Akutan Harbor Navigational Improvements
Appendix C: Economics
Akutan, Alaska

Photo Credit: Department of Commerce, Community and Economic Development; Division of Community and Regional Affairs' Community Photo Library

U.S. Army Corps of Engineers
Alaska District

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1.0 OVERVIEW

1.1. Executive Summary

This appendix presents the economic analysis of three structural alternatives and one nonstructural alternative for providing navigation improvements for the village of Akutan at Akun, Alaska. The alternatives are 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 (NED), Regional Economic Development (RED), Environmental Quality (EQ), and Other Social Effects (OSE).

Consistent with the authority of Section 2006 of the Water Resources Development Act of 2007 (WRDA 2007) – Remote and Subsistence Harbors, as amended, a NED analysis was performed, which demonstrated that none of the alternatives had a benefit-cost ratio (BCR) greater than 1.0. Since there is no NED plan, Cost Effectiveness and Incremental Cost Analysis (CE/ICA) is used to support plan selection. The non-monetary metric used in the CE/ICA is Access Capability for the design vessel. The metric refers to the improved opportunity each alternative offers the community to reliably access the transportation network and directly impacts waterborne transportation for Akutan, particularly given the integral significance that the ability to access their airport has on the long-term viability of the community.

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. Multiple Criteria Decision Analysis (MCDA) is used to account for these OSE benefit intricacies. A focus group was conducted in October 2022 with key community members (i.e. skiff owners, retired and current commercial fishers, elected government officials and representatives, tribal members, village corporation members, and Aleut corporation 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.

The results of the NED analysis (BCR’s and Net NED benefits), the Environmental Quality (EQ) analysis, the Regional Economic Development analysis (RED), the OSE analysis (including CE/ICA and the MCDA) are summarized in Table 1. Note that Alternative 2 has the highest average annual net NED benefits, but the BCR is below 1.0. The FWOP condition and Alternative 2 are identified as Best Buy plans through the CE/ICA, meaning these alternatives provide the greatest increase in output for the least

increase in cost. The subsequent MCDA analysis ranks Alternative 1 and 2 highest in the OSE criteria that describe long-term community viability concerns, with Alternative 2 becoming the highest ranked plan with the CE/ICA variables of cost and Access Capability included. These analyses inform plan selection as detailed in the main report of the Draft Integrated Feasibility Report and Draft Environmental Assessment. Alternative 4, the nonstructural larger helicopter scenario, was not a best buy and did not meet the project objectives and therefore was dropped from further consideration and is not included in this summary table.

Table 1. 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

1.2. Purpose and Scope

The purpose of this economic analysis is to evaluate whether the proposed navigation improvements at Akun, Alaska, are economically justified.

1.3. General Methodology

This section describes the methods used to conduct the economic analysis of the proposed navigation improvements at Akun. The study was conducted, and the report prepared in accordance with goals and procedures for water resources planning as contained in Engineer Regulation 1105-2-100, Planning Guidance Notebook, specifically in the appendices on economic and social considerations, along with the project authorization, as well as recent ERs and Economic Guidance Memoranda (EGMs) issued by Headquarters USACE. Alternatives were examined for their feasibility, considering engineering, economic, environmental, and other criteria.

Compilation of this report included a literature review of published information on the history, present status, and prospects for transportation at Akun. Primary data collection

was conducted through focus groups, personal interviews, and other follow-up research and data gathering.

National Economic Development (NED) benefits are defined as the change in value of goods and services that accrue to the Nation as a whole as a result of constructing a project. National Economic Development costs are defined as the total economic costs of constructing and maintaining the project. The average annual economic benefits of the project are compared to the average annual economic costs to provide an estimated benefit-cost ratio (BCR). A project with a BCR greater than 1.0 is considered NED justified. The project that reasonably maximizes net NED benefits is the NED plan.

The regional economic development (RED) account displays changes in the distribution of regional economic activity (for example, income and employment). 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. The environmental quality (EQ) account measures positive and negative benefits to the environment and is analyzed consistent with current guidance.

All prices listed in this appendix are reported in FY24 dollars. All costs were calculated using Fiscal Year (FY) 2024 (October 2023) price levels and then converted to Average Annual Equivalent values using the FY 2024 Federal discount rate of 2.75 percent, assuming a 50-year period of analysis.

NED benefits are assessed for the alternatives identified in the Project Alternatives section and follow the methodology for small boat harbor navigation analysis described in the Planning Guidance Notebook and other relevant USACE regulations and policy guidance. For Akutan, the main NED benefit equals the difference between future without- and future with-project costs associated with transportation (transportation cost savings).

