency.

6.3 Project Benefits

Each alternative provides a certain amount of relief from existing and expected future inefficiencies. From a NED perspective, the differences between the FWOP conditions and those that will occur under the various With Project Conditions are benefits that accrue to the project and together with cost data inform the identification of the Recommended Plan. As mentioned at the outset, the Remote and Subsistence Harbors Authority allows for plan justification under a non-NED Framework: Other Social Effects.

6.3.1.1 Transportation Cost Savings

Transportation cost savings are computed as the difference between the direct transportation cost portion of the annual contract costs for both the helicopter (FWOP) and the estimated marine ferry. Non-transportation related costs built into the contracts such as profit, financing charges, administration staff, office rent, office supplies, utilities, and miscellaneous overhead costs are expected in support of the transportation services, however they are eliminated from the transportation cost savings portion of the economic analysis as they are not direct transportation costs.

It is further assumed that the contract costs utilized are reasonable. The amounts in FWOP are reflective of what is spent on those transportation services for the helicopter, the ferry contract amounts in FWP are an estimate calculated by the MDC and supported by readily available daily contract rates of similar vessels and includes a range of costs to allow for some uncertainty. Given that the transportation in Akutan is heavily subsidized, it is a reasonable assumption that the DOT would not support the subsidy rate if it included unreasonable fees or price gouging due to low competition rates.

6.3.1.0 Total Project NED Benefits

Total project NED benefits are presented in Table 25 and include a range of values to reflect uncertainty.

Table 25. NED Benefits by Alternative (Present Value).

	Alt 1		Alt 2		Alt 3	
Description	**Low**	**High**	**Low**	**High**	**Low**	**High**
Present Value Benefits	$9,773,00	$20,842,000	$9,773,000	$20,842,000	$9,773,00	$20,842,000
Average Annual Benefits	$362,000	$772,000	$362,000	$772,000	$362,000	$772,000

6.4 Four Accounts

The USACE planning guidance establishes four accounts to facilitate and display the effects of alternative plans. The following four accounts facilitate the evaluation and presentation of the effects of alternative plans. The first is the NED account, which displays changes in the economic value of the national output of goods and services. Next, the Regional Economic Development (RED) account displays changes in the economic value of the regional output of goods and services. The third account is Environmental Quality (EQ), which displays non-monetary effects on ecological and aesthetic resources, including the positive and adverse effects of plans. The last account is the OSE account, which displays plan effects on social aspects such as community impacts, health and safety, displacement, and energy conservation. A full discussion of the four accounts can be found in Appendix C: Economics.

6.4.1 National Economic Development Analysis

6.4.1.1 Net Benefits and Benefit-Cost Ratios

Net benefits and the Benefit-Cost Ratios (BCR) are determined using the average annual benefits and average annual costs for each alternative (Table 26). Net benefits are determined by subtracting the average annual costs from the average annual benefits for each alternative; the BCR is determined by dividing average annual benefits by average annual costs.

Table 26. NED Net Benefits and BCRs by Alternative.

	Alt 1		Alt 2		Alt 3	
Description	**Low**	**High**	**Low**	**High**	**Low**	**High**
Average Annual Benefits	$362,000	$772,000	$362,000	$772,000	$362,000	$772,000
Average Annual Costs	$4,326,000	$4,326,000	$2,827,000	$2,827,000	$3,181,000	$3,181,000
Net Average Annual Benefits	$(3,964,000)	$(3,554,000)	$(2,465,000)	$(2,055,000)	$(2,819,000)	$(2,409,000)
BCR	0.08	0.18	0.13	0.27	0.11	0.24
Most Likely (Average) Net AAEQ Benefits	**$(3,759,000)**		**$(2,260,000)**		**$(2,614,000)**	
Most Likely (Average) BCR	**0.13**		**0.20**		**0.18**	

The alternative that reasonably maximizes net benefits would typically be the recommended alternative under the NED account, particularly when the BCR is greater than 1.0 (when benefits exceed costs). In this case, no alternative has NED benefits exceeding costs. However, Alternative 2 has the highest net NED benefits on both the lower and upper ends of the benefits range.

6.4.2 Regional Economic Development

The economic benefits that accrue to the region, but not necessarily the nation, include developing consistent, reliable, and affordable transportation to the Native Village of Akutan. Without affordable access in and out of the community, the long-term viability of the community is threatened, and potential local and regional economic opportunities may not be realized.

Functioning infrastructure may also result in transfers of economic activity from other regions to the region where the proposed project is located due to the project efficiencies. These represent regional economic gains to the project region but may cause losses to other regions (shifting of the economic activity from one region to another). The area of regional impacts will vary depending upon the type and scope of the project, and due to the unique nature of the transportation network and the project formulation, no significant regional transfers of economic activity are anticipated for Akutan.

6.4.3 Environmental Quality (EQ)

For each alternative plan, positive and negative benefits to the environment must be analyzed consistent with current guidance. The benefit assessment can be quantitative or qualitative and, if appropriate, monetized. The analysis must distinguish between national and regional benefits while ensuring benefits are not accounted for more than once.

The FWOP condition would result in continued air travel between the Akutan Airport on Akun Island and Akutan Island by helicopter. The extent to which marine mammals and birds are affected by this are unknown, but some level of disturbance when the helicopter is low during takeoff and landing is possible.

Environmental effects, both positive and negative, are similar among all three FWP alternatives. All alternatives would place fill over existing benthic habitat and dredge adjacent benthic habitat. The area inside the breakwaters would be converted to a lower energy environment, but the areas are small overall when compared to overall coastal habitat on Akun Island. Confined underwater blasting would be required for alternatives 2 and 3 which would lead to greater impacts to fishes and marine mammals, although the impacts are of short duration and would be mitigated to the extent possible by timing windows and shutdown distances. All three alternatives would introduce additional vessel traffic between Akutan and Akun and this would increase underwater noise and the risk of vessel strikes to marine mammals. These potential impacts could be mitigated by observing for marine mammals and altering course and speed as required to avoid vessel strikes. All three alternatives would eliminate helicopter flights and remove this source of potential disturbance. All three alternatives would impact a known historic property (the Surf Bay Archaeological District).

6.4.4 Other Social Effects

6.4.4.1 Cost Effectiveness/Incremental Cost Analysis

Section 6.3.1 presented the NED analysis and demonstrated that there is no NED Plan. In accordance with the Section 2006 Authority, the CE/ICA is conducted to evaluate the effects of the proposed alternatives beyond the NED perspective. These effects are non-monetary outputs. The CE/ICA is utilized to inform decisions on sound investments by identifying options that yield maximum desired outputs for the least acceptable cost. The selected outputs are measured in Access Capability for the marine ferry as served by navigation improvements. This section first describes the development of the CE/ICA variables, the underlying assumptions, and Hydraulics and Hydrology (H&H) modeling that form the basis of the outputs or metric. It then discusses the computations and CE/ICA results completed utilizing the Institute of Water Resources (IWR) Planning Suite II tool.

6.4.4.1.1 CE/ICA Framework

The project objectives are to improve the long-term community viability of the Native Village of Akutan, provide sustainable, safe, and reliable access to Akutan by improving key service operations such as the transportation of passengers, goods, mail, and medical supplies between the Akutan Airport on Akun Island and the Native Village of Akutan on Akutan Island over the 50-year period of analysis. The basis of the outputs used in this CE/ICA is rooted in those planning objectives.

Access Capability directly impacts waterborne transportation for Akutan, particularly given the integral significance that the ability to access the island of Akun and their airport has to the long-term viability of the community. This metric was chosen rather than Access Days due to the varying factors such as transportation of people, freight, and mail; the complexity involved in coordinating fixed wing flights between Unalaska and Akun with transportation between Akun and Akutan (via FWOP helicopter or FWP ferry), along with additional considerations such as safety (including delivery of essential medications and medivacs) and subsistence (ability to access current resources and benefits associated with FWP alternative sites). A metric encompassing all factors was critical for the OSE analysis to reflect the complexity of FWOP and FWP conditions. Therefore, the optimal metric for the CE/ICA is Access Capability. The CE/ICA metric compares the accessibility between the proposed alternative plans and the No Action alternative.

The OSE analysis operates similarly to the analysis undertaken to choose a National Ecosystem Restoration plan. ER 1105-2-100 states:

> When selecting a single alternative plan for recommendation from all those that have been considered, the criteria used to select the National Ecosystem Restoration (NER) plan include all the evaluation criteria discussed above. Selecting the NER plan requires careful consideration of the plan that meets planning objectives and constraints and reasonably maximizes environmental benefits while passing tests of cost effectiveness and incremental cost analyses, significance of outputs, acceptability, completeness, efficiency, and effectiveness.

While the above regulation refers to NER and environmental benefits, it is the same guiding principle for the OSE benefits under which this study is authorized. As such, the development and application of the CE/ICA tools to determine the recommended plan comply with the above guidelines.

The Alaska District H&H collaborated with Economics, Planning, and Project Management on the development of the model metric and model input.

6.4.4.1.2 Variable Descriptions

The CE/ICA in this analysis considers two variables, non-monetary outputs and cost. The non-monetary outputs are measured in Access Capability. The terms output and metric are interchangeable in this report.

Access Capability is defined as percentage of time that the design vessel (marine ferry) can safely access and moor at the proposed navigation improvements, or the helicopter can safely operate between the islands. Access Capability is the non-monetary metric used in this CE/ICA. Safe access represents the percentage of time that the weather conditions meet the safety requirements for each alternative.

Safe ferry access is based on wave and water level conditions at the proposed alternatives and is controlled by the safe operating conditions for the design vessel. The H&H Appendix (Appendix A) details the methodology used to determine the wave and water level conditions. Hindcast wind and wave data was used to estimate the percent of time that the wave conditions at the sites and the entrance of the proposed navigation improvements would have exceeded the safe operating conditions of the design vessel. Transportation to and from the airport occurs year-round for Akutan, and marine accessibility for the airport is similarly evaluated annually.

For purposes of this analysis, the baseline FWOP Access Capability (estimated at 69.6% for the Bell 206 helicopter) is subtracted from the FWP Ferry Access Capability at each alternative. See Appendix C: Economics for additional information.

Table 27. Access Capability Metric.

Alternative	Total Access Capability	Access Capability above FWOP
FWOP – Bell 206 Helicopter	69.6%	0.0%
Alternative 1	77.7%	8.1%
Alternative 2	77.7%	8.1%
Alternative 3	77.7%	8.1%
Alternative 4 - Larger Helicopter (Bell 412)	71.9%	2.3%

The cost-effectiveness analysis evaluates a plan’s level of outputs against its cost. The subsequent incremental cost analysis evaluates a variety of alternatives of different scales to arrive at a “Best Buy” option. Best Buy plans are considered the most efficient plan which provides the greatest increase in output for the least increase in cost. These analyses help to inform whether the next unit of benefit is “worth it”.

The costs variable for a CE/ICA refer to the average annual equivalent costs (AAEQ) of each alternative. These costs include project costs, interest during construction, and operation and maintenance costs, and the operation cost of the heli/ferry for each alternative. The costs are amortized using the federal discount rate for FY24 over the period of analysis.

IWR Planning Suite locks the cost variable of the FWOP alternative at zero. Because of that, for purposes of this analysis, the baseline FWOP average annual cost (estimated at $2.29M for the Bell 206 helicopter) is subtracted from the FWP average annual cost for each alternative. Since the CE/ICA is considering project costs, the total estimated annual contract rates are utilized rather than only the portions that are direct transportation costs. The annual average costs used in the CE/ICA are summarized in Table 28 and Table 29.

Table 28. Average Annual Costs for CE/ICA by Alternative.

Cost Component	Alt 1	Alt 2	Alt 3
Total Project Construction Costs	$109,388,000	$70,421,000	$79,802,000
Interest During Construction	$3,217,000	$2,070,000	$2,346,000
Operations and Maintenance	$4,185,000	$3,817,000	$3,739,000
Total Economic Cost	**$116,789,000**	**$76,308,000**	**$85,887,000**
Average Annual Equivalent Cost	**$4,326,000**	**$2,827,000**	**$3,181,000**

Table 29. Annual Cost Metric for CE/ICA.

Alternative	**Annual Contract Cost ($1000)**	**AAEQ Project Cost ($1000)**	**Total AAEQ Cost above FWOP Used for CE/ICA** (Total Cost for Each Alt minus FWOP)
FWOP – Bell 206 Helicopter	$ 2,290	$ 0	$ 0
Alternative 1	$ 1,645	$ 4,326	$ 3,681
Alternative 2	$ 1,645	$ 2,827	$ 2,182
Alternative 3	$ 1,645	$ 3,181	$ 2,536
Alternative 4 - Larger Helicopter (Bell 412)	$ 4,406	$ 0	$ 2,116

6.4.4.1.2. CE/ICA Calculations and Results

The CE/ICA consists of four steps. The first is to estimate the average annual benefits of each alternative. These average annual benefits are the non-monetary units measured through the access capability metric. The second step is to estimate the average annual equivalent economic costs of the alternative plans. The first two steps are completed in the previous subsections. The third and fourth steps use the IWR Planning Suite II software to identify cost-effective plans and estimate incremental cost outputs, respectively.

6.4.4.1.2. Cost Effectiveness

The cost-effective analysis results showed that FWOP, Alternative 2 and Alternative 4 are cost-effective. The incremental cost analysis yielded that the No Action (FWOP) and Alternative 2 are the only Best Buy (most efficient) plans. A summary of the CE/ICA variables and the cost-effectiveness analysis results are shown in Table 29.

Table 30. CE/ICA Results Summary.

Alternative	Change in Access Capability (above FWOP)	Change in Average Annual NED Cost ($1000) (above FWOP)	Average Annual Cost per Unit of Access Capability ($1000/Access Capability)	Cost-Effective
No Action (FWOP)	0.0%	$ 0	$ 0	Best Buy
Alt 1	8.1%	$ 3,681	$ 454.4	Non-Cost Effective
Alt 2	8.1%	$ 2,182	$ 269.4	Best Buy
Alt 3	8.1%	$ 2,536	$ 313.1	Non-Cost Effective
Alt 4	2.3%	$ 2,116	$ 920.0	Cost Effective

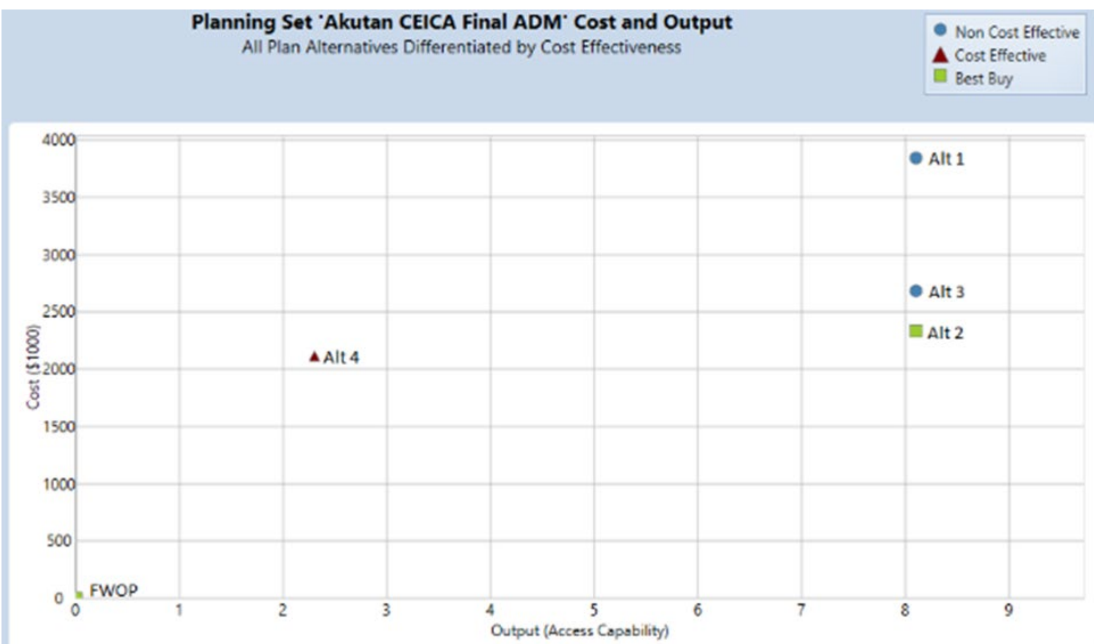


Figure 45: Alternatives Differentiated by Cost-Effectiveness.

Figure 45 illustrates the CE/ICA concept well. Cost effectiveness analysis is conducted to ensure that the least cost alternative is identified for each possible level of environmental output; and that for any level of investment, the maximum level of output is identified. In Figure 45, when comparing Alternative 1 2, and 3, all provide the same level of Access Capability but Alternative 2 does so at a lesser cost. When comparing Alternative 2 and Alterative 4, Alternative 2 outperforms Alternative 4 by having a significantly higher level of Access Capability at very similar cost. The No Action (FWOP) is always considered cost effective since it also meets the criteria of being the least cost ($0) plan for the given level of output (which is also zero). As no other alternative provides greater benefits at a lesser cost, Alternative 2 and No Action (FWOP) are the two Best Buy plans.

6.4.4.1.2. Incremental Cost Analysis

The Incremental Cost Analysis is performed by determining the incremental cost per unit between successively larger Best Buy plan alternatives, which helps answer the question of whether the next unit of benefit is “worth it”. The Cost-Effective Analysis identifies the No Action (FWOP) and Alternative 2 as the two Best Buy plans to be compared by the incremental cost analysis. The Incremental Cost Box Graph in Figure 46 displays the Best Buy plan comparisons resulting from the incremental cost analysis and the incremental cost per unit for Access Capability provided by Alternative 2, as there is no incremental cost or output for No Action.

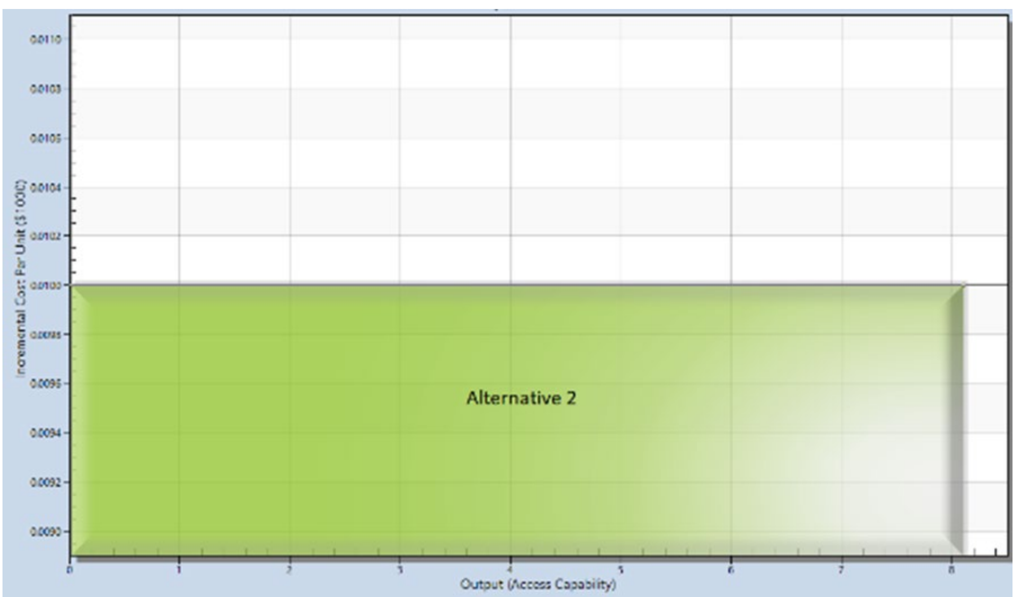


Figure 46: Incremental Cost Analysis of Best Buy Plans.

The gain in access capability (i.e., non-monetary outputs) relative to the increase in cost for each cost-effective alternative is shown in Table 30 and further illustrates that Alternative 2 significantly outperforms Alternative 4.

Table 31. Incremental Cost Analysis of Cost-Effective Plans.

Alternative	Change in Access Capability (above FWOP)	Incremental Cost ($1000)	Incremental Output (Access Capability)	Incremental Cost per Output ($1000)
No Action (FWOP)	0.0%	$ 0	0.0	$ 0
Alt 2	8.1%	$ 66	5.8	$ 11.8
Alt 4	2.3%	$ 2,116	2.3	$ 920.0

Note: As per ER 1105-2-100, Appendix E, Section E36(c)(5)(a), only cost-effective plans are presented in this table.

To allow for uncertainty, in addition to the CE/ICA already presented, six additional scenarios were also computed including a reduction to the annual cost of transportation services to accommodate a potential drop in transportation demand and subsequently trip counts in FWOP (potentially associated with a Trident processing plant closure). In all scenarios the only best buy plans were FWOP and Alternative 2 (matching the analysis that was previously presented). In some scenarios Alternative 4 was found to be cost effective, but not a best buy in any of those scenarios. Additional information can be found in the Economic Appendix, Section 7.9.1

Due to Alternative 4 (the larger helicopter) being outperformed in every metric, it was screened from further analysis following the CE/ICA.

6.4.4.1 Multi-Criteria Decision Analysis

While Access Capability is the optimal metric representing the opportunity for safe access at each alternative plan, the metric alone inadvertently assumes all alternatives provide a uniform level of benefits for that access. By this assumption, the nuances of benefits and their contribution to community viability are not fully captured within that metric. In these cases, Multi-Criteria Decision Analysis (MCDA) can be used to account for these OSE benefit intricacies. The specific OSE metrics which impact community viability are described in detail and qualitatively discussed in Section 6.1.4.

MCDA has great value for providing a method and structure for informed discussions of the relevant conflicts and values between potential alternatives. MCDA is a decision aiding tool and allows for clarification and conveyance of tradeoffs across alternatives. It can serve to demonstrate that the final decision is informed through a rational process fully cognizant of stakeholders' criteria (Trade-Off Analysis Planning and Procedures Guidebook, IWR 02-R-2), and it is important to understand that MDCA is a decision-making aid, not a decision in itself.

The selection of criteria for the MCDA is based on key benefits that support community viability and meet the planning objectives. These criteria were formulated throughout the study process and then vetted and revised during a community focus group consisting of key stakeholders. Participants at the focus group were selected from a wide-ranging pool of village residents with the aim to have representation from all elements of the community (i.e., skiff owners, retired and current commercial fishermen, elected government officials and representatives, tribal members, and Village/Regional corporation members. In all, a total of nine key community members were invited to the focus group and every invited individual attended. Table 31 presents the OSE criteria selected for the MCDA.

Table 32. MCDA OSE Criteria.

Criteria 1	Health and Safety
Criteria 2	Subsistence
Criteria 3	Delivery of Essential Non-Medical Goods
Criteria 4	Cultural Identity (non-food gathering cultural practices)
Criteria 5	Income Opportunities
Criteria 6	Community Growth/Expansion
Criteria 7	Transportation Mode Preferences
Criteria 8	Local Vessel Access

6.4.4.1.1 Assigned Quantitative Values

The MCDA follows the methodology set out in the IWR Planning Suite II User Guide (USACE 2017). Weighted Scoring is utilized as the ranking method for this analysis as it is simple, intuitive, and the most commonly used method. Under weighted scoring, qualitative criteria such as those presented in the preceding Table 31 are each assigned a quantitative score (by alternative) and weight (by criteria). Each criterion represents a measured quantity in the MCDA decision matrix.

MCDA involves optimizing criteria, whereby the minimization of undesirable effects and maximization of desirable effects are considered. Since the selected criteria represents a benefit that supports community viability, a maximization of each criterion is considered favorable.

It is acknowledged that assigning values to criteria has some limitations, for example a *Medium* ranking is almost twice that for the Low ranking. However, for the level of analysis for the MCDA, it was determined that ranking values by the focus group was appropriate.

Alternative sites were utilized for the MCDA scoring rather than alternatives in this case. This was done for two reasons. First, it was determined that sites would be the primary driver for differences between scores of alternatives. Second, scoring the potential alternative sites rather than specific alternatives enables the outputs from the focus group to remain valid even if alternative designs are subsequently optimized.

Each focus group participant conducted scoring of each criterion from 1 to 10 (with 1 being the lowest, and 10 being the highest) based on the individual's best knowledge of the conditions and how well the proposed site would meet the planning objectives. The criteria rankings clarify the incremental benefits of Access Capability across alternatives. Additional information on criteria scores is included in Table 32.

Table 33. MCDA Criteria Scores.

		Total Score by Criteria Each participant scored from 1 (low) to 10 (high)			
Criteria #	**Description**	**FWOP**	**Alternative 1**	**Alternative 2**	**Alternative 3**
Criteria 1	Health and Safety	78	89	89	26
Criteria 2	Subsistence	49	70	70	28
Criteria 3	Delivery of Essential Non-Medical Goods	70	89	89	38
Criteria 4	Cultural Identity (non-food gathering cultural practices)	49	77	77	31
Criteria 5	Income Opportunities	47	82	82	26
Criteria 6	Community Growth/Expansion	45	79	79	32
Criteria 7	Transportation Mode Preferences	62	87	87	28
Criteria 8	Local Vessel Access	38	73	73	41

Not all criteria are equally important to the decision. With criteria defined and scored, each was then individually weighted (from low to high) based on the focus group participants best knowledge of the conditions and how important each criterion is to community viability.

Following the focus group, the criteria were then transformed numerically using the following: low equal to a weight of 1, medium-low equal to 2, medium equal to 3, medium-high equal to 4, and high equal to 5. These numerical weights were then summed and averaged to determine a weight for each criterion. In addition to the OSE criteria, the CE/ICA metrics of Access Capability and Average Annual NED Cost were included in the MCDA with a weight of 5 to account for the need of reliable and affordable access within the MCDA. Additional information on criteria weights is included in Table 33.

Table 34. MCDA Criteria Weights.

Criteria #	Description	Criteria Weight (1 = low, 5 = high)	Criteria Rank (by Importance)
Criteria 1	Health and Safety	5.00	1
Criteria 2	Subsistence	4.78	4
Criteria 3	Delivery of Essential Non-Medical Goods	4.00	6
Criteria 4	Cultural Identity (non-food gathering cultural practices)	4.00	6
Criteria 5	Income Opportunities	3.78	8
Criteria 6	Community Growth/Expansion	3.44	10
Criteria 7	Transportation Mode Preferences	3.78	8
Criteria 8	Local Vessel Access	4.22	5
From CE/ICA	Average Annual NED Cost	5.00	1
From CE/ICA	Access Capability	5.00	1

6.4.4.1.2 MCDA Ranking Results

For purposes of the MCDA, the score for criteria was calculated as the change from FWOP to FWP for each alternative. The two criteria that were previously utilized in the CE/ICA (Access Capability and AAEQ Cost) are also included for the MCDA.

The MCDA aims to support and unpack the complexities within the single metric of access capability. Weights and scores were analyzed within the MCDA module of the IWR Planning Suite II software utilizing weighting scoring by range (as recommended within the IWR Planning Suite users guide). Utilizing this technique, for this portion of the analysis the tool assigns the poorest performance of each criterion a value of zero. Given the desire to minimize cost, for this analysis the poorest performance for the cost criteria is the highest cost plan (Alternative 1) and it is therefore assigned a zero value. Given the desire to maximize all other criteria, for this analysis the poorest performance (lowest scores) across all other criteria is Alternative 3 and therefore they are given zero values. Figure 47 shows the MCDA criteria outputs by Alternative, and the subsequent alternative rankings.

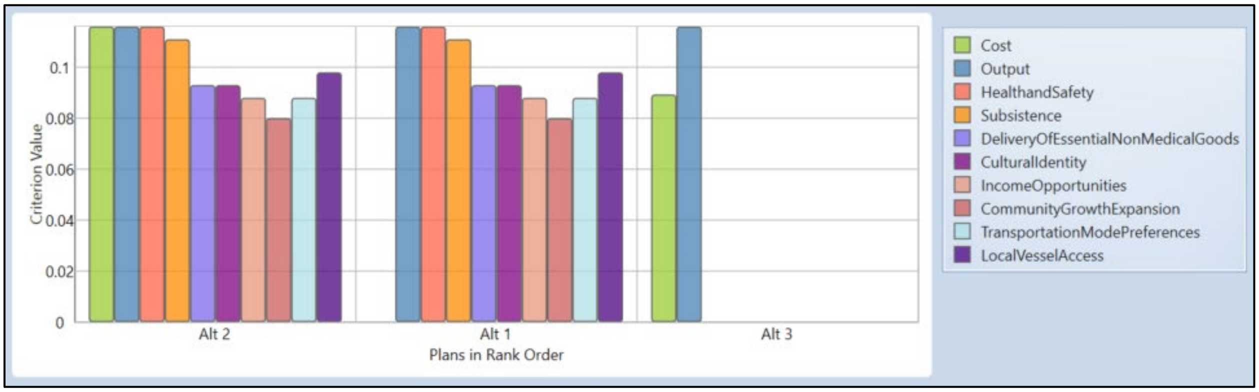


Figure 47. MCDA Criterion Weighted Scoring by Range Outputs by Alternative.

Alternative 2 scores highest in the MCDA analysis, with Alternative 1 following close behind and Alternative 3 a distant third. The alternative plan scores are normalized by range, with each score varying from 0 to 1. See Figure 48 and Table 34 for additional information.

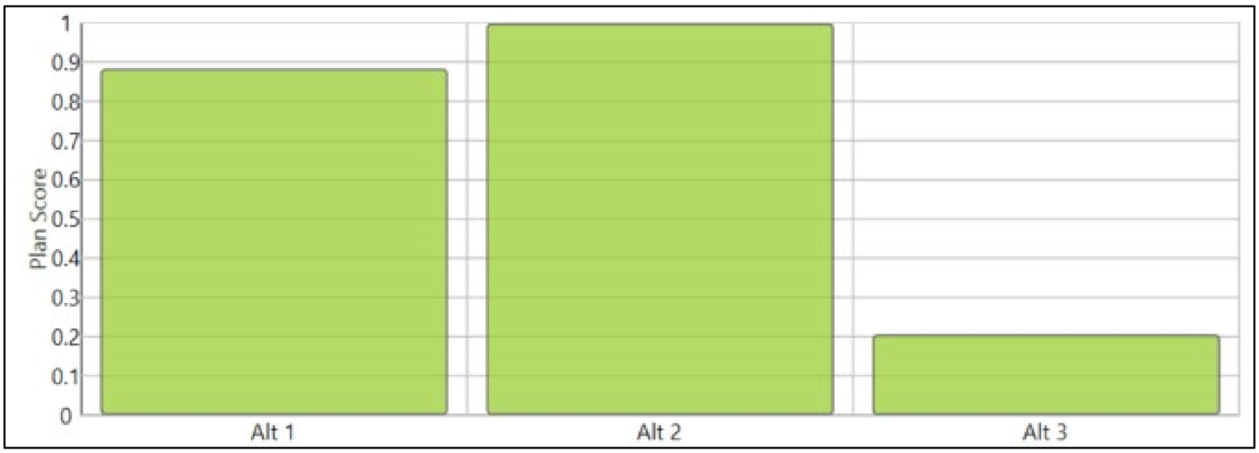


Figure 48. MDCA Plan Outputs by Alternative.

Table 35. MCDA Scored Values by Alternative.

Alternative	MCDA Score	MCDA Rank
Alt 1	0.9	2
Alt 2	1.0	1
Alt 3	0.2	3

6.5 Four Accounts Evaluation Summary

The alternatives were evaluated using the four accounts established in the Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies: National Economic Development, Regional Economic Development, Environmental Quality, and Other Social Effects.

Consistent with Section 2006 of WRDA 2007 – Remote and Subsistence Harbors, as amended, a NED analysis was performed, which demonstrated that none of the alternatives had a BCR greater than 1.0. Since there was no NED plan, CE/ICA was used to inform plan selection. Additionally, the MCDA tool was used to aid in capturing the incremental value of the CE/ICA metric of Access Capability. Economic risks and uncertainties were identified and discussed to support risk-informed planning and decision-making under uncertainty.

Alternative 2 had the highest average annual net NED benefits, however the BCR is below 1.0. The No Action and Alternatives 2 were identified as Best Buy plans through the CE/ICA, meaning Alternative 2 provides the greatest increase in output for the least increase in cost. The results of the MCDA similarly pointed to Alternative 2 as the best option. The CE/ICA with the MCDA for OSE benefits demonstrate how the proposed alternatives support Akutan's long-term viability. For additional information see Table 35.

Table 36. Four Accounts Evaluation Summary.

Alternative	Benefit-Cost Ratio	AAEQ Net NED Benefits	EQ	RED	OSE (CE/ICA results, MCDA Rank)	
No Action (FWOP)	0.00	$ 0	Neutral	Neutral	Best Buy	NA
Alt 1	0.08 to 0.18	$(3,964,000) - $(3,554,000)	Neutral	Increased employment and income for the region and state	Non-Cost Effective	2
Alt 2	0.13 to 0.27	$(2,465,000) - $(2,055,000)	Neutral	Increased employment and income for the region and state	Best Buy	1
Alt 3	0.11 to 0.24	$(2,819,000) - $(2,409,000)	Neutral	Increased employment and income for the region and state	Non-Cost Effective	3

In addition to the traditional 4 accounts analysis, strengths, and weaknesses of each of the potential alternatives were analyzed to further confirm that the correct alternative is being recommended.

Table 37. Strengths and Weaknesses by Alternative.

Alternative	Strengths	Weaknesses
No Action (FWOP)	• Limits future uncertainty.	• Does not meet the goals and objectives of the study. • High cost of helicopter contract will remain a burden to both the community and the federal government (through EAS subsidy) • Critical community needs including Health and Safety; Subsistence; Delivery of Essential Non-Medical Goods; Cultural Identity (non-food gathering cultural practices); Income Opportunities; Community Growth/Expansion; Transportation Mode Preferences; and Local Vessel Access will remain unmet, putting long-term community viability in jeopardy.
Alt 1	• Community support for site location. • No blasting required. • High Access Capability	• Highest Cost • Largest project footprint due to alternative being located in the highest energy wave environment. • Requires a 1,100-foot road to be constructed to access the harbor.
Alt 2	• Community support for site location. • Lowest Cost Alternative • Highest Net Benefits • High Access Capability	• Requires blasting and ESA/MMPA exception. • Requires a 1,100-foot road to be constructed to access the harbor.
Alt 3	• Shortest road required to access the harbor because alternative is located adjacent to the existing hovercraft pad and road.	• Significant community concerns with site location proximity to subsistence salmon stream and upland subsistence camp properties. • Lowest Access Capability • Requires blasting and ESA/MMPA exception.
Alt 4	• No construction necessary • Similar to the FWOP	• AEB will be cost-sharing EAS until 2032. • Does not provide for increased vessel access to Akun Island • One-quarter the Access Capability of harbor alternatives.

6.6 Comprehensive Documentation of Benefits Policy Directive Requirements

Consistent with the 5 January 2021 Policy Directive on Comprehensive Documentation of Benefits in Decision Document, each study must include, at a minimum, the following plans in the final array of alternatives for evaluation:

1. The “No Action” alternative.
2. A plan that maximizes net total benefits across all benefit categories.
3. A plan that maximizes net benefits consistent with the study purpose.
4. For flood-risk management studies, a nonstructural plan, which includes modified floodplain management practices, elevation, relocation, buyout/acquisition, dry flood proofing and wet flood proofing.
5. A locally preferred plan, if requested by a non-federal partner, if not one of the aforementioned plans.

For Akutan, a “No Action” alternative is included so the first requirement is met. Additionally, the same plan (Alternative 2) meets the criteria for both item two and item three in the guidance. The fourth and fifth criteria do not currently apply as this is not a flood-risk management study and the sponsor has expressed support for Alternative 2.

7. RECOMMENDED PLAN

The guiding principles of federal trust responsibility that are the basis of the USACE Civil Works Tribal Consultation Policy includes six USACE Tribal Policy Principles: Tribal sovereignty; trust responsibility; Government-to-Government relations; pre-decisional and honest consultation; self-reliance, capacity building, and growth; and preserving and protecting natural and cultural resources.

The Tribal Partnership Program is a key program that operates within the federal trust responsibility to allow “Indian tribes” an essential role to protect and manage their own resources by developing projects that acknowledge Tribal sovereignty, allow Tribal governments to exercise self-determination, and foster and build Tribal capacity. The federal objective for studies and projects under the TPP is to substantially benefit Tribal Nations.

Navigation projects allowing improved access of vessels on both inland and coastal waters addresses not only the movement of commercial goods along the nation's coasts and waterways but also provides benefits to subsistence fishing, hunting, and gathering that are important components supporting the long-term stability of Tribal Nations and their associated cultures. The recommendations under TPP must specifically address the determination that the project is feasible and includes appropriate cost sharing. The determination of feasibility includes that the project is technically feasible; the economic, environmental, and social benefits to the Tribal Nation outweigh the costs; the project is cost-effective; and the project is environmentally acceptable. USACE should consider the breadth of benefits provided including those identified by the relevant Tribal Nation. The primary driver in the implementation consideration is whether the project will substantially benefit Indian tribes.

After initial screening of the alternatives, the team developed preliminary designs for the remaining alternatives as described in Section 5.5. These preliminary designs formed the basis for the NED and CE/ICA analyses to inform the selection of the TSP (Alternative 2). With the TSP identified, the team incorporated modifications with input from the public, USACE, and sponsors to present the Recommended Plan at the Agency Decision Milestone (ADM).

7.1 Description of the Recommended Plan

Alternative 2 was presented as the Tentatively Selected Plan at the ADM on 16 January 2024 and received an endorsement from the HQUSACE Chief of Planning and Policy Division to be carried forward as the Recommended Plan. Alternative 2 includes constructing a harbor below the Akutan Airport in Surf Bay which consists of a rubble mound breakwater, an entrance channel, and turning basin (Figure 49). Also included in the project are a mooring basin and dolphins, a rubble mound causeway, sheet pile dock, a small pad for parking and freight loading/unloading, and a road connecting the pad to an area near the Surf Bay Inn.

Plan components are typically categorized into General Navigation Features and Local Service Facilities. The GNF and LSF are important to identify during the study because design and construction costs for GNF are cost shared between the Federal Government and Non-Federal Sponsors, but the LSF are the sole responsibility of the Non-Federal Sponsor for construction, operation, and maintenance cost. This topic is discussed in more detail in the Cost Sharing section of this report (Section 7.6). Additionally, both GNF and LSF are assessed for potential environmental impacts.