This study utilizes the project justification allowed under Section 2006 of WRDA 2007 – Remote and Subsistence Harbors, as modified by Section 2104 of the Water Resources Reform and Development Act of 2014 (WRRDA 2014) further modified by Section 1105 of WRDA 2016. Additional information on the authorities utilized, the requirements that must be fulfilled, and how the Akutan study meets those requirements, can be found in the IFREA Section 1.2, Project and Study Authority, along with Section 1.2.1 of the IFREA. The authority specifies that in the absence of a NED Plan and/or the selection of a plan other than the NED Plan is based in part or whole on non-monetary units (such as Environmental Quality and Other Social Effects accounts), then the selection will be supported by a Cost Effectiveness and Incremental Cost Analysis (CE/ICA) consistent with ecosystem restoration evaluation procedures. The future with- and without-project evaluation framework is similar for both the NED analysis and CE/ICA and is described in subsequent sections as appropriate.

2.0 INTRODUCTION

2.1. Historical Information

The history of Akutan can be traced to the middle of the 18th century and extended in time to remote prehistory based on archeological data.[1] The Chulka area on Akun Island was occupied from at least 780 AD until 1878, when the people moved to Akutan where there was a trading post (Holland 1982).

Akutan began in 1878 as a fur storage and trading port for the Western Fur & Trading Company. The company's agent established a commercial cod fishing and processing business that quickly attracted nearby Unangan to the community. A Russian Orthodox church and a school were built in 1878 and the Alexander Nevsky Chapel was built in 1918 to replace the original structure. The Pacific Whaling Company built a whale processing station across the bay from Akutan in 1912. It was the only whaling station in the Aleutians and operated until 1939. After the Japanese attacked Unalaska in June 1942, the U.S. government evacuated Akutan residents to the Ketchikan area. The village was re-established in 1944, although many villagers chose not to return. This exposure to the outside world brought many changes to the traditional lifestyle and attitudes of the community. The city was incorporated in 1979[2].

2.2. Project Location and Description

The community of Akutan is located on Akutan Island, in the eastern Aleutian Island archipelago, 35 miles east of the city of Unalaska/Dutch Harbor and approximately 766 air miles southwest of Anchorage (Figure 1). It is situated on the eastern side of Akutan Island, on a flat piece of land with the steep slope of a mountain rising behind the village, confining the community to a small area. Akutan is situated on the north shore of Akutan Harbor, a large deep body of water protected by the island’s active volcano (also called “Akutan”) that blocks much of the prevailing easterly winds of the Aleutian Islands. The bay accommodates large vessels, including floating processors, and large container and cargo ships that service both Akutan as well as the large adjacent shore-based seafood processing facility, Trident Seafoods (Trident).

[1] The History and Ethnohistory of the Aleutians East Borough. Lydia T Black. 1999
[2] Alaska Department of Commerce, Community, and Economic Development Division of Community and Regional Affairs