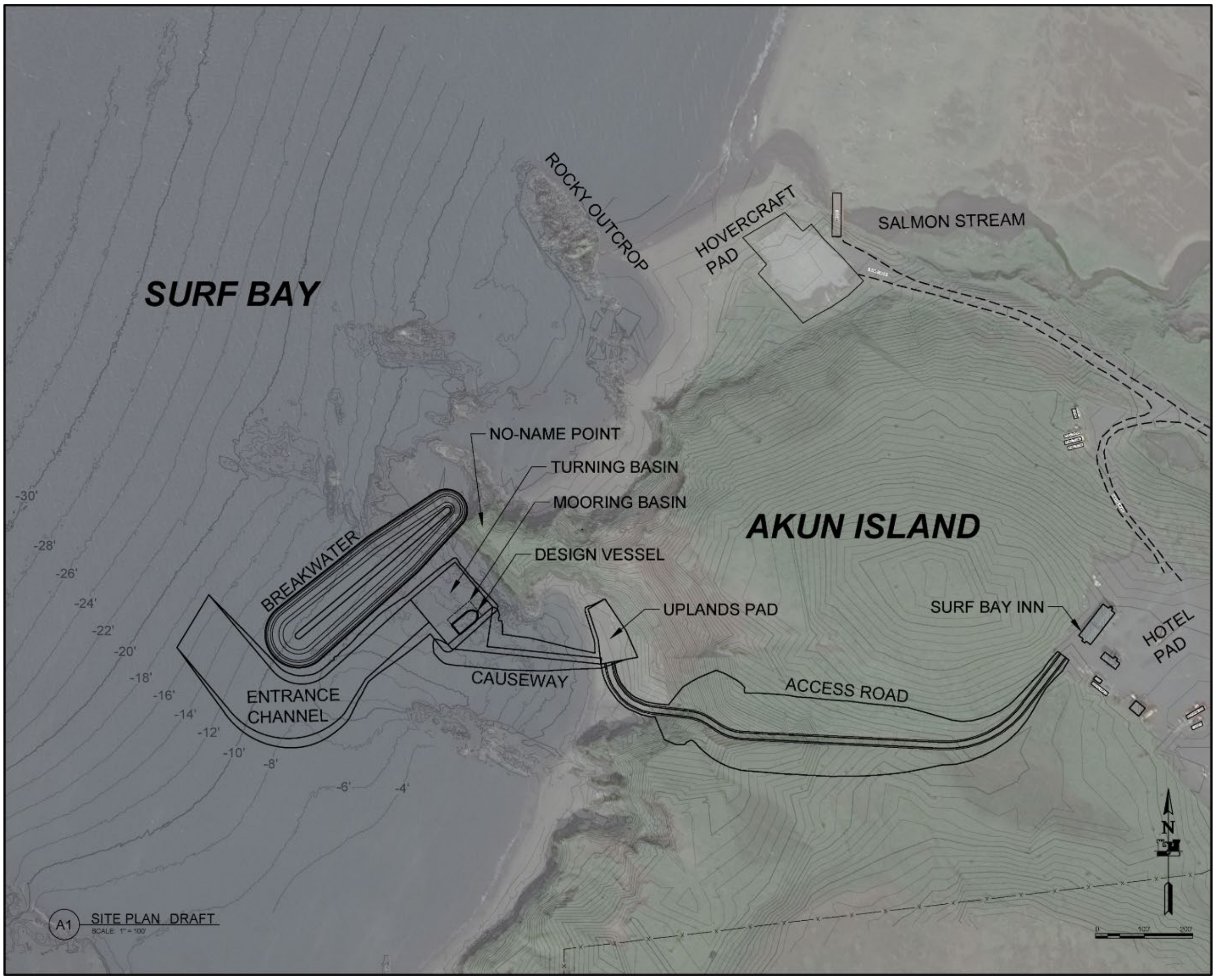


Figure 49. Alternative 2, the Recommended Plan.

7.1.1 Plan Components

The GNF in the Recommended Plan include a harbor entrance channel, turning basin, and breakwater. The turning basin encompasses the mooring basin, described below. The harbor can accommodate a design vessel with a length of 58 feet and draft of 8 feet, but a larger vessel may utilize the harbor at pilot's discretion.

The harbor entrance channel width varies from a minimum of 60 feet to a maximum of 120 feet at the turn. The entrance channel depth is -17 feet MLLW. The harbor turning basin is 120 feet by 120 feet (minus a 60-foot by 40-foot mooring basin) that is a local service facility (Figure 49). The turning basin depth is -14 feet MLLW. It is anticipated that blasting would be required for the turning basin and part of the entrance channel in this location. The harbor will be protected by a 400-foot-long rubble mound breakwater. A typical cross-section is show in Figure 50.

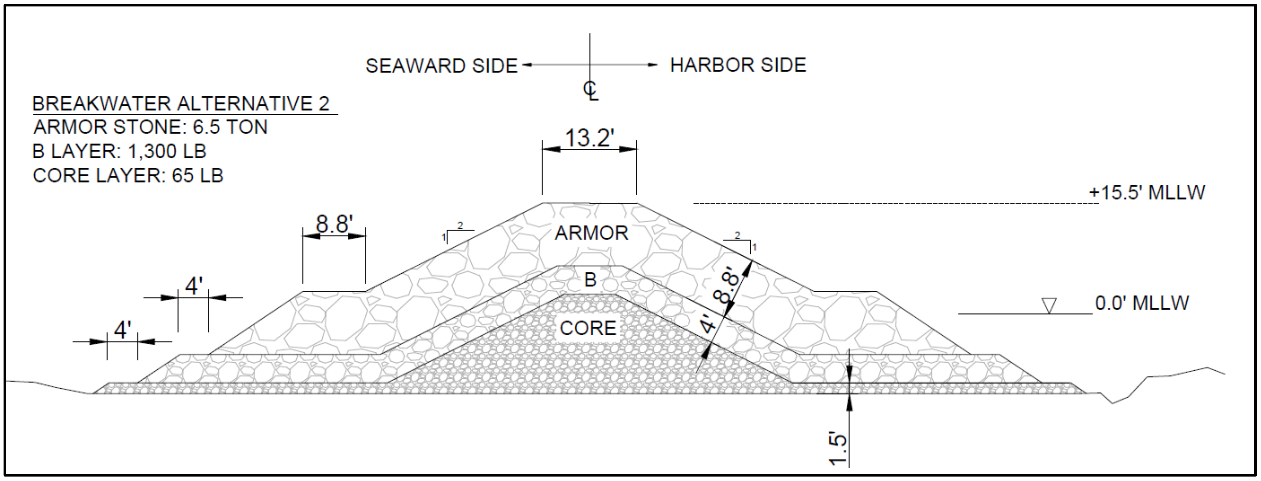


Figure 50. Typical Breakwater Section with Water Level Components.

Local service facilities required would include a 560 foot long by 12-foot-wide rubble mound causeway, sheet pile dock, 60-foot by 40-foot mooring basin with mooring dolphins, 7,000 square foot pad for loading/unloading freight, and a 1,100-foot-long road connecting the harbor areas with the existing hotel pad.

7.1.2 Dredged & Excavated Material Storage Location

A potential temporary upland storage area has been identified to the northeast of the existing hovercraft pad (Figure 51). One of the non-federal sponsors, the Native Village of Akutan, has expressed an interest in the dredged and excavated material as it is usable for construction projects and there is a need for it on the island (i.e., proposed roads to Trident Bay and Lost Harbor). It is costly to import road-building material from remote locations and can make construction projects cost-prohibitive. Placement of dredged materials in an upland site for future use by the non-federal sponsor for road construction and other projects.

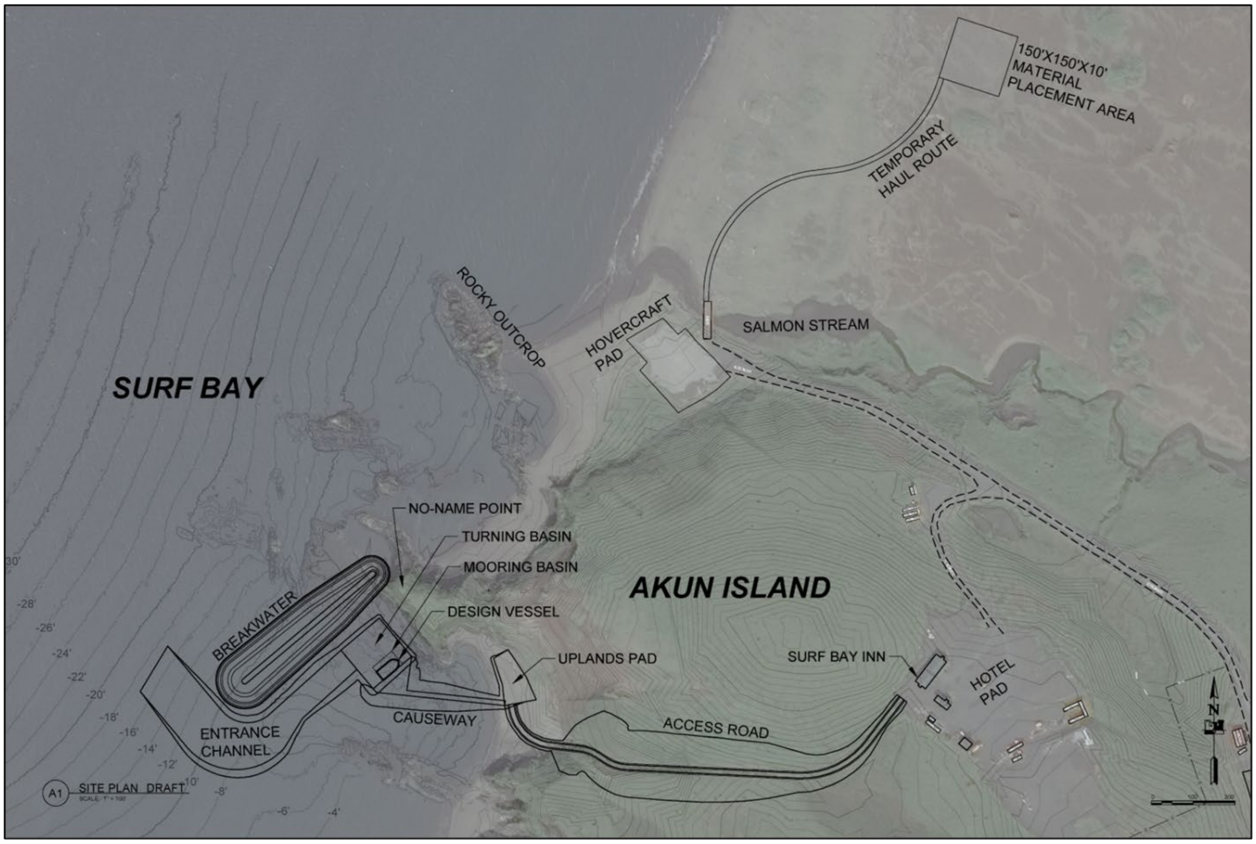


Figure 51. Temporary Upland Materials Storage Location.

Open water placement of dredged material in Surf Bay was considered during the planning process for this project. Field studies indicated a site in Surf Bay approximately one mile away from the project location could be a viable placement site for rocky habitat creation and thus a beneficial use. As the project planning process developed, it became clear that upland placement for future use by the non-federal sponsor made the most sense in terms of constructability and cost. The shallow depths that exist at the project alternative sites, the extreme wave exposure and the likely need to use dredged material to create a pad for drilling and blasting made the in-water placement for beneficial use unrealistic. Operation of a dump scow near shore in a volatile wave environment in shallow depths (and then dump scow disposal in rough seas) made this placement option problematic.

The Federal Standard is defined in USACE regulations as the least costly dredged material disposal or placement alternative (or alternatives) identified by USACE that is consistent with sound engineering practices and meets all federal environmental requirements, including those established under the Clean Water Act and the Marine Protection, Research, and Sanctuaries Act (see 33 CFR 335.7, 53 FR 14902). Based on equipment and methods anticipated for initial construction, upland placement is likely cheaper than in-water placement, considering the economic benefits of providing construction material to the NFS. These factors make upland placement for future use by the non-federal sponsor consistent with the Federal Standard. It is anticipated that O&M dredged materials would also utilize uplands placement, although other locations may be investigated in PED. However, O&M dredged material placement in the future may result in open water placement being the least cost method. Additional information related to O&M can be found in the Real Estate Appendix.

7.1.3 Construction Considerations

Construction is expected to be phased over 3 years of 6-month construction seasons. In-water work will likely occur during the summer due to frequent winter storms. The type of dredge equipment used to perform the work will not be specified in the contract. It is anticipated that the bidders on the project will have experience blasting since it will likely be used in this project, although the government will not require blasting so long as the contractor provides a plan to remove the hard material using mechanical means. To attract several bidders, it is recommended that the project be advertised early to interest dredging contractors in bidding on this project. The work season length, wave climate, remote site location, and hard material removal are just some of the conditions that a contractor would need to consider when proposing on this contract.

7.1.4 Dredging

Typical blasting and dredging operations utilize a barge and dump scow. Given the wave environment, shallow depths, and rocky outcrops in the project area, it is possible that that dredging operations could occur either from a barge/dump scow, from the breakwater (constructed before nearshore dredging), or from shore or the same temporary fill pads.

Initial dredging quantities associated with the Recommended Plan are estimated to be 9,840 CY. Alternatives 2 is located within known bedrock prisms and will likely require blasting. Dredging limits were determined based on vessel maneuvering characteristics as a function of length, beam, turning radii, and wind conditions. Side slopes of 2H:1V were assumed based on the rocky material anticipated, and further geotechnical analysis will likely allow for even steeper side slopes. Mechanical dredging in combination with heavy ripping and/or drilling and blasting will be required to remove material from the proposed entrance channel, turning basin and mooring basin.

Anticipated dredging conditions consist of approximately 5 to 10 feet of loose to medium dense unconsolidated sediment at the surface transitioning into bedrock at varying depths. Based in the information presented in the 2003 Geophysical Report by WSP Golder, it is anticipated that the depth of bedrock ranges from approximately -5 feet MLLW along the eastern portion of the proposed entrance channel to -20 feet MLLW along the western portion of the proposed entrance channel. The sediment material can be mechanically dredged by clamshell or long-reach excavator. For estimating purposes, we anticipate dense sediments, weathered bedrock, or bedrock will be encountered within the dredge prism. The type of equipment required to remove dense sediments or weathered bedrock could consist of an excavator-mounted pneumatic or hydraulic rock breaker, rock ripper, or rock ripping bucket. After dense sediment or weathered bedrock is loosened or ripped, it can be mechanically dredged by clamshell or long-reach excavator. Bedrock and hard materials are expected to require drilling and controlled blasting before they can be mechanically dredged.

7.1.5 Operations, Maintenance, Repair, Replacement, and Rehabilitation

The non-Federal operator of the harbor would be responsible for the operation and maintenance of the mooring basin, causeway, and sheet pile dock. The Federal Government would be responsible for the maintenance of the breakwaters (except for docks and other local service facilities), entrance channel and turning basin. The Alaska District, USACE, would visit the site periodically to inspect the breakwaters and perform hydrographic surveys at 3- to 5-year intervals for the dredged areas. The hydrographic surveys would be used to verify whether the predicted minimal maintenance dredging was warranted for the entrance channel and maneuvering areas. Maintenance requirements for breakwaters would be determined from the surveys and inspections. Local and Federal dredging requirements, if necessary, would likely be combined, so there would be only a single mobilization and demobilization cost.

The breakwaters were designed to be stable for the 50-year predicted wave conditions and no significant loss of stone from the rubble mound structures is expected over the life of the project. Stone quality is strictly specified in construction contracts to control stone degradation. However, it is anticipated that up to 5 percent of the armor stone could need to be replaced every 25 years. This results in an average of 2,000 cubic yards of armor rock required for replacement for the three alternatives at year 25.

Maintenance dredging would be conducted on an estimated 10-year cycle. The entrance channel and turning basin would require dredging of approximately 900 cubic yards. A dredged material management plan would be developed for the project in which a long-term disposal option would be identified. For purposes of this study, it is assumed that the entrance channel and turning basin material would be disposed of at the uplands site preliminarily identified. Clamshell bucket dredging equipment with a scow barge would likely be used for maintenance dredging. Dredged material is generally unconsolidated and should be easier to remove than construction material, and no blasting would be required for maintenance.

7.2 Aids to Navigation

Coordination with the U.S. Coast Guard Aids to Navigation Office would be conducted in PED to ensure that necessary marking of the new entrance channels is considered.

7.3 Integration of Environmental Operating Principles

The following environmental operating principles have been integrated into the planning process:

Foster sustainability as a way of life throughout the organization: This project would increase access and moorage days, fostering a sustainable subsistence-cash economy utilizing marine resources in the Bering Sea. The future without-project condition sees continued inefficiencies in transit between Akun and Akutan Islands and residents of Akutan continuing to experience reliability concerns with transportation, medical supplies, and freight. By constructing the Recommended Plan, these negative impacts on the viability of the Native Village of Akutan could be reduced.

Proactively consider environmental consequences of all USACE activities and act accordingly: Environmental consequences were considered throughout the planning process, and every effort has been made to avoid, minimize, or mitigate anticipated impacts.

Create mutually supporting economic and environmentally sustainable solutions: No NED plan was identified for this project, but the Section 2006 authority affords the PDT the flexibility to use CE/ICA in the absence of a NED plan. The Recommended Plan, Alternative 2, is a best buy plan based on the CE/ICA. This project was formulated in a way that makes it lasting, requires limited maintenance and avoids long term environmental impacts wherever possible. The sediments removed from the entrance channel, turning basin, and mooring basin would potentially be placed in a temporary stockpile in a natural dune area north of the Salmon Stream. The Native Village of Akutan has also expressed interest in utilizing these materials for future use; specifically, for building roads on Akun Island.

Continue to meet our corporate responsibility and accountability under the law for activities undertaken by USACE, which may impact human and natural environments: A full environmental assessment (EA) was conducted as required by the National Environmental Policy Act (NEPA), and a Finding of No Significant Impact (FONSI) was prepared. Additionally, a Programmatic Agreement (PA) under the National Historic Preservation Act (NHPA) has been executed. The principles of avoidance, minimization, and mitigation will be enacted to the extent possible.

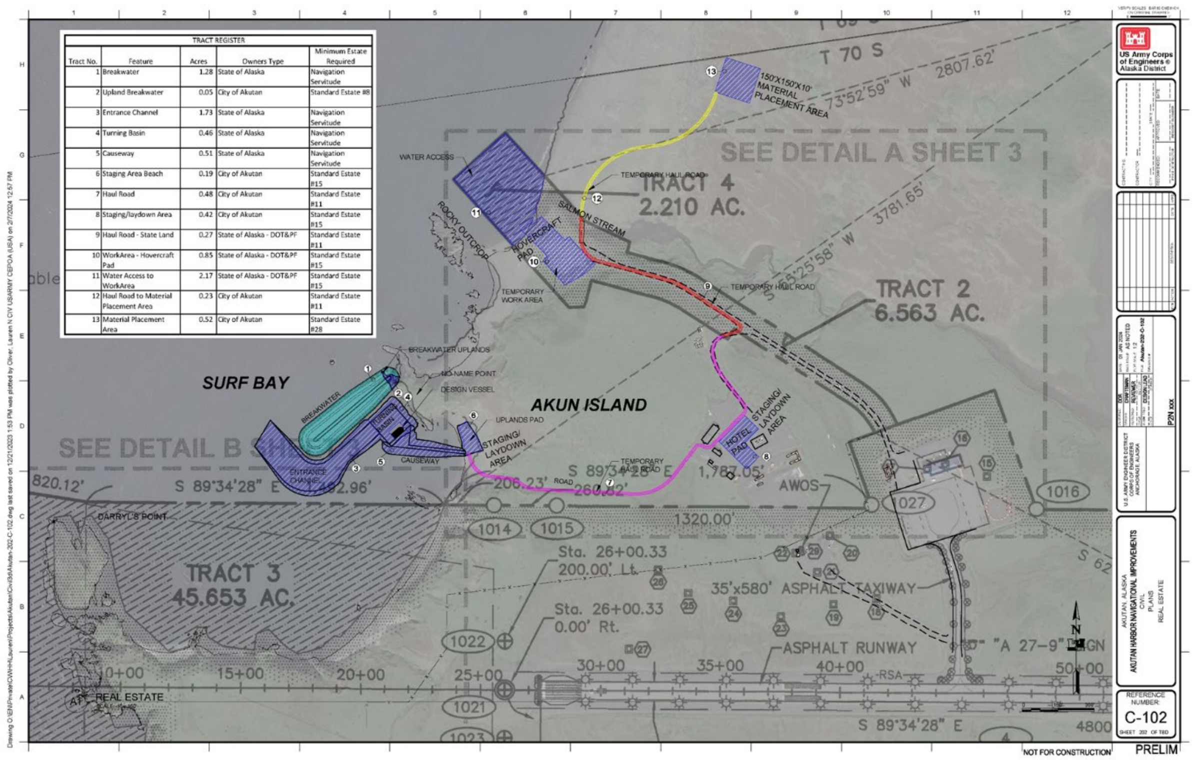
Consider the environment in employing a risk management and systems approach throughout the life cycles of projects and programs: For this study, extensive coordination has taken place to determine the impacts and subsequent mitigative actions regarding environmental impacts.

Leverage scientific, economic, and social knowledge to understand the environmental context and effects of USACE actions in a collaborative manner: USACE worked closely with the Native Village of Akutan and Aleutians East Borough throughout this study. Coordination with agencies is on-going and may be completed in PED, and per the proposed USACE policy exception regarding completing MMPA/ESA consultation during the Feasibility study, which is currently under review.

Employ an open, transparent process that respects the views of individuals and groups interested in USACE activities: USACE made every effort to be responsive to stakeholder concerns. Public input has been solicited and used for both environmental and economic analysis purposes. Section 9.1 details USACE outreach to date.

7.4 Real Estate Considerations

There are no other existing federal projects that lie fully or partially within the lands, easements, rights-of-way, relocations, and disposals (LERR) required for this project (Figure 52).



TRACT REGISTER				
Tract No.	Feature	Acres	Owners Type	Minimum Estate Required
1	Breakwater	1.28	State of Alaska	Navigation Servitude
2	Upland Breakwater	0.05	City of Akutan	Standard Estate #8
3	Entrance Channel	1.73	State of Alaska	Navigation Servitude
4	Turning Basin	0.46	State of Alaska	Navigation Servitude
5	Causeway	0.51	State of Alaska	Navigation Servitude
6	Staging Area Beach	0.19	City of Akutan	Standard Estate #15
7	Haul Road	0.48	City of Akutan	Standard Estate #11
8	Staging/laydown Area	0.42	City of Akutan	Standard Estate #15
9	Haul Road - State Land	0.27	State of Alaska - DOT&PF	Standard Estate #11
10	WorkArea - Hovercraft Pad	0.85	State of Alaska - DOT&PF	Standard Estate #15
11	Water Access to WorkArea	2.17	State of Alaska - DOT&PF	Standard Estate #15
12	Haul Road to Material Placement Area	0.23	City of Akutan	Standard Estate #11
13	Material Placement Area	0.52	City of Akutan	Standard Estate #28

Figure 52. Map showing LERR required for the project.

Per 33 Code of Federal Regulations (CFR) § 329.4, navigable waters of the U.S. are those waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or maybe susceptible for use to transport interstate or foreign commerce.

7.4.1 LERR Required for the Construction of GNF

LERR necessary to implement this project are lands owned by the State of Alaska or the City of Akutan. Table 37 reflects the feature and estate required to construct the GNF for the project. The NFS will negotiate to secure and acquire all necessary real property interest (LERR) required for the construction of the GNF. Table 37 reflects the LERR required for the construction of the GNF and estimated cost. The rubble mound causeway, the 7,000 square foot pad, and the 1,100-foot-long road is needed for the construction of the GNF, and they will ultimately be utilized for construction/development of LSF. The Government's dominant right of navigation servitude would be exercised for project tidelands below the MHW line for the general navigation features.

Table 38. LERR Required for the Recommended Plan.

Tract No.	Feature	Acres	Owners Type	Minimum Estate Required	Estimated Cost
1	Breakwater	1.28	State of Alaska	Navigation Servitude	NA
2	Upland Breakwater	0.05	City	Standard Estate #8	$430
3	Entrance Channel	1.73	State of Alaska	Navigation Servitude	NA
4	Turning Basin	0.46	State of Alaska	Navigation Servitude	NA
5	Causeway	0.51	State of Alaska	Navigation Servitude	NA
6	Staging Area Beach	0.19	City	Standard Estate #15	$1536
7	Haul Road	0.48	City	Standard Estate #11	$5,726
8	Staging/laydown Area	0.42	City	Standard Estate #15	$3,357
9	Haul Road - State Land	0.27	State of Alaska - DOT&PF	Standard Estate #11	$3,193
10	Work Area - Hovercraft Pad	0.85	State of Alaska - DOT&PF	Standard Estate #15	$6,838
11	Water Access to Work Area	2.17	State of Alaska - DOT&PF	Standard Estate #15	$17,348
12	Temporary Haul Road to Material Placement Area	0.23	City	Standard Estate #11	$2,742
13	Temporary Material Stockpile	0.52	City	Standard Estate #28	$4,132

7.5 Risk and Uncertainty

In any planning decision, it is important to consider the risk and uncertainty that is invariably present. For this study, there are 10 risk and uncertainty categories that were identified and are being evaluated during the planning process. Table 38 summarizes the risk and uncertainty items remaining for this project.

Table 39. Risks and Uncertainties.

Risk	Type of Risk	Rating	Actions
Weather delays	Study & Implementation	M	Cost contingency. One final field trip in study, or for construction related activities.
Identification and approval of dredged material placement site	Study	L	Continue agency coordination and make determination.
MMPA and ESA concurrence deferred until after feasibility phase/exception needed.	Implementation	M	Submit exception. Complete coordination in PED. Will add time and cost to design.
Incidental Harassment Authorization permit	Implementation	M	Will be sought as part of coordination in PED (exception). Will add time and cost to design.
Blasting	Implementation	M	Coordinate with Services (IHA), lessons learned from Nome, Dutch & other projects in PED that will utilize blasting in Aleutian & Pribilof Islands, and Western Alaska
Subsurface cultural resources	Implementation	L	PA; Archaeological monitor.
Budgetability	Implementation	L	Position project in programs for Tribes or EJ communities, or supplemental funding when available.
AEB & City Fish Tax from Trident impacted if plant moves.	Implementation	L	Monitor Trident status, project would make transportation for community more cost effective (positive).
Impacts of climate change and sea level rise upon project are uncertain	Operation	L	SLC is considered in design; design elevation refined in PED.
Constructability	Implementation	M	It may be necessary to conduct dredging and blasting from a shore-based pad due to shallow and rocky conditions at the project site.
Limited Geophysical & Geotechnical Investigations	Implementation	L	Additional site investigations will occur during PED.

7.5.1 Design Vessel

While the PDT has made informed decisions regarding selection of a design vessel (described in Section 5.4), ultimately the vessel that would provide ferry services would be determined by which contractors are interested in bidding on a ferry service contract and which vessels they have access to. To account for this uncertainty, the contract cost that is the foundation of the transportation cost reduction analysis includes a range of potential contract fees as informed by the MDC ferry analysis as well as surveying local vendors.

For additional information on design vessel uncertainty see Appendix A: Hydraulics & Hydrology and Section 5.4 of this report.

7.5.2 Project Benefits

The FWOP and FWP conditions for this study have been formulated based on the permanent resident population of the village of Akutan, rather than incorporating the transient population of Trident, due to significant uncertainty regarding the future of the Trident Seafoods processing plant in Akutan. While the primary mode of transportation of Trident workers in the existing condition is tramper vessels to/from Unalaska Dutch, if Trident were to shift its plant to Unalaska Dutch Harbor, as is currently being explored, transportation demand associated with the plant would similarly be reduced in both FWOP and FWP conditions. A comparison of similarly sized communities including Atka (population 71), Nikolski (pop 15), St George (pop 79), and St Paul (pop 492) indicate their communities support transportation demand of 2-3 round trips per week. Under a potential Trident relocation scenario, a reasonable assumption would be a reduction in trip counts to a similar level as those comparable communities. If a shift like this were to occur, there is a likelihood that the frequency of trips for both the helicopter (FWOP) and marine ferry (FWP) would similarly be reduced and subsequently lessen the estimated cost for an annual contract of each method (see Section 6.1 for more information). The impact of this reduction in trip count would likely be a lessening of NED benefits (as the difference between a FWOP and FWP annual transportation contract cost would be lessened if trip counts and subsequently annual contract rates for each service method were lessened) it is not expected to impact alternative recommendation. The portion of contract costs directly attributable to transportation services for the helicopter (FWOP) and marine ferry (FWP) form the basis for the transportation cost savings benefit and are considered reasonable for this purpose. Additionally, given that the transportation in Akutan in heavily subsidized, it is a reasonable assumption that the DOT would not support the existing subsidy rate if it included unreasonable fees due to things like ROI or price gouging due to low competition rates.

If Trident were to close its Akutan plant and fully shift operations from Akutan to Unalaska, the fish tax base resulting from plant operations would shift from the Aleutians East Borough to the Aleutians West Borough. This loss of both an economic driver for the Native Village of Akutan, and a significant income source to the AEB, would make affordable and reliable transportation for the village of Akutan even more critical. The village would be facing all the previously discussed losses along with an annual contract for helicopter operations that is costly even under the existing conditions. The OSE benefits associated with a marine ferry and associated breakwater at Akun Island would become even more impactful to the community in this scenario and support long term community viability to an even greater degree. While this shift in operations is not likely to impact alternative plan selection, it would be likely to lead to an even stronger OSE justification than would be expected if Trident were to maintain some operations in the community. Local vessel access is also likely to be improved, as detailed in Section 6.1.2.6.

Using the Level 3 Certified Cost Estimate, the Recommended Plan (Alternative 2) the average annual equivalent economic cost is $3,191,000 and average annual benefits are $362,000 - $772,000, resulting in net annual NED benefits of $(2,829,000) to $(2,419,000). The project's benefit-cost ratio is 0.11 – 0.24, with a most likely BCR of 0.18. In accordance with the Section 2006 Authority, the Recommended Plan was the best buy alternative (as determined by the CE/ICA). The Recommended Plan was also the highest-ranked alternative in the MCDA analysis and provided the most effective and complete approach to addressing the problem and objectives while also efficiently realizing the specified opportunities compared to cost and being environmentally acceptable.

7.5.3 Project Depth/Optimization

Project depth was formulated to accommodate both environmental factors such as tide, RSLC, and set down as well as ship factors such as squat, response to waves, and safety clearance.

The harbor is designed to be accessible during tides of MLLW 0 feet or greater. The intermediate RSCL scenario of –0.92 feet, rounded to 1 of depth, will be incorporated at construction to account for sea level rise. Set-down, or a lowering of water surface elevation due to wind stresses, was not included as the conditions that would cause set-down would likely preclude the ferry from operating. Vessel squat, or the lowering of vessel draft due moving through shallow water, was calculated to be 1 foot of depth. Vessel response to waves, or the vertical movement of pitch, roll, and heave, was calculated to be 1 foot of depth. USACE guidance recommends 3 feet of net underkeel clearance for hard bottom conditions such as rock. An allowable over depth of 2 feet is reasonable to accommodate imprecisions of the anticipated dredging method of blasting.

The result is a harbor basin depth of 14 feet (-14 feet MLLW) with a max payline of 16 feet (-16 feet MLLW) and an entrance channel depth of 17 feet (-17 feet MLLW) with a max payline of 19 feet (-19 feet MLLW). See Appendix A: Hydraulics & Hydrology for further information on harbor depth calculations.

Depth can be optimized throughout the study process, but the impact of this uncertainty would be expected to be similarly borne by the full suite of alternatives and is unlikely to impact plan selection. The project depth for the basin and entrance channel may continue to be optimized during PED.

7.6 Project Cost

The project cost information shown in Table 40 (and in the Pertinent Data and Executive Summary sections) is based on the Level 3 Certified Cost, which is only produced for the Recommended Plan. These numbers will not match the initial cost calculations presented in the body of the report and the appendixes, which utilized Level 4 cost estimates for apples-to-apples plan comparison purposes.

Using the Level 3 Certified Cost estimate, the Recommended Plan (Alternative 2) has a project first cost of $69,800,000. The total project construction cost is $79,700,000 which includes GNF, LSF and LERR. The total economic cost, including interest during construction and the present value cost of operations and maintenance, is $86,146,000. The average annual equivalent economic cost is $3,191,000 and average annual benefits are $362,000 - $772,000, resulting in net annual NED benefits of $(2,829,000) to $(2,419,000). The project's benefit-cost ratio is 0.11 – 0.24, with a most likely BCR of 0.18.

7.6.1 Cost Apportionment

Construction of the project would be apportioned in accordance with the Water Resources Development Act of 1986, as amended. GNF is cost-shared between the Federal government and the non-Federal sponsors. LSF features are solely the responsibility of the non-Federal sponsor. The cost-share summary is based on the project's first cost with contingency. Section 1156 of Water Resources Development Act 1986, Cost Sharing Provisions for the Territories, as amended, provides a cost-sharing waiver to Indian tribes of an inflation-adjusted amount for studies and projects. This study has a $511,000 cost share waiver (the amount at the time the FCSA was signed in 2021). The NFS cost-share for design and construction costs for an authorized project would also be subject to the waiver under Section 1156 (at whatever amount is applicable on the date a Project Partnership Agreement is executed).

In accordance with the Economic Guidance Memorandum 24-04, Tribal Partnership Program Reduced Cost Share Eligibility Criteria (Ability to Pay) published 12 January 2024, the Native Village of Akutan is eligible for a reduction in Tribal cost share.

Table 40. Cost Share Breakdown

Cost Share Table			
(October 1, 2023, Price Levels, Program Year (FY) 2024) [1]			
Description	**Total (Project First Cost w/Contingency)**	**Federal Share**	**Non-Federal Share**
General Navigation Features	$53,300,000	$48,000,000	$5,300,000
Planning, Engineering, & Design	$7,300,000	$6,600,000	$700,000
Construction Management	$9,100,000	$8,200,000	$900,000
Subtotal of Construction	**$69,700,000**	**$62,800,000**	**$6,900,000**
Cost adjustments			
LERR	$100,000		$100,000
Section 1156 Waiver[3]		$648,000	($648,000)
Ability to Pay Reduction to 25%[4]		$4,700,000	$(4,700,000)
Total Project First Costs	**$69,800,000**	**$68,100,000**	**$1,700,000**
LSF and Post Construction Adjustments			
Credit for LERR[5]		$100,000	($100,000)
Post-Construction 2.5% Payback (10% of the GNF, equal to the 25% Ability to Pay reduction)[5, 6]		($1,700,000)	$1,700,000
Local Service Facilities	$7,600,000		$7,600,000
Planning, Engineering, & Design	$1,000,000		$1,000,000
Construction Management	$1,300,000		$1,300,000
Total Cost Apportionment	**$79,700,000**	**$66,500,000**	**$13,200,000**

Notes:
* 1156 amount changes annually, the actual amount of the waiver is dependent upon the year the agreement is executed.
[1] Cost is based on the Total Project Cost (Fully Funded) within the Cost Certification Statement dated March 13, 2024, which is the project first cost escalated to the midpoint of construction.
[2] GNF cost-sharing totals are reflected as 90% Federal and 10% Non-Federal.
[3] IAW Section 1156 of WRDA 1986, as amended, the Federal Government will waive up to the first $665,000 of project execution for design and construction from the project cost-share requirements.
[4] Section 1156 IAW. Section 203 of WRDA 2000, as amended, provided that cost-share agreements for such studies are subject to a Tribe's ability to pay, as determined by and with procedures established by the Secretary of the Army.
[5] Credit is given for the incidental costs borne by the Non-Federal Sponsor for LERR per Section 101 of WRDA 86, not to exceed 10% of the GNF.
[6] The Non-Federal Sponsor shall pay an additional 10% of the costs of GNF of the NED plan, pursuant to Section 101 of WRDA 86. The value of LERR shall be credited toward the additional 10% payment except in the case of LERR for GNF.

7.6.2 Schedule

Table 40 below displays the project's feasibility study schedule for milestones. This study is currently scheduled to be completed within the established timeline.

Table 41. Project Milestone Schedule.

Title	Date
Execute Feasibility Cost Sharing Agreement	21 July 2021
Planning Charrette	14-17 October 2021
Alternatives Milestone	15 March 2022
Tentatively Selected Plan Milestone	28 April 2023
Agency Decision Milestone	16 January 2024
Final Report Submittal	04 April 2024
Signed Chief's Report to Congress	16 July 2024

8. ENVIRONMENTAL CONSEQUENCES

8.1 Introduction

This section discusses the potential impacts of the alternatives (discussed in Chapters 5 through 7) upon the environmental resource categories described in Chapter 3, including the agency's Recommended Plan (Alternative 2) and the no-action alternative. For the purposes of this section, Alternative 4 will be considered no different from the no-action alternative, as the alternative involves the use of a similar (larger) helicopter.

Regulations on NEPA analyses state that the document should, "based on the information and analysis presented in the sections on the Affected Environment and the Environmental Consequences" present the environmental impacts of the proposal and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decision-maker and the public" (40 CFR § 1502.14). However, as will be shown in the following sections, the three structural alternatives brought forward for analysis are, from an environmental perspective, quite similar to one another. The alternatives would each impact the same general environmental location and resources, in a similar manner, differing incrementally in the magnitude, extent, and duration of those impacts. Resource categories such as climate, tides, current, and sea level change, are addressed collectively when there is no discernable difference between the consequences of the three action alternatives. However, resource categories are addressed individually where there are differences between the three structural action alternatives. Within each resource category, the magnitude of the effects upon that resource are evaluated using these criteria (where relevant) and best professional judgment, and tiered as follows:

- No Effect: not noticeable.
- Minor: effects are not detectable or are so minor that they would neither destabilize nor noticeably alter any important attribute of the resource.
- Moderate: effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource.
- Major: Environmental effects are noticeable and are sufficient to destabilize important attributes of the resource.

The greatest direct impacts from project construction on several resource categories (Table 41) would be caused by:

- Placement of rock for rubble mound breakwaters.
- Deepening of the seafloor by dredging, to include blasting.

Table 42. Project quantities by Alternative.

Alt #	Area of Rock Placement (sq feet)	Area of Construction Dredging (sq feet)	Volume of Construction Dredging (cubic yards)	Likelihood of Blasting	Blasting Average Depth (ft)	Volume of Maintenance Dredging (cubic yards)
1	135,217	0	8,703	No	-	870
2	**69,777**	**48,800**	**9,840**	**Yes**	**5**	**984**
3	88,087	35,500	8,180	Yes	6	818
Alternative 2 is the Recommended Plan						

Dredging to create the basin and entrance channel is likely to require a combination of traditional mechanical dredging with a clamshell dredge or excavator, and hydraulic “ripping” of weathered bedrock or other dense material. The Recommended Plan is likely to require blasting to break up bedrock that cannot be removed by ripping; however, the extent of potential blasting has not yet been evaluated.

The greatest direct impacts from project operation on some biological resource categories would be caused by:

- Potential disturbance of marine mammals and birds by vessel traffic

8.2 Physical Environment

The following sections describe the project impacts on the physical environment.

8.2.1 Climate

The no-action alternative would have no effect on the climate.

Impacts to climate are not anticipated from implementing any of the three alternatives. Given the high frequency of cyclonic storms within the north Pacific and Bering Sea, and overall low population density across the region; any changes in climate due to anthropogenic influence will be difficult to quantify. The overall impact of the project on climate is considered “no effect”.

8.2.2 Tides

The no-action alternative would have no effect on the tides.

Impacts to tides are not anticipated from implementing any of the three alternatives Tides are influenced by the interaction of the Earth and the moon and this project does not have the capacity to influence these forces. The overall impact of the project on tides is considered “no effect”.

8.2.3 Currents

The no-action alternative would have no effect on currents.

Impacts to tidal currents are anticipated but are expected to be minor and localized with equal consequences for each action alternative considered. The influence of tidal currents within the proposed and alternative action areas is a major consideration in alternative development and selection. The construction of breakwaters is expected to reduce the strength of tidal currents within the harbor basin, as this is part of the reason for building a breakwater.

8.2.4 Wave Climate

The no-action alternative would have no effect on the wave climate.

Reductions to the wave climate are anticipated as they are the primary purpose of building a breakwater. Effects of this reduction would be equal for each action alternative and would be limited to the area inside the breakwater. The wave climate outside the three breakwater alternatives will remain the same for all three alternatives. Overall, the impacts to the wave climate would be minor for all three action alternatives.

8.2.5 Sea Level Change

Sea level change would be minor for the no-action alternative and equally minor for all three of the action alternatives since the scale of this project is not sufficient to influence sea level.

Small rates of isostatic rebound have been observed across the Aleutians, both in Akun and Unalaska. The intermediate relative sea level change (RSLC) rate of -0.82 feet was chosen for project design, and to maintain the project depth after the 50-year period of analysis, an additional 1 foot of dredging will be incorporated in the harbor and entrance channel design depths during construction.

8.2.6 Water Levels

Storm surges can produce short term increases in water level considerably over normal tidal levels. There is no known storm surge model or study near the project area. The closest tidal gage that would capture a storm surge event is Unalaska (9462620). The highest observed water level is 6.7 feet, which when subtracted from the difference between MHHW at Unalaska (9462620) and Surf Bay (9462711) results in 3.1 feet of storm surge for the total water level. This is the best approximation of storm surge with the available data.

The no-action alternative and all three actions alternatives would have no effect on water levels.

8.2.7 Bathymetry

The no-action alternative would have no effect on bathymetry.

Surf Bay is an open shallow bay exposed to the west and north. While construction methodology is difficult to determine at this point, it is anticipated that the harbor will be built from shore (save for the breakwater). Therefore, material from the road cut will likely be used to fill in a working pad in the harbor basin to use that as a pad for drilling and blasting. After construction, this material would be removed and then the harbor would be dredged to depth.

All three action alternatives, with roughly similar dredge quantities, would result in a moderate (noticeable) increase in water depth in the area that would become the harbor basin. Alternative 1 would have a smaller impact on existing bathymetry as there would be less material to be dredged since the footprint would be in deeper water.

8.2.8 Sediments

The no-action alternative would have no effect on sediments; sediment would continue to accumulate and disperse as it always has.

Under Alternative 2 (proposed action) and Alternative 3, impacts to sediments would be short in duration but, in some cases, disruptive. For Alternative 2, approximately 9,840 CY of marine sediments within the project footprint would be subject to drilling, blasting, dredging, compression, and hydraulic and atmospheric processes. These sediments would be moved to an upland storage area. A potential site has been identified to the north of the Salmon Stream (Figure 53). Sediments at the Alternative three site would be exposed to the same processes, although the quantity for Alternative 3 is slightly less at 8,180 CY. Impacts of Alternatives 2 and 3 would have moderate impacts on sediments.

Initially, sediments would be fractured and pulverized during drilling and blasting; these forces would also expose sediments to wave and current action, which may mobilize some sediments or cause others to fall out of suspension.

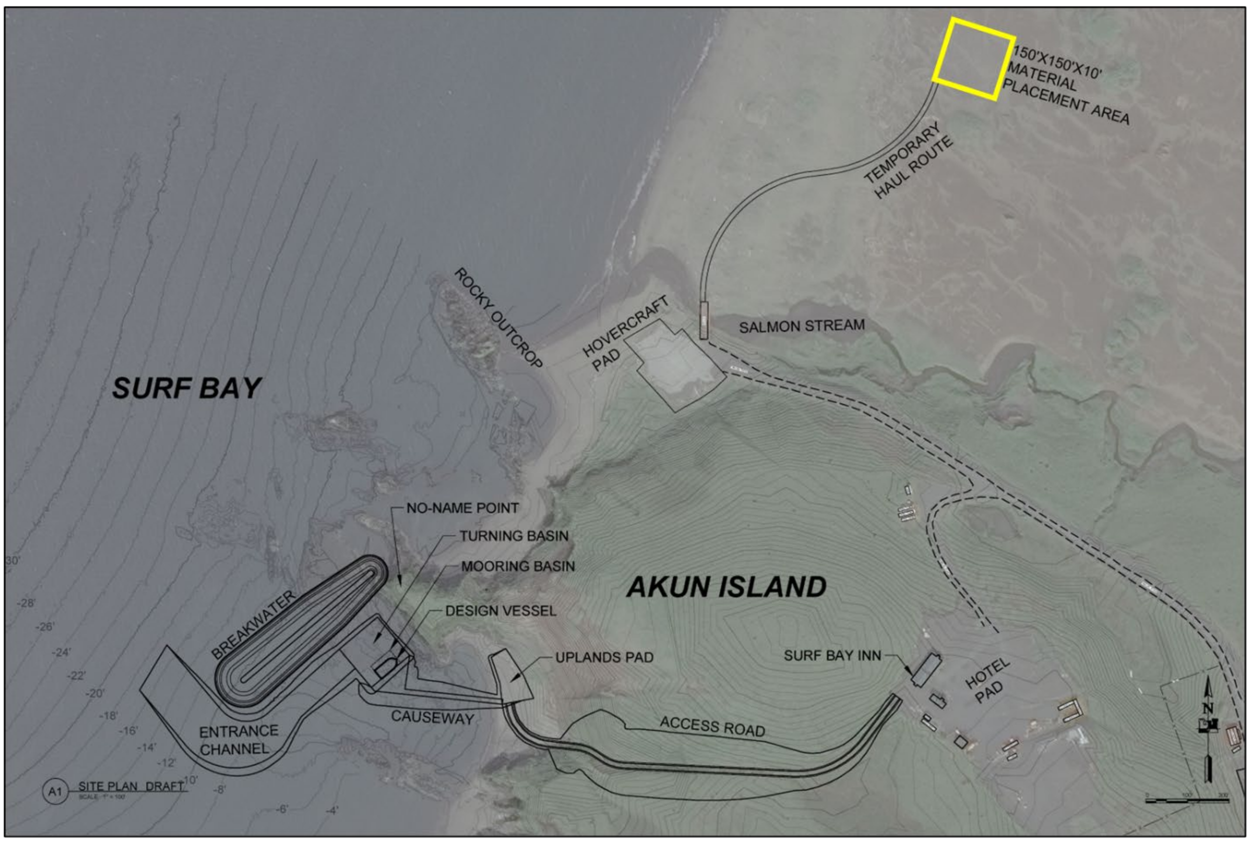


Figure 53. Potential Dredge Material Placement Area (identified in yellow).

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.

Newly exposed shoreline sediments may be indirectly affected over the long-term by the implementation of the project and may experience reduced capacity for mobilization as the project's breakwater and causeway would likely reduce the wave energy contacting those sediments behind it. Similarly, those areas of protected waters behind the breakwater would likely facilitate suspended sediments to fall out and accumulate.

All three action alternatives, provided upland placement of dredged materials is implemented as planned, would require the dredged material to be dewatered and require mitigation measures such as silt fencing around the dredged material pile and a plan to manage the runoff and trap sediment from running into adjacent areas.

Impacts of Alternatives 2 and 3 would likely have a major impact on sediments in the short-term. However, these impacts would be expected to dissipate and ultimately result in a minor long-term impact on sediments after construction. Alternative 1 would also have a major impact on sediments in the short term, although the material would likely not be exposed to blasting. Impacts from alternative 1 would be expected to dissipate and ultimately result in a minor long-term impact on sediments after construction.

8.2.9 Geology/Topography

The no-action alternative would have no effect on geology or topography.

Alternatives 2 and 3 would result in a moderate change to topography by altering the shoreline with the access road and placing the cut between the harbor site and the upland storage location. This would be a noticeable visual alteration of the local topography. Geology would not be affected by either of these alternatives.

Alternative 1 would have only minor impacts to topography as it would not require a large cut on the land for an access road. Geology would not be affected by this alternative.

8.2.10 Seismicity

The no-action alternative and all three action alternatives would have no effect on seismicity.

8.2.11 Geotechnical Conditions

The no-action alternative and all three action alternatives would have no effect on geotechnical conditions.

8.2.12 Water Quality

The no-action alternative would have no effect on water quality.

<u>During Construction Overall:</u> Impacts to water quality would be minor and temporary for all three action alternatives during construction. Alternative 2, the Recommended Plan, would likely involve placement of in-water fill to serve as a construction pad for drilling and blasting due the to the shallow nature of the water behind the breakwater. This fill

would cause temporary and localized turbidity, but the fill would be removed along with the existing bottom to the project depth after blasting is complete. Impacts to water quality from turbidity during construction from alternatives 1 and 3 would be similar to each other in that they would be localized and temporary and likely not involve placement of in-water fill for drilling and blasting. Petroleum spills during construction are equally possible for all three action alternatives and could be caused by inadvertent spills on deck or blown hydraulic hoses or other equipment failures. While these spills could result in major effects, mitigation measures such as having oil booms on deck and ready to deploy and having oil-absorbent pads available would likely reduce the potential impacts of a spill to water quality to the moderate effect level.

<u>During In-water Construction:</u> Water quality at the Akun Island site 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 during in-water construction would be minor and temporary. While blasting is likely unnecessary for Alternative 1, this activity is not one that would likely contribute much to the increase of suspended sediment, so the potential effects from not having blasting for this alternative would not change the overall magnitude of effects for this alternative in terms of water quality.

<u>During Upland Construction:</u> Runoff from the disturbed and exposed ground in proximity to or associated with the proposed project site during construction represents a more likely source of fine particulate material that could impact water quality due to turbidity. The effects of this potential runoff would likely be minor for Alternative 3 as it would use the existing access road to the old hovercraft pad but would be moderate for Alternatives 1 and 2 as there would be a new road cut down to the site from the Surf Bay Inn area. Akun Island's coastal wave climate and currents would effectively reduce impacts from this source of turbidity. However, an effective stormwater pollution prevention plan would be implemented to greatly reduce such impacts. Impacts to water quality from upland construction from project-related runoff would be minor with the implementation of a comprehensive stormwater pollution prevention plan.

<u>During Upland Placement of Dredged Materials:</u> Potential effects of runoff from all three action alternatives are anticipated to be moderate but would be reduced to minor by implementation of a Storm Water Pollution Prevention Plan (SWPPP). A SWPPP would be developed by the construction contractor and reviewed approved by the Alaska Department of Environmental Conservation.

<u>During In-water Placement of Dredged Materials:</u> In-water placement of dredged materials for beneficial use (marine habitat creation) is not part of the recommended plan for this project, but the potential impacts are evaluated here for comparison

purposes. Potential effects would be similar for all action alternatives in that they involve similar materials and quantities and effects are expected to be moderate and temporary. Placement would likely be from a bottom-dump or split-hull dump scow, so dredged material would enter the water from below the water surface to minimize turbidity. A small and localized turbidity increase would occur but would be likely be dispersed rapidly given the wave environment and currents at the potential beneficial use site. Unlike upland placement, it is not possible to contain the sediment that is dispersed from in-water placement of dredged materials. Mitigation measures such as silt curtain are not implementable in the open marine environment due to waves and currents.

<u>During Harbor Operations:</u> Potential effects to water quality from harbor operations would be the same for all three action alternatives and would be no more than minor level. Minor and temporary effects from localized petroleum releases are possible since a vessel will be operating in an area where they do not currently operate (i.e., a new harbor basin) and along the vessel route between Akun and Akutan with routine traffic. Other than an unforeseeable catastrophic incident such as a grounding or sinking, effects from petroleum spills during operation would be minor since the vessel would not be moored at the new site on Akun Inland. It would arrive and depart daily as needed but would only be at the new basin for a short time on days it makes the trip. This is different than a scenario where a new harbor is built, and many vessels are present continuously. The ferry vessel for this project would likely be moored full time at the existing small boat harbor at the head of Akutan Harbor where materials are staged to deal with unexpected spills.

8.2.13 Air Quality

The no-action alternative would have no effect on air quality.

Under all three action alternatives, the operation of construction equipment and vessels during project construction would, in the short term, add incrementally to the air pollutant emissions ordinarily generated by vessels and machinery on Akun Island. Direct, short-term project-related impacts to air quality on Akun Island would be highly variable and transitory, where noticeable at all, and would thus be categorized as minor for all three alternatives. The area and surrounding region of Akun Island is designated as “unclassified” under EPA air quality regulations, as insufficient information exists to designate it as an “attainment” or “nonattainment” area (18 AAC 50.015). Without an air quality baseline, it is impossible to determine whether direct, construction related emissions would cause exceedances of air quality standards on Akun Island.

It is anticipated that the project operation will not create any new stationary sources of air emissions. Indirect, long-term effects of the project on ambient air quality would be dependent on the number and type of mobile sources (i.e., vessels) that use the new harbor. These would be primarily small watercraft with combustion engines (i.e., gasoline and diesel fuel), including the contracted ferry vessel. Based on the harbor configurations, there is only room for a small number of vessels, and it is likely that all of them would be transient. Overall, effects on air quality from operations is anticipated to be minor.

8.2.14 Noise

The no-action alternative would have no effect on noise. Helicopter flights would continue to be part of the noise environment in the air and to a smaller extent underwater beneath the aircraft both on Akun Island, Akutan Island, and the open water segment in between these locations.

During Construction Overall: Impacts on both airborne and in-water noise levels would be moderate during most of construction and periodically major during blasting and pile driving for the access dock. Although Alternative 1 is unlikely to have blasting, airborne and underwater noise levels would likely be moderate, although temporary, due to the need for in-water pile driving as with the other two action alternatives.

The operation of heavy equipment such as loaders, excavators, cranes, dump trucks, and impact pile drivers during construction could 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, dredging, keying in armor stone (placement), and pile driving would contribute to the overall impact on noise, both in the air and underwater.

During Harbor Operations: Airborne noise during harbor operations would be minor, temporary, and transient. The ferry vessel would make noise that could be heard in the air, but it would be like existing commercial vessels that routinely operate in the area. Helicopter noise would no longer be a routine part of the airborne noise environment, which would reduce the overall noise environment despite the addition of a ferry vessel.

8.2.15 Climate Change

The no-action alternative and all three action alternatives would have no effect on climate change.

8.3 Natural Environment

The following sections describe the Recommended Plan’s impacts on biological resources.

8.3.1 Marine Environment

8.3.1.1 Marine Fish and Invertebrates

The no-action alternative would have no effect on marine fishes and invertebrates.

During Construction Overall: Impacts to fish for alternative 1 would be the lowest of the three alternatives since there would likely be no blasting. Impacts from other sources (dredging, pile driving, etc.) would result in an overall moderate level of impact for Alternative 1.

Alternatives 2 and 3 would likely involve blasting in addition to the pile driving, dredging, and rock placement. This blasting could have a minor impact on fish and invertebrates if a fill pad is constructed and drilling took place "in the dry" behind the rubble mound breakwater.

All charges would be detonated underground in boreholes and charges would be stemmed to confine as much of the blast as possible to the ground to break the rock, but there would still be pressure waves that would kill or injure fish, particularly those with swim bladders. Many invertebrates, apart from 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 area. The loss of a small number of invertebrates in a small and localized footprint is considered an overall moderate impact.

Construction of the breakwater would represent the loss of less than 1 acre (Alternative 2) to 3 acres (Alternative 1) of existing subtidal habitat, replacing it with relatively steep, rocky subtidal, intertidal, and supratidal habitat. Marine invertebrates would be temporarily impacted by in-water project-related actions that alter the geometry of, fracture, dislodge, crush-together, cover, and/or bury the sediments and substrates that they use for attachment, cover, feeding, egg-laying, and breeding.

<u>During Construction In-water Dredged Material Placement:</u> In-water placement of dredged materials for beneficial use (marine habitat creation) is not part of the recommended plan for this project, but the potential impacts are evaluated here for comparison purposes. Potential effects would be similar for all action alternatives in that they involve similar materials and quantities and effects are expected to be moderate and temporary. Placement would likely be from a bottom-dump or split-hull dump scow, so dredged material would enter the water from below the water surface to minimize turbidity. A small and localized turbidity increase would occur but would be likely be dispersed rapidly given the wave environment and currents at the potential beneficial use site. Once placed, the dredged material would eventually colonize with algae and would likely be used by both fish and invertebrates as it would introduce rocky substrate and vertical structure to what was a bottom composed of sand waves, shell litter, and sparse algae.

Permanent impacts on marine invertebrates resulting from the implementation of Alternative 2 include decreased wave energy and increased depth in the harbor entrance channel, turning basin, and mooring basin 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 being permanent, over time, these impacts would likely be beneficial to some marine invertebrate communities by providing suitable substrate and structure for colonization. Similarly, over time, and despite alterations to the existing habitat, invertebrate communities would recover to some degree of equilibrium in the inner basin and at the dredged material placement site. Organisms generally precluded from the surf and intertidal zones may find the deeper, calmer waters of the inner basin suitable for settlement, while at the material placement area, those species whose life history is dependent upon rocky reef type habitat would be expected to colonize the habitat and eventually reach some degree of equilibrium. In total, USACE would expect invertebrate community compositions at the affected habitats to change over time following the implementation of the project. However, USACE acknowledges that its data concerning the intertidal and subtidal marine invertebrate community at the project location is limited and that the exact scenario and rate at which the affected habitats might become recolonized is unknown.

During Construction Operations: The construction on rubble mound breakwaters is anticipated to create habitat for certain species of nearshore fish that depend upon rocky habitat. Permanent impacts on marine invertebrates resulting from the implementation all action alternatives include decreased wave energy and increased depth in the harbor entrance channel, turning basin, and mooring basin 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 being permanent, over time, these impacts would likely be beneficial to some marine invertebrate communities by providing suitable substrate and structure for colonization. Similarly, over time, and despite alterations to the existing habitat, invertebrate communities would recover to some degree of equilibrium in the inner basin and at the dredged material placement site. Organisms generally precluded from the surf and intertidal zones may find the deeper, calmer waters of the inner basin suitable for settlement. In total, USACE would expect invertebrate community compositions at the affected habitats to change over time following the implementation of the project. However, USACE acknowledges that its data concerning the intertidal and subtidal marine invertebrate community at the project location is limited and that the exact scenario and rate at which the affected habitats might become recolonized is unknown.

It is possible that black rockfish might concentrate in the harbor basin after construction. As such, harbor design alternatives closer to the mouth of the salmon stream near the hovercraft pad were not selected due to local concerns that the possible presence of black rockfish in the new harbor could impact juvenile salmon exiting the creek.

8.3.1.2 Marine Mammals

The no-action alternative would have no effect on marine mammals (non-ESA-listed species).

During Construction: The effects on marine mammals (non-ESA-listed species) during construction would be moderate for Alternative 1 (assuming no blasting) but be temporary in nature due to pile driving.

The effects on marine mammals during construction would be moderate for Alternatives 2 and 3 (assuming blasting) but be temporary in nature. Effects to marine mammals as a resource category are considered moderate in that there will be disruption (for which USACE is seeking an IHA) but effects would not result in mortality and would be limited to the period of construction involving blasting and pile driving. Major impacts, such as permanent hearing loss, injury, or mortality are not anticipated from this project even with the issuance of an IHA.

The decision process for how to address potential impacts to non-ESA-listed marine mammals under the Marine Mammal Protection Act is to either issue a “no effect” determination, which is a decision made solely by the action agency and does not receive approval from NMFS or USFWS, or to request an Incidental Take Authorization (ITA) from one or both agencies. This ITA can take the form of an Incidental Harassment Authorization (IHA) or a LOA). Based on the limited information understood at this point in the planning process, seeking an Incidental Harassment Authorization (IHA) is probably the most appropriate path forward. An IHA will be required from NMFS and USFWS. IHAs will be sought during the PED phase (under an exception to USACE policy requiring ESA consultation during the feasibility process) due to the IHA timeline and design data needed for the IHA permit application.

The IHA allows for marine mammals to be harassed without the need to shutdown project construction except when they are very close to sound sources that could result in permanent damage or lethality. Without the IHA in place, shutdown distances are too great to allow for efficient construction and the zones are so large as to not be reasonable to be able to ensure that marine mammals are not present inside the zones. Potential radii to consider for blasting (4.4 kilometers) and pile driving (10 kilometers) shown in Figure 54 represent estimated shutdown zones that would have to be adhered to if an IHA is not obtained. Without an IHA, these zones will have to be free of marine mammals before detonation or pile driving. With an IHA, zones are monitored for exposure and are only shutdown for Level A exposure radii (e.g., 550 m for high frequency cetaceans for blasting).

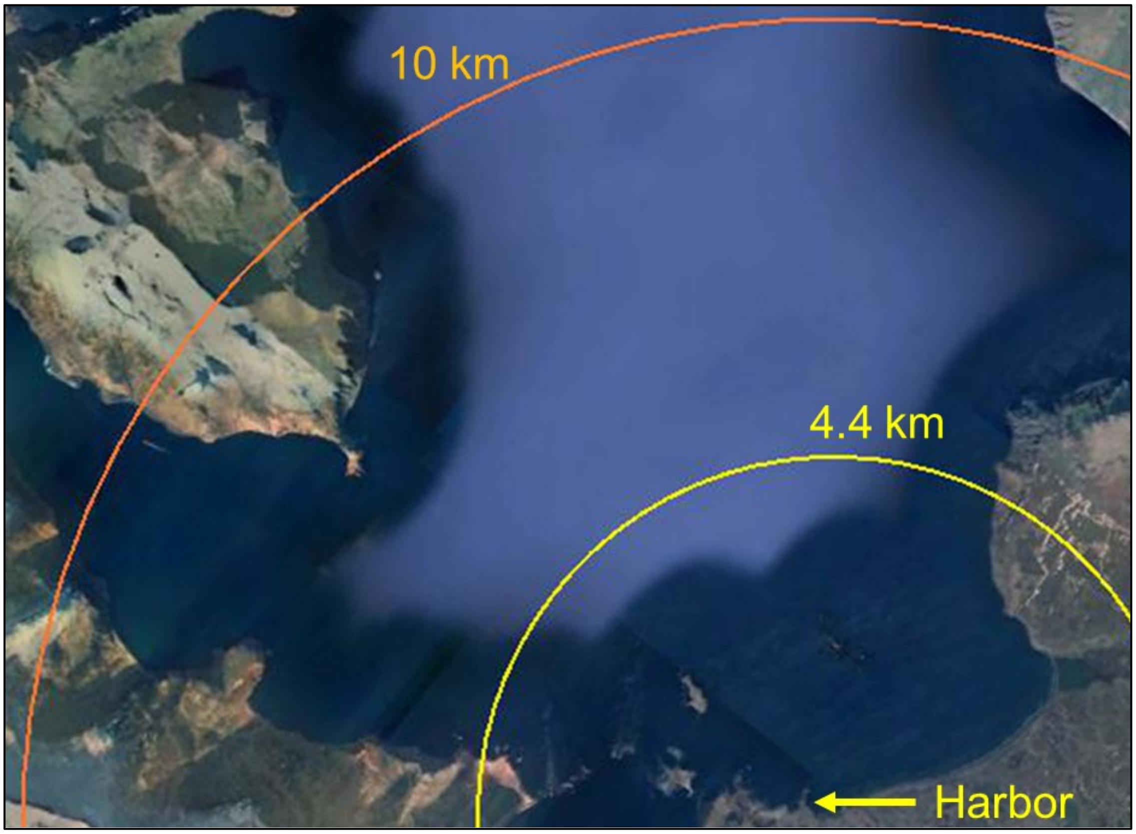


Figure 54. Potential radius of shutdown zones if IHA were not obtained.

8.3.1.3 Marine Birds

The no-action alternative would have no effect on marine birds.

Under all three action alternatives, marine birds within the area of construction may be displaced in the short term due to construction activities and result in overall minor effects. Marine birds within the construction area are typically limited to gulls, kittiwakes, and small numbers of pigeon guillemots. Other marine birds, such as tufted puffins, were not observed in or near the construction footprint of any of the alternatives during the June 2022 shore-based marine mammal surveys or the June 2023 boat-based survey. The nearest aggregations of puffins were on the water on the NE side of Green Island approximately 1.2 miles from any of the harbor site alternatives. No nesting habitat for marine birds is present near any of the harbor alternatives. Nesting puffins and other seabirds' likely nest on the south side of Green Island, but this is not in direct line of site to the harbor alternatives. Tufted puffins and other seabirds do nest in Lost Harbor, but this is over 4 miles from the project site and not in the line of site of the project.

Under all action alternatives, long-term impacts to marine birds near the project site would be minor once the harbor becomes operational. Given that the number of seabirds occupying Green Island is dependent on seasonality (i.e., breeding and nesting) the colonies are distant enough to result in minimal, if any, disturbance during construction. Vessel transits between Akun and Akutan would occur at slow speeds (likely under 10 knots) and would not transit near to seabird aggregations on the water next to Green Island since it is necessary to stay well north of Green Island to avoid the large tide rips that are commonly present. Lighting present on the dock at Akun would be downward shielded to minimize the likelihood of attracting seabirds and causing collisions with structures.

Steller's eiders, which are marine birds, are discussed in Section 8.3.3.

8.3.1 Terrestrial Environment

8.3.1.0 Terrestrial Mammals

The no-action alternative would have no effect on terrestrial mammals.

Alternatives 1 and 2 would have minor effects on terrestrial mammals such as foxes and cattle. Construction of the new road cut may temporarily displace these animals during construction, but these animals are very tolerant of human presence.

Alternative 3 would also have a minor impact on terrestrial mammals as they sometimes are encountered crossing the road, but the only new road section on land would be on the beach between the old hovercraft pad and new harbor site.

8.3.1.1 Terrestrial Birds

The no-action alternative and Alternative 3 would have no effect on terrestrial birds.

Alternatives 1 and 2 would have minor effects on terrestrial birds. Construction of the new road cut may temporarily displace these animals during construction. Vegetation clearing would take place outside of migratory bird nesting windows or a nest survey would be conducted before construction. The only possible nesting habitat in the road cut area is for ground-nesting birds. These birds are unlikely to nest in this area due to cattle traffic and the presence of fox on Akun Island.

8.3.1.2 Terrestrial Vegetation

The no-action alternative and Alternative 3 would have no effect on terrestrial vegetation.

Under Alternatives 1 and 2, it is anticipated that any potential effects on terrestrial vegetation will be limited to the project area during construction activities. The dredged material storage area would be in the sand dunes north of the Salmon Stream. Overall, the effects of Alternatives 1 and 2 would be minor.

8.3.2 Essential Fish Habitat Analysis

The no-action alternative would have no effect on Essential Fish Habitat.

Under all action alternatives, EFH would be adversely affected by in-water construction-related activities: drilling, blasting, dredging of sediments, and the placement of breakwater materials. Some features of the existing EFH would essentially undergo permanent conversion from sandy subtidal-type habitat to a gradation of rocky subtidal, intertidal, and supratidal-type habitats as an effect of breakwater material placement. However, these effects and the permanent loss of some sandy subtidal-type habitat are expected to be limited in scope compared to the quantity and quality of existing EFH in the eastern Aleutian Islands region. Temporary adverse impacts to EFH from construction activities such as increased turbidity, underwater noise, and the presence of construction equipment and vessels is expected to be highly localized.

The USACE has coordinated with NMFS Habitat Division regarding potential dredge material fates and locations, and there exists the potential that EFH adjacent to the project area could be enhanced by the in-water placement of dredged materials through the creation of rocky reef-type habitat where sandy bottom-type habitat currently exists. While upland storage of dredged materials for reuse in the uplands on Akun Island is the intended course of action, it is noted that there could be potential EFH enhancement opportunities should the dredged materials need to be placed in water if there are new developments during the PED phase of this project. The USACE would coordinate any potential EFH enhancement actions with NMFS Habitat Division.

The USACE engaged NMFS Habitat Division early in the development of this project and was able to minimize the extent of the impact to EFH through the site selection and project footprint size process. The USACE similarly provided the language included in this document as its preliminary assessment of effects to EFH to NMFS Habitat Division and in response, NMFS Habitat Division recommended that the timing of any potential blasting activities be offset to the greatest degree practicable with the known salmon immigration and outmigration periods of the adjacent salmon bearing stream. NMFS Habitat Division also noted that compensatory mitigation for the loss of or permanent conversion of EFH was not being offered.

8.3.3 Federal and State Threatened and Endangered Species

The no-action alternative would have no effect on threatened and endangered species.

As discussed in Section 8.3.1.2 (Marine Mammals), an IHA would be pursued during the PED phase of this project. As part of the overall IHA process, when ESA-listed marine mammals are included in the IHA application a Biological Assessment is prepared by USACE and Biological Opinion would be prepared by USFWS and NMFS. This ESA consultation process cannot precede the IHA process since take numbers agreed upon in the IHA inform the ESA consultation. Steller's eiders, since they are not marine mammals, are not part of the IHA process, but they would be included in the

USFWS BA so that all USFWS species would be covered under a single consultation using the most up to date information from the PED phase.

As they will be discussed in the IHA (except marine birds) and BA during the PED phase, discussions about individual species of ESA-listed species is not presented in this section. Based on what is already generally understood about the project construction and the ESA-listed species, there does not appear to be any chance of a jeopardy determination for any listed species. Effects to ESA species as a resource category are considered moderate in that there will be disruption (for which we are obtaining an IHA) but effects would not result in mortality and would be limited to the period of construction involving blasting and pile driving.

8.3.4 Special Aquatic Sites

The no-action alternative would have no effect on Special Aquatic Sites.

None of the action alternatives would affect the Alaska Maritime National Wildlife Refuge as there is no land managed by them inside the project footprints. All three action alternatives also avoid the anadromous stream near the old hovercraft pad. There would be no effect to the refuge or the anadromous stream.

Intertidal habitat (i.e., vegetated shallows) would be subject to minor impacts from the construction of any of the three action alternatives. Over time, the new breakwaters and harbor basin would colonize with algae and invertebrates and serve as fish habitat.

8.4 Subsistence Use

Section 803 of the Alaska National Interest Lands Conservation Act (ANILCA) defines subsistence use as “the customary and traditional uses by rural Alaska residents of wild, renewable resources for direct personal or family consumption of food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of nonedible byproducts of fish and wildlife resources taken for personal or family consumption; for barter, or sharing for personal or family consumption; and for customary trade.” Subsistence activities are of vital importance to the Native Village of Akutan. This section analyzes whether the proposed alternatives would impact *access* to subsistence opportunities at Akun Island.

The Alaska Land Use Council wrote that a significant restriction of subsistence use occurs if “a proposed action... can be expected to result in a substantial reduction in the opportunity to continue subsistence uses of renewable resources” (ALUC 1984). Additionally, the U.S. District Court Decision of Record in *Kunaknana vs. Watt* [No. A83-337 CIV, D. Alaska Dec. 20, 1983] stated that “restrictions for subsistence uses would be significant if there were large reductions in abundance or major redistribution of these resources, substantial interference with harvestable access to active subsistence-use sites, or major increases in non-rural resident hunting.” These access concerns include not only the physical access to subsistence areas but potential increases to the cost of their use and potential increases in competition for subsistence resources.

The no-action alternative would have no effect on current access to or use of subsistence resources on Akun Island.

The action alternatives all have the possibility of increasing the Native Village of Akutan‘s access to subsistence resources on Akun Island. A safe harbor may allow additional community members to travel to Akun Island to participate in subsistence fishing, harvesting, or other related activities. Of the three alternatives, a concern has been expressed that Alternative 3 may impact juvenile salmon out-migrating from the nearby salmon stream due to the creation of rockier habitat, which could increase predation by rockfish species.

8.5 Cultural Resources

The no-action alternative would allow natural and biological erosion activities to continue to impact cultural resources in Surf Bay.

The action alternatives all have a similar potential to impact subsurface archaeological sites. All alternatives are located within the Surf Bay Archaeological District (UNI-00103), which comprises multiple known subsurface cultural features with unknown boundaries. Any ground-disturbing activities, such as the construction of a road from the airport to the harbor, are likely to have an adverse effect on historic properties. USACE identified the Area of Potential Effect (APE) for the Recommended Plan, Alternative 2, in accordance with 36 CFR § 800.4(a)(1).

8.5.1 Area of Potential Effect

The Area of Potential Effect (APE) for the Recommended Plan encompasses both General Navigation Features (GNF) and Local Service Facilities (LSF). GNF includes the harbor entrance channel and turning basin south of No-name Point protected by a 400-foot-long rubble mound breakwater toed into the base of No-name Point. Local service facilities required would include a 560-foot long by 12-foot-wide rubble mound causeway, sheet pile dock, 60-foot by 40-foot mooring basin with mooring dolphins, 7,000 square foot pad for loading/unloading freight, and a 1,100-foot-long road connecting the harbor areas with the existing pad associated with Surf Bay Inn, and a temporary materials stockpile location northeast of the existing hovercraft pad, north of the Salmon Stream. The APE also includes a temporary access-route to the stockpile location and the location of the temporary workforce camp that will likely be set up during construction (Figure 55).

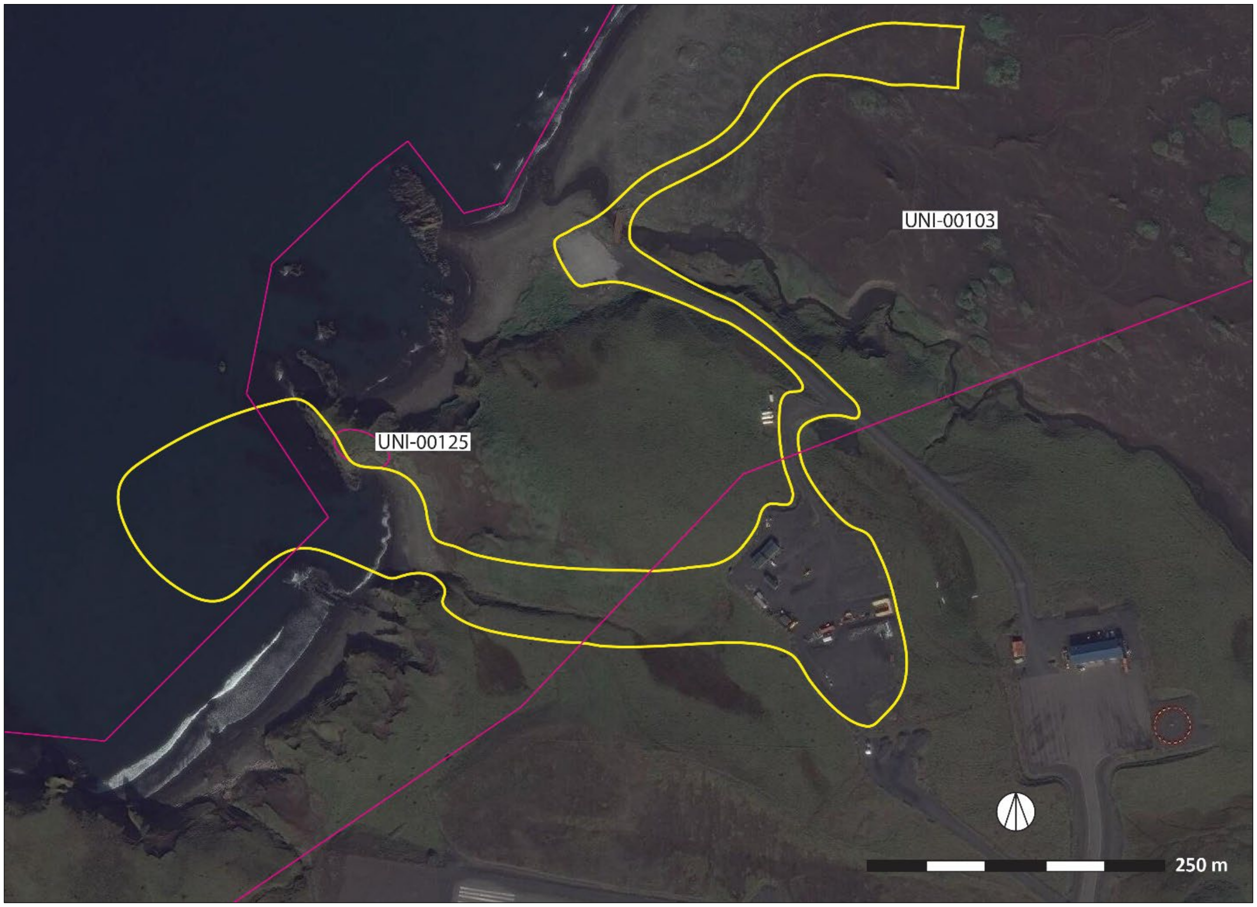


Figure 55. Approximate APE outlined in yellow; approximate boundaries of historic properties outlined in pink.

The APE is approximately 20 acres. The APE overlaps portions of both the Surf Bay Archaeological District (UNI-00103) and Sanaĝan site (UNI-00125). Pedestrian archaeological surveys conducted in support of previous undertakings have occurred across the entirety of the APE. Limited shovel testing, trowel testing, and excavations have also occurred within the APE. These excavations encountered cultural materials up to 65 centimeters below ground surface (CRC 2016); however, no excavations within the APE were excavated to sterile soil (Sarah Meitl, Pers. Comm. 19 December 2023). The depth of cultural materials within the APE is unknown.

Due to the volcanic geology of Akun Island and the nature of the known cultural materials within the APE, identification of additional subsurface archaeological features via a geophysical survey (e.g., magnetometry, ground-penetrating radar) is unlikely to be successful. As it is impractical and cost-prohibitive to conduct sufficient archaeological testing to bedrock in mixed sand and paleosols across the entire APE in order to determine the locations of potential subsurface cultural materials, USACE has deferred final identification of historic properties in accordance with 36 CFR § 800.4(b)(2) through the execution of a PA (see Section 8.5 for more information).

8.5.2 Resolution of Adverse Effect

The Recommended Plan, Alternative 2, will require significant upland ground-disturbing activities which are likely to have an adverse effect on historic properties, including the Surf Bay Archaeological District (UNI-00103) and the Sanaĝan site (UNI-00125). In accordance with 36 CFR § 800.5(d)(2), USACE determined that the proposed undertaking has the potential to have an adverse effect on historic properties on 17 June 2023. The SHPO concurred with this finding on 12 July 2023, and agreed that a PA was the appropriate path forward to minimize and mitigate the potential adverse effect, on 19 July 2023. In accordance with 36 CFR § 800.6(a)(1), USACE notified the Advisory Council on Historic Preservation (ACHP) of the finding on 27 July 2023. On 9 August 2023, the ACHP declined to participate in the consultation to resolve adverse effects.

A PA among USACE, the SHPO, the Native Village of Akutan, the AEB, and the City of Akutan was executed, with the assistance Akutan Corporation, APIA, Aleut Corporation, Museum of the Aleutians, and other stakeholders, on 29 March 2024 (see Appendix F, Environmental Correspondence). This PA was developed in accordance with 36 CFR § 800.14(b)(1)(ii); which is appropriate when “effects on historic properties cannot be fully determined prior to approval” of the undertaking. Stipulations to minimize or mitigate adverse effects include archaeological monitoring of all upland geotechnical soil sampling during the phase and upland ground-disturbing activities during the Construction phase. If buried subsurface cultural materials associated with the Surf Bay Archaeological District or the Sanaĝan site are identified, an archaeological excavation (data recovery) will be conducted at the Sanaĝan site.

8.6 Other Required Analyses

8.6.1 Protected Tribal Resources

The Executive Memorandum on Government-to-Government Relations with Native American Tribal Governments of 1994, the Department of Defense American Indian and Alaska Native Policy of 1998, and the Department of the Army Memorandum on American Indian and Alaska Native Policy of 2012 require that USACE assess the impact that Federal projects may have on protected tribal resources and assure that the rights and concerns of Federally Recognized Tribes are considered during the development of such projects. Protected Tribal Resources are defined by the Department of the Army as those natural resources and properties of traditional or customary religious or cultural importance, either on or off Tribal lands, retained by, or reserved by or for Federally Recognized Tribes through treaties, statutes, judicial decisions, or executive orders. 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.

This trust responsibility is discharged in this report through compliance with multiple statutes affecting Protected Tribal Resources (Table 42). The U.S. Government has no treaties with any Alaska Native Tribes. Therefore, in this report, Protected Tribal Resources are generally understood to include natural resources, cultural resources, and access to subsistence resources. At this time, no specific resource(s) have been identified by the Native Village of Akutan.

Table 43. Sections that address Protected Tribal Resources.

Topic	Report Section	Statute	Potential Effects
Natural Resources	Section 3.1 Section 3.2 Section 8.2 Section 8.3	Migratory Bird Protection Treaty Act of 1918, National Environmental Policy Act of 1970, Marine Mammal Protection Act of 1972, Clean Water Act of 1972, Endangered Species Act of 1973, Magnusson-Stevens Fisheries Conservation and Management Act of 1976	Minor impacts as a result of mitigation
Cultural Resources	Section 3.4.3 Section 8.5	National Historic Preservation Act of 1966, National Environmental Policy Act of 1970, American Indian Religious Freedom Act of 1978, Abandoned Shipwreck Act of 1988, E.O. 13007 "Indian Sacred Sites"	Minor impacts as a result of mitigation
Subsistence Use	Section 3.4.2 Section 8.4	Marine Mammal Protection Act of 1972, Endangered Species Act of 1973, Alaska National Interest Lands Conservation Act of 1980	Minor Impacts
Environmental Justice	Section 8.6.2	Clean Air Act (CAA) of 1963, National Environmental Policy Act of 1970 E.O. 12898 "Environmental Justice"	Minor Impacts

8.6.2 Environmental Justice and Protection of Children

In accordance with EO 12898, Federal agencies are required to identify any adverse environmental or human health impacts anticipated from the proposed project, and to determine whether those impacts would disproportionately affect minority and/or low-income communities. Additionally, in accordance with EO 13045, Federal agencies are required to identify any impacts that would disproportionately affect children.

The Native Village of Akutan has been identified as a disadvantaged community.

8.6.2.1 Identification of Adverse Impacts

The proposed development of a harbor at Akun Island does not have the potential to increase the negative impact of any of the twelve environmental justice indices identified by EJScreen on the Native Village of Akutan: Particulate Matter 2.5, Ozone, Diesel Particulate Matter, Air Toxics Cancer Risk, Air Toxics Respiratory Hazard Index, Traffic Proximity, Lead Paint, RMP Facility Proximity, Hazardous Waste Proximity, Superfund Proximity, Underground Storage Tanks, Wastewater Discharge. Any harbor development at Akun Island is 7 miles from the Native Village of Akutan. Although some indices may be increased temporarily at the harbor location during construction, they are not expected to impact the Native Village of Akutan itself.

8.6.2.2 Determination under E.O. 12898

USACE has determined that the Recommended Plan would not have any adverse environmental or human health impacts that would disproportionately affect minority and/or low-income communities. The proposed project may be a benefit to the public health and safety of an economically disadvantaged community by increasing access to natural resources for subsistence purposes, increasing local and regional economic opportunities, increasing welfare of the local population, and adding social and cultural value to the community.

8.6.2.3 Determination under E.O. 13045

USACE has determined that there would be no disproportionate health or safety risks to children as a result of the proposed project.

8.6.3 Cumulative and Long-Term Impacts

The Council on Environmental Quality's (CEQ) regulations for implementing the National Environmental Policy Act (NEPA) define cumulative effects as the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such other actions (40 CFR § 1508.7).

8.6.4 Unavoidable Adverse Impacts

The Recommended Plan would replace 1.6 acres of sandy near shore benthic habitat with rubble mound breakwaters. Constructing the navigation improvements for Akutan would introduce new, minor sources of air emissions, noise, and potential contamination to Akutan, in the form of the ferry vessel replacing helicopter operations between Akutan and Akun Islands. It is likely that the Recommended Plan will have an unavoidable adverse effect on subsurface cultural features associated with the Surf Bay Archaeological District, a historic property. The potential adverse effect to this historic property will be resolved in the development and execution of a PA under NHPA.

8.6.5 Incomplete or Unavailable Information

Information that would be required before construction of the Recommended Plan, but which has been unavailable during Feasibility Phase, includes:

- Project-specific geotechnical information.
- Project-specific physical characterization of the material to be dredged.
- Refinement of the location of the proposed dredged material disposal area through soundings and underwater imagery.
- Quantitative surveys of marine mammal presence within the project area.

8.6.6 Comparison of the Effects of the Project Alternatives

Table 43 summarizes the Environmental Effects by Alternative for the various project related resource categories.

Table 44. Environmental Effects by Alternative.

Resource Category	No Action Alternative	Alt 1	Alt 2	Alt 3
Climate	No Effect	No Effect	No Effect	No Effect
Tides	No Effect	No Effect	No Effect	No Effect
Currents	No Effect	Minor	Minor	Minor
Wave Climate	No Effect	No Effect	No Effect	No Effect
Sea Level Change	No Effect	No Effect	No Effect	No Effect
Water Levels	No Effect	No Effect	No Effect	No Effect
Bathymetry	No Effect	Minor	Moderate	Moderate
Sediments	No Effect	Minor	Minor	Minor
Geology and Topography	No Effect	Minor	Moderate	Moderate
Seismicity	No Effect	No Effect	No Effect	No Effect
Geotechnical Conditions	No Effect	No Effect	No Effect	No Effect
Water Quality	No Effect	Minor	Minor	Minor
Air Quality	No Effect	Minor	Minor	Minor
Noise	No Effect	Moderate	Moderate	Moderate
Climate Change	No Effect	No Effect	No Effect	No Effect
Marine Fishes and Invertebrates	No Effect	Moderate	Moderate	Moderate
Marine Mammals	No Effect	Moderate	Moderate	Moderate
Marine Birds	No Effect	Minor	Minor	Minor
Terrestrial Mammals	No Effect	Minor	Minor	Minor
Terrestrial Birds	No Effect	Minor	Minor	Minor
Terrestrial Vegetation	No Effect	Minor	Minor	No Effect
Essential Fish Habitat	No Effect	Minor	Minor	Minor
Threatened and Endangered Species	No Effect	Moderate	Moderate	Moderate
Special Aquatic Sites	No Effect	Minor	Minor	Minor
Cultural Resources	No Effect	Major	Major	Major
Subsistence Use	No Effect	Minor	Minor	Moderate

8.7 Mitigation Measures

The following sections discuss the cultural and biological mitigation actions that could be proposed with implementation of the Recommended Plan, Alternative 2. The USACE would implement a suite of mitigation measures designed to minimize the impact of the project on the area's biological and cultural resources. While these measures would reduce the potential impacts on resources, they would not eliminate them entirely and it is anticipated that direct and indirect impacts would result from project activities.

8.7.1 Cultural Resources

As described in Section 8.5.2 above, a Programmatic Agreement will be developed to resolve the adverse effect on historic properties in accordance with the National Historic Preservation Act.

8.7.2 Biological Resources

Mitigation actions include those measures that would avoid, minimize, and implement best management practices that have been identified and refined as a function of the resource agency coordination processes for the purpose of conserving relevant resources. Avoidance and minimization mitigation concepts such as those that related to confined underwater blasting and pile driving, will be developed in detail (such as specific distances) through interagency coordination.

While specific distances will be developed during the IHA/ESA process, general details on blasting and pile driving are standard and would be incorporated during construction. For example, all confined underwater blasting charges will be stemmed, which is an industry standard. Stemming ensures the force of the blast is directed to fracturing rock as not going upwards into the water column through the borehole. Further, shutdown distances will be developed for both confined underwater blasting and pile driving. These shutdown distances are intended to limit impacts to marine biota to potential temporary behavioral reactions and protect them against permanent hearing impacts, physical injury, or mortality.

8.8 Summary of Potential Mitigation Measures

For avoiding and minimizing impacts to water quality:

1. Dredging would be conducted to minimize the amount of suspended sediment generated. Best management practices may include:
   - Avoiding multiple bites while the bucket is on the seafloor.
   - No stockpiling of dredged material on the seafloor.
   - No leveling of the seafloor with the dredge bucket.
   - Slowing the velocity (i.e., increasing the cycle time) of the ascending loaded clamshell bucket through the water column.
   - Pausing the dredge bucket near the bottom while descending and near the waterline while ascending.
   - Placing filter material over the holding-scow scuppers to remove sediment from the return water.

2. The contractor would be required to prepare an Oil Spill Prevention and Control Plan. Reasonable precautions and controls would be used to prevent incidental and accidental discharge of petroleum products or other hazardous substances. Fuel storage and handling activities for equipment would be sited and conducted, so there is no petroleum contamination of the ground, surface runoff, or water bodies. Equipment

would be inspected daily for leaks. If leaks are found, the equipment would not be used and pulled from service until the leak is repaired. During construction, spill response equipment and supplies such as sorbent pads shall be available and used immediately to contain and clean up oil, fuel, hydraulic fluid, antifreeze, or other pollutant spills. Any spill amount must be reported in accordance with Discharge Notification and Reporting Requirements (AS 46.03.755 and 18 AAC 75 Article 3).

For avoiding and minimizing impacts to air quality:
The contractors would be required to use equipment that is in good repair and meets applicable emission standards. Best management practices such as wetting work surfaces would be applied if visible lofted dust is noted.

For avoidance and minimization of impacts to pinnipeds and cetaceans:

These measures are extensive and will be covered in detail in the Marine Mammal Monitoring and Mitigation Plan (4MP) that would be prepared as part of the IHA or LOA application process. Additional mitigation measures could be required as part of the Biological Opinions from NMFS and USFWS.

For avoidance and minimization of impacts to EFH:

Piles would be driven with a vibratory hammer to the extent practicable. Pile driving can generate intense underwater sound pressure waves that can disrupt migration and injure or kill fish. Vibratory hammers produce less intense sounds than impact hammers. If an impact hammer is required because of substrate type or the need for seismic stability, piles would be driven as deep as possible with a vibratory hammer before the impact hammer is used.

9. PUBLIC AND AGENCY INVOLVEMENT

9.1 Public/Scoping Meetings

Planning Charrette – 15-16 November 2021
A planning charrette was held in Akutan 15-16 November 2021. This public meeting served as a scoping exercise to assist USACE define its overall project objectives. It was decided over the course of the charrette to study the feasibility of implementing navigational improvements between the Native Village of Akutan and the Akutan Airport on Akun Island.

Community Meeting in Akutan – 11-14 October 2022
USACE team members presented at public meetings in Akutan, which were held in several location over four days and attended by approximately 14 community members and 3 Trident Seafoods personnel. The purpose of this meeting was for USACE subject matter experts to present and coordinate with the community, to continue open communication with the sponsor on the Akutan Harbor Navigation Improvements

project, gather key information to inform OSE analysis for feasibility, interview Trident to gather information for FWOP conditions, and document existing conditions through photos.

Aleutians East Borough Assembly Meeting – 08 March 2023
USACE POA team members presented the TSP to the AEB Assembly in March of 2023. The AEB was unanimous in their support of Alternative 2 as the TSP.

Native Village of Akutan Meeting – 23 March 2023
USACE POA team members presented the TSP to the Native Village of Akutan on 23 March 2023. The Native Village of Akutan was supportive of Alternative 2 as the TSP.

Native Village of Akutan Meeting – 17–18 July 2023
USACE POA team members travelled to Akutan and presented the TSP to the Native Village of Akutan on 17-18 July 2023. The Native Village of Akutan expressed continued support of Alternative 2 as the TSP.

9.2 Government to Government

The Native Village of Akutan, which is the Federally Recognized Tribe of Akutan, is the Non-Federal Co-Sponsor of this study. The Native Village of Akutan has not requested formal Government-to-Government consultation. USACE invited the Native Village of Akutan to pursue Government-to-Government consultations in December 2021, when this study was started.

9.3 Federal and State Agency Coordination

Agency Coordination is underway and ongoing with ADEC, USEPA, NMFS and USFWS. Information on the status of this communication can be found in Table 44.

9.4 Status of Environmental Compliance

Environmental compliance is on-going and will not be completed in the Feasibility phase (Table 44). A USACE policy wavier, permitting POA to conclude MMPA/ESA consultation during the PED phase, has been submitted.

Table 45. Environmental Compliance Table
Items are fully completed (FC), partially complete (PC), or not applicable (N/A).

Federal Statutory Authority	Compliance Status	Compliance Date/Comment
Clean Air Act	**FC**	This project is not reasonably expected to negatively impact air quality. This project is not located in a CAA non-attainment area, and the conformity requirements of the CAA are not applicable.
Clean Water Act	**FC**	401 Certification received on 16 Jan 2024. Dredge placement area is planned for upland storage for reuse.
Coastal Zone Management Act	**N/A**	As of July 1, 2011, the Coastal Zone Management Act Federal consistency provision no longer applies in Alaska.
Endangered Species Act	**PC**	ESA compliance will be finalized during the IHA/LOA process in PED, pending approval of policy exception.
Marine Mammal Protection Act	**PC**	Will be addressed in PED with either and IHA or LOA application.
Magnuson-Stevens Fishery Conservation and Management Act	**FC**	EFH consultation complete. NMFS Letter dated 25 July 2023 concludes no conservation recommendations for the proposed action.
Fish and Wildlife Coordination Act (FWCA)	**FC**	USFWS will not prepare a FWCA Report. They reserve most of their input for the MMPA and ESA process when we have additional project details.
Marine Protection, Research, and Sanctuaries Act	**FC**	Upland storage of dredged materials is planned.
Migratory Bird Treaty Act	**FC**	Pending conservation measures from USFWS.
National Historic Preservation Act	**FC**	A Programmatic Agreement has been executed to resolve likely adverse effects on historic properties.
National Environmental Policy Act	**PC**	Pending signature of the FONSI.
Executive Order 11990: Protection of Wetlands	**FC**	Conservation measures will endeavor to protect the wetlands along the access road where applicable.
Executive Order 12898: Environmental Justice	**FC**	Does not disproportionately 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 13186 Protection of Migratory Birds	**PC**	Pending conservation measures from USFWS.

9.5 Views of the Sponsor

Both the Native Village of Akutan and the Aleutians East Borough support the findings of this study and understands the cost share for design and construction of the Recommended Plan, Alternative 2.

10. PREPARERS OF THE ENVIRONMENTAL ASSESSMENT

The Environmental Assessment was prepared by members of the USACE Alaska District Environmental Resources Section, Hydraulics & Hydrology Section, and Civil Works Branch (Table 45).

Table 46. Preparers of the Environmental Assessment.

Name	Title
Kelly Eldridge	Archaeologist
Chris Hoffman	Biologist
John Olson	Planner
Lauren Oliver	Hydraulic Engineer
Michael Rouse	Chief of Environmental Resources
Erin Stockdale	Chief of Planning
Andria Werning	Economist
CPT Matt Ripperger	Project Manger

11. CONCLUSIONS AND RECOMMENDATIONS

Given the analysis presented throughout this IFR/EA, it was determined that Alternative 2 is the Recommended Plan. There was no NED Plan identified during this study; therefore, a CE/ICA and MCDA was used to identify the best buy plan. Alternative 2 would increase Access Capability to Akun Island over 8 percent, supporting both more sustainable, safe, and reliable transportation in and out of the Native Village of Akutan as well as improving key services such as the delivery of light freight, mail, and medical supplies. The resulting reduction in the cost of essential goods coupled with expanded subsistence and economic opportunities would contribute to the long-term viability of the mixed, subsistence-cash local economy of Akutan. This assessment supports the conclusion that the proposed project does not constitute a major Federal action, significantly affecting the quality of the human environment. Therefore, a draft FONSI has been prepared.

Federal implementation of the Recommended Plan would be subject to the NFS agreeing to enter into a written Project Partnership Agreement (PPA), as required by Section 221 of Public Law 91-611, as amended, to provide local cooperation satisfactory to the Secretary of the Army. Entering into the PPA will ensure compliance with Federal laws and policies.

The Alaska District recommends that the selected navigational improvements plan at Akutan, Alaska be constructed generally in accordance with the Recommended Plan herein, and with such modifications thereof as in the discretion of the Chief of Engineers may be advisable at a certified total project cost (fully funded) of $87,671,000 with the contingency, provided that prior to construction the NFS agree to enter into a PPA and be jointly and severally responsible for all non-Federal obligations and responsibilities, including the following:

a. Provide the non-Federal share of construction costs, as further specified below:

> *1) Provide, during design, the non-federal share of the costs of design for the general navigation features of the project in accordance with the terms of the design agreement for the project;*
>
> *2) Provide, during construction, 10 percent of the costs of the general navigation features of the project minus the Section 1156 waiver and reduced by the ability to pay adjustment;*

b. Provide all lands, easements, and rights-of-way, including those required for relocations and dredged material placement facilities, acquire or compel the removal of obstructions, and perform or ensure the performance of all relocations, including utility relocations, as determined by the Federal government to be necessary for the construction, operation, and maintenance of the general navigation features;

c. Pay, with interest over a period not to exceed 30 years following completion of construction of the general navigation features, an additional amount equal to 10 percent of the construction costs of the general navigation features less the amount of credit afforded by the Federal government for the value of the real property interests and relocations, including utility relocations, provided by the non-Federal sponsor for the general navigation features, reduced by application of the ability to pay adjustment, except for the value of the real property interests and relocations provided for mitigation, which is included in the construction costs of the general navigation features;

d. Ensure that the local service facilities are constructed, operated, and maintained at no cost to the Federal government, and that all applicable licenses and permits necessary for construction, operation, and maintenance of such work are obtained;

e. Give the Federal government a right to enter, at reasonable times and in a reasonable manner, upon the real property interests that the non-Federal sponsor owns or controls for the purpose of operating and maintaining the project;

f. Hold and save the Federal government free from all damages arising from design, construction, operation and maintenance of the project, except for damages due to the fault or negligence of the Federal government or its contractors;

g. Perform, or ensure performance of, any investigations for hazardous, toxic, and radioactive wastes (HTRW) that are determined necessary to identify the existence and extent of any HTRW regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. 9601-9675, and any other applicable law, that may exist in, on, or under real property interests that the Federal government determines to be necessary for construction, operation and maintenance of the general navigation features;

h. Agree, as between the Federal government and the non-Federal sponsor, to be solely responsible for the performance and costs of cleanup and response of any HTRW regulated under applicable law that are located in, on, or under real property interests required for construction, operation, and maintenance of the project, including the costs of any studies and investigations necessary to determine an appropriate response to the contamination, without reimbursement or credit by the Federal government;

i. Perform the non-Federal sponsor's responsibilities in a manner that will not cause HTRW liability to arise under applicable law to the maximum extent practicable; and

j. Comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, as amended, (42

U.S.C. §§4630 and 4655) and the Uniform Regulations contained in 49 C.F.R Part 24, in acquiring real property interests necessary for construction, operation, and maintenance of the project including those necessary for relocations, and placement area improvements; and inform all affected persons of applicable benefits, policies, and procedures in connection with said act.

The recommendations for implementation of navigation improvements for Akutan, Alaska reflect the policies governing formulation of individual projects and the information available currently. They do not necessarily reflect the program and budgeting priorities inherent in the local and State programs or the formulation of a national civil works water resources program. Consequently, the recommendations may be changed at higher review levels of the executive branch outside Alaska before they are used to support funding.

Date	**JEFFREY S PALAZZINI** **Colonel, Corps of Engineers** **District Commander**

12. REFERENCES

Alaska Fisheries Development Foundation (AFDF). 2019. Social Responsibility Onboard Commercial Fishing Vessels in Alaska. Alaska Fisheries Development Foundation, Inc.

Alaska Heritage Resources Survey (AHRS). 2023. Alaska Heritage Resources Survey Database. Office of History and Archaeology, Alaska Department of Natural Resources.

Alaska Land Use Council (ALUC). 1984. Recommended Guidelines for Compliance with ANILCA Section 810.

Alaska Volcano Observatory (AVO). 2023. Akutan Reported Activity. Internet document, https://avo.alaska.edu/volcanoes/activity.php?volcname=akutan&eruptionid=247&page=basic.

Aleut Corporation. 2023. Our History: Our Corporation. Internet document, https://aleutcorp.com/our-corporation/our-history/.

Aleutians East Borough (AEB). 2023. Akun Dock and Breakwater – White paper. Internet document, https://www.aleutianseast.org/wp-content/uploads/2023/02/Akun-Dock-and-Breakwater-Project-White-Paper-Final-1-31-23.docx.

Aleutian Pribilof Islands Association (APIA). 2023. About APIA. Internet document, https://www.apiai.org/about/.

Aleutian Pribilof Island Community Development Association (APICDA). 2023. Purpose and History. Internet document, https://www.apicda.com/about/purpose-and-history/.

Black, Lydia T. 1987. Whaling in the Aleutians. *Études/Inuit/Studies* 11(2):7–50).

Black, Lydia T. 1999. Akutanax: The Krenitzin Islands and Akutan from Prehistory to 1867. In: *The History and Ethnohistory of the Aleutians East Borough*, R. A. Pierce, K. L. Arndt, and S. McGowan, eds. Pp. 33–43. Limestone Press, Ontario.

Black, Lydia T. 2004. *Russians in Alaska, 1732–1867*. University of Alaska Press.

Bureau of Indian Affairs (BIA). 2016. Native Entities in Alaska. Subset of Indian Lands of Federally Recognized Tribes of the United States Map. U.S. Department of the Interior, Office of Trust Services.

Bureau of Ocean Energy Management (BOEM). 2011. Shipwrecks Off Alaska's Coast. Internet document, https://www.boem.gov/about-boem/shipwrecks-alaskas-coast.

Byrd, V. 2001. Wildlife observations at sites in the Krenitzin Islands on June 2001. Memo to the files of the Alaska Maritime NWR. 4 pp.

Byrd, Vernon. 2005. Personal communication to Kate Pearson regarding birds in the project area. V. Byrd, Alaska Maritime National Wildlife Refuge. February 21, 2005.

Case, D. S., and D. A. Voluck. 2012. *Alaska Natives and American Laws* (3rd Edition). University of Alaska Press.

CFEC. 2023. CFEC Public Search Database. https://www.cfec.state.ak.us/plook/#vessels. Accessed 11 March 2023

Cultural Resources Consultants, LLC (CRC). 2006. Eligibility Evaluation for the Surf Bay Archaeological District (UNI-0103). Prepared for HDR Alaska, Inc.

Cultural Resources Consultants, LLC (CRC). 2010. Revised Eligibility Evaluation for the Surf Bay Archaeological District (UNI-103), Akun Island, Alaska. Prepared for DOWL HKM.

Cultural Resources Consultants, LLC (CRC). 2016. Archaeological Investigations in the Surf Bay Archaeological District, Akun, Alaska. Prepared for HDR Alaska, Inc. and the Alaska Department of Transportation and Public Facilities.

Davis, Richard, Richard Knecht, and Jason Rogers. 2016. First Maritime Cultures of the Aleutians. In: *The Oxford Handbook of the Prehistoric Arctic*. T.M. Friesen and O.K. Mason, eds. Pp. 279–302. Oxford University Press.

Denfeld, D. Colt. 1996. The Akutan Whaling and Naval Fueling Station: A History, Akutan Island, Alaska. U.S. Army Corps of Engineers, Alaska District.

Department of Transportation (DOT). 2023. Transportation Disadvantaged Census Tracts (Historically Disadvantaged Communities) Interim Definition Methodology. Internet document, https://www.transportation.gov/priorities/equity/justice40/transportation-disadvantaged-census-tracts-historically-disadvantaged.

Division of Community and Regional Affairs (DCRA). 2023. Community Overview: Akutan. Alaska Department of Commerce, Community, and Economic Development. Internet document, https://dcra-cdo-dcced.opendata.arcgis.com/search?q=akutan.

Eagleton, Matt. 2007. Email from Matt Eagleton, NOAA Fisheries, to Dan Golden, DOT&PF, regarding language in forthcoming letter on EFH and ESA consultation.

Eastern Aleutian Tribes (EATS). 2023. Culture: EAT History. Internet document, https://www.eatribes.org/culture/e-a-t-history/.

Environmental Protection Agency (EPA). 2023. Overview of Environmental Indicators in EJScreen. Internet document, https://www.epa.gov/ejscreen/overview-environmental-indicators-ejscreen.

Fall, J.A., C.L. Brown, N.M. Braem, L. Hutchinson-Scarbrough, D. S. Koster, T.M. Krieg, and A.R. Brenner. 2012. Subsistence harvests and uses in three Bering Sea communities, 2008: Akutan, Emmonak, and Togiak. Alaska Department of Fish and Game, Division of Subsistence Technical Paper No. 371, Anchorage.

Federal Aviation Administration (FAA). 2007. Federal Aviation Administration Alaskan Region Finding of No Significant Impact and Record of Decision for the Final Environmental Assessment for Construction of a Land-Based Airport on Akun Island, Alaska. December.

HDR Alaska, Inc. (HDR) 2004b. Akutan Airport Master Plan Steller's Eider Winter Surveys. Prepared for the DOT&PF, Central Region.

HDR Alaska Inc. (HDR). 2006a. Biological Assessment of Steller's Eider. Prepared for DOT&PF, Central Region. HDR Alaska Inc. (HDR). 2006b. Biological Assessment of the Northern Sea Otter. Prepared for DOT&PF, Central Region.

Holland, Kathryn M. 1992. Rethinking Aleutian Prehistory as Viewed from a Lithic Database. Unpublished PhD dissertation, Arizona State University.

Hudson, Ray, and Rachel Mason. 2014. *Lost Villages of the Eastern Aleutians: Biorka, Kashega, Makushin*. National Park Service, U.S. Department of the Interior.

Kappler, Charles Joseph. 1971. *Kappler's Indian Affairs: Laws and Treaties*, Vol. VII. Department of the Interior. U.S. Government Printing Office.

Knecht, Richard A., and Richard S. Davis. 2001. A Prehistoric Sequence for the Eastern Aleutians. In *Archaeology in the Aleut Zone of Alaska: Some Recent Research.* University of Oregon Anthropological Papers No. 58. D. E. Dumond, ed. Pp. 269–288. University of Oregon Press.

Mason, Rachel. 2010. You Can't Go Home Again: Processes of Displacement and Emplacement in the 'Lost Villages' of the Aleutian Islands. Alaska Journal of Anthropology 8(2):17–29.

McGowan, Sarah. 1999. The Modern Village of Akutan: 1878 to Present. In *The History and Ethnohistory of the Aleutians East Borough*, R. A. Pierce, K. L. Arndt, and S. McGowan, eds. Pp. 45–58. Limestone Press, Ontario.

Mitchell, Donald Craig. 2001. *Take My Land, Take My Life: The Story of Congress's Historic Settlement of Alaska Native Land Claims, 1960–1971*. University of Alaska Press.

Morrison, Aubrey L. 2016. Unangan (Aleut) Subsistence throughout the Medieval Climatic Anomaly: Zooarchaeological Analysis of the Surf Bay Landing Site (1500 B.P. to 700 B.P.) on Akun Island, Alaska. Unpublished MA thesis, University of Alaska Anchorage.

National Oceanic and Atmospheric Administration (NOAA). 2016. Wrecks and Obstructions Database. https://nauticalcharts.noaa.gov/data/wrecks-and-obstructions.html. https://nauticalcharts.noaa.gov/data/wrecks-and- obstructions.html.

National Marine Fisheries Service (NMFS). 2023. ESA and Critical Habitat Species Distribution Mapper. https://www.fisheries.noaa.gov/resource/data/alaska-endangered-species-and-critical-habitat-mapper-web-application.

Office of Minority Health (OMH). 2023. Diabetes and American Indians/Alaska Natives. U.S. Department of Health and Human Services. Internet document, https://minorityhealth.hhs.gov/diabetes-and-american-indiansalaska-natives#:~:text=American%20Indian%2FAlaska%20Native%20adults,whites%20to%20die%20from%20diabetes.

Orth, Donald J. 1967. *Dictionary of Alaska Place Names*. U.S. Government Printing Office, Washington D.C.

Ortiz, I. and Zador, S. 2022. Ecosystem Status Report 2022: Aleutian Islands, Stock Assessment and Fishery Evaluation Report, North Pacific Fishery Management Council, 1007 West Third, Suite 400, Anchorage, Alaska
99501.

Pentec Environmental. 2004. Akutan Harbor Marine Environmental Surveys, July–August, 2004. Report prepared for HDR Alaska, Inc. November 2004. Pentec No. 12214-011.

Pentec Environmental. 2006. Marine Environment Survey July 31, 2005, Akun Island, Alaska. Report prepared for HDR Alaska, Inc. February 23, 2006. Pentec No. 12214-011.

Peterson, R. S. 1967. The land mammals of Unalaska Island: present status and zoogeography. Journal of Mammalogy 48:119-129.

Reedy K. 2016. Kelp-Fed Beef, Swimming Caribou, Feral Reindeer, and Their Hunters: Island Mammals in a Marine Economy. Sustainability. 8(2):113. https://doi.org/10.3390/su8020113

Schmidt, Jennifer I., M. Marchioni, and Matt Berman. 2018. "Adapting to Environmental and Social Change: Subsistence in Three Aleutian Communities." University of Alaska Anchorage Institute of Social and Economic Research, North Pacific Research Board Project No. 1520, Anchorage, AK.

Schroeder, M.T. 2000. Personal observations. Field notes from trip to Akutan Harbor, June 4-11, and June 24-July 1, 2000, primarily to collect fisheries and dive survey information, U.S. Fish and Wildlife Service, Ecological Services, Anchorage, Alaska.

Schroeder, M.T. 2001. Trip report. Wintering wildlife survey, Akutan Harbor, 22 January and 14-18 February, 2001, with an emphasis on Steller's eiders. U.S. Fish and Wildlife Service, Ecological Services, Anchorage, Alaska.

Siddon, E. 2022. Ecosystem Status Report 2022: Eastern Bering Sea, Stock Assessment and Fishery Evaluation Report, North Pacific Fishery Management Council, 1007 West 3rd Ave., Suite 400, Anchorage, Alaska 99501.

Smith, Barbara Sweetland and Patricia J. Petrivelli. 1994. *A Sure Foundation: Aleut Churches in World War II*. Aleutian Pribilof Islands Association. Northern Printing.

Smith, Brad. 2004b. Personal communication to Sirena Brownlee regarding marine mammal occurrence and response to hovercraft operations. B. Smith, NOAA Fisheries. Anchorage, Alaska.

Spaulding, Philip T., and Jack Pierce. 1954. An Archeological Survey of the Krenitzin Islands, Alaska. On file at the Alaska Resources Library and Information Service, Anchorage.

Turner, Christy G. 1972. Preliminary Report of Archaeological Survey and Test Excavations in the Eastern Aleutian Islands, Alaska. *Arctic Anthropology* 9(2):32–35.

Turner, Christy G. 1974. Report on 1973 Anthropological Fieldwork on Akun Island, Alaska. On file at the State of Alaska Office of History and Archaeology, Anchorage.

Turner, Christy G. 2002. Wet and Chilled with Fogged-Up Glasses: An Aleutian Photographic Essay in Tribute to William S. Laughlin. In *To The Aleutians and Beyond: The Anthropology of William S. Laughlin.* Publications of The National Museum, Ethnographical Series, Vol. 20. B. Frohlich, A. B. Harper, and R. Gilberg, eds. Pp. 309–332.The National Museum of Denmark.

Turner, Lucien M. 2008. *An Aleutian Ethnography*. R. L. Hudson, ed. University of Alaska Press.

U.S. Army Corps of Engineers (USACE). 2000. Engineering Regulation (ER) 1105-2-100 Planning Guidance Notebook, 20314-1000. Department of the Army.

U.S. Army Corps of Engineers (USACE). 2004. Navigation Improvements, Interim Feasibility Study, and Final Environmental Impact Statement, Akutan Alaska.

U.S. Army Corps of Engineers (USACE). 2017. Implementation Guidance for Section 1105 of the Water Resources and Development Act (WRDA 2016), Remote and Subsistence Harbors. Department of the Army.

U.S. Army Corps of Engineers (USACE). 2019a. Incorporating Sea Level Change in Civil Works Programs. (ER 1100-2-8162). Department of the Army.

U.S. Army Corps of Engineers (USACE). 2019b. Procedures to Evaluate Sea Level Change: Impacts, Responses, and Adaptation. (EP 1100-2-1). Department of the Army.

U.S. Army Corps of Engineers (USACE). 2022. Socioeconomic indicators meeting in the Native Village of Akutan (12–15 October 2022).

U.S. Army Corps of Engineers (USACE). 2023a. Planning Policy for Conducting Civil Works Planning Studies. (ER 1105-2-103). Department of the Army.

U.S. Army Corps of Engineers (USACE). 2023b. Feasibility and Post-Authorization Study Procedures and Report Processing Requirements. (ER 1105-2-61). Department of the Army.

U.S. Census Bureau. 2021. American Community Survey 5-year estimates. Retrieved from Census Reporter Profile page for Akutan, AK https://data.census.gov/profile?g=1600000US0201090

U.S. Fish and Wildlife Service (USFWS). 2007. Biological Opinion on the Effects of the Akutan Airport Project on Steller's Eiders and Northern Sea Otters. May 30, 2007.

U.S. Fish and Wildlife Service (USFWS). 2002c. Comments on the Draft Feasibility Report and Draft Environmental Impact Statement for Navigation Improvements at Akutan, Alaska. Letter to the U.S. Army Corps of Engineers, Anchorage, AK Dec. 2, 2002.

Water Resources Council (WRC). 1983. Economic and Environmental Guidelines for Water and Related Land Resources Implementation Studies.

Waythomas, C. F., K. L. Wallace, and H. Schwaiger. 2012. Tephra-Producing Eruptions of Holocene Age at Akutan Volcano, Alaska: Frequency, Magnitude, and Hazards. American Geophysical Union, Fall Meeting 2012. Abstract ID NH11C-1562.

Williams, Maria Shaa Tláa. 2009. Alaska and Its People: An Introduction. In *The Alaska Native Reader: History, Culture, Politics*. M.S.T. Williams, ed. Pp. 1–11. Duke University Press.

Windfinder 2023. Wind & weather statistics Akutan Airport/Akun Island. https://www.windfinder.com/windstatistics/akutan-airport_akun-island

Witherell, D., Fey, M., & Fina, M. (2012). Fishing Fleet Profiles. Anchorage: North Pacific Fishery Management Council.

Wuebbles, D. J., Fahey, D. W., Hibbard, K. A., Dokken, D. K., Stewart, B. C., & Maycock, T. K. 2019. Climate Science Special Report: Fourth National Climate Assessment, Volume I. Washington, D.C.: U.S. Global Change Research Program. doi:10.7930/J0J964J6.