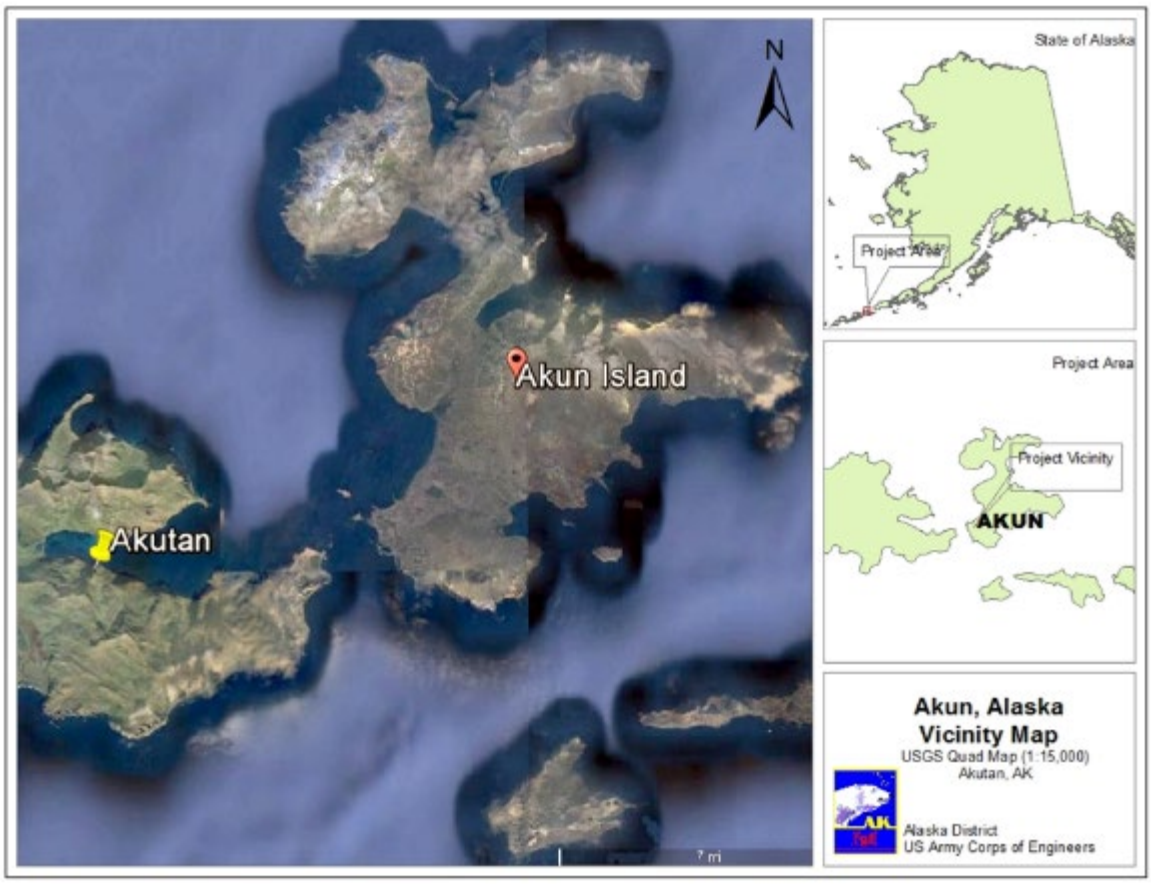

Figure 1. Akun Navigation Improvements Project Location and Vicinity

Akun Island lies immediately northeast of Akutan Island and has a land area of 64 square miles. Akun and Akutan islands fall within the southwest maritime climate zone, characterized by persistently overcast skies, high winds, and frequent cyclonic storms. High winds and storms are frequent in the winter, and fog is common in the summer. The islands of Akutan and Akun are in a maritime climate zone, characterized by mild winters and cool summers. According to NOAA, mean temperatures range from 22 to 55 °F (-5 to 13 °C) and precipitation averages 28 inches per year.

Akutan is part of the Aleutians East Borough. Present in the community are 2 local governments, the Native Village of Akutan (a federally recognized tribe with an active tribal council) and the City of Akutan (incorporated as a second-class city in 1979). The City of Akutan represents populations that reside in the village of Akutan, with about 113 year-round residents, most of whom are of Alaska Native ancestry, as well as transient Trident employees who reside in dormitories at the facility. The Akutan Corporation, with its headquarters in the community, is an Alaska Native village corporation organized under the provisions of the Alaska Native Claims Settlement Act (ANCSA). Both historically and currently there has been little interaction between the two populations,

and the populations were further self-isolating during the COVID pandemic. Minimal village residents are employed by Trident.

The islands and adjacent waters are resource-rich with various species of fish and marine mammals, productive intertidal reefs, and bird rookeries. While they are not indigenous, feral cattle and red foxes are present.

2.3. Problems and Opportunities

Akutan is only accessible by boat or amphibious aircraft. In 2012, an airport was opened on the neighboring Akun Island to provide a link between inhabitants of the village of Akutan and mainland Alaska. Initially, the Aleutians East Borough used a hovercraft to transport passengers between Akutan and Akun. However, operation costs of the hovercraft exceeded $4 million annually and it was minimally effective due to wave threshold limitations. The hovercraft was discontinued in February 2014. The Borough currently utilizes helicopter transport, which costs approximately $2.3 million annually. The Borough believes that transport via a conventional marine vessel would be much less financially burdensome, but there are currently no marine facilities on Akun Island.

2.4. Infrastructure

2.4.1. Marine Facilities

Trident Seafoods, one of the largest fish processing plants in Alaska, is located about one-quarter of a mile west of the village and includes several commercial docks for fishing vessels.

The City has a 100’ public dock that can accommodate most freighters and fishing vessels, as well as the state ferry Tustumena. A small skiff moorage area is also located near the community.

Figure 2. Aerial View of Akutan Ferry Dock

The City's boat harbor, located at the head of the bay, provides moorage for 58 vessels ranging up to 165 feet in length, serves as a place of refuge for disabled craft, and adds an important link in the community's transportation network[3].

Akutan Harbor Amenities include:

- Moorage up to 58 vessels for up to 165'.
- Channel entrance: 100' wide and 18.5' deep.
- Two armored stone breakwater sections.
- Approximately 12-acre basin.
- Float A is 560' x 16' with a 6' x 60' gangway which accommodates up to 10 vessels, up to 165' in length & 2 vessels up to 125' in length.
- Harbor electrification project is complete.
- Construction of new harbormaster house is fully operational, with electricity and water/septic systems in place.

[3] https://akutanharbor.com/

Figure 3. Aerial View of the Akutan Harbor, Head of the Bay

Figure 4. Akutan Harbor dock, Head of the Bay
Source: City of Akutan, https://akutanharbor.com

The Akutan harbor is an economic asset to the community and the Borough. The Borough believes it's necessary to complete the float system in its entirety so the harbor can function as intended, meet the needs of the community, and realize its full potential

as a key harbor for the fishing industry and the North Pacific fishing fleets. The Akutan Harbor Float System Project consists of installing a new timber main float (Float B) with a pile-supported access trestle and aluminum gangway; and installing new timber finger floats on the existing Float A, which will cost approximately $15.1 million. The Borough is pursuing grant funds for completion of this project. See Figure 5.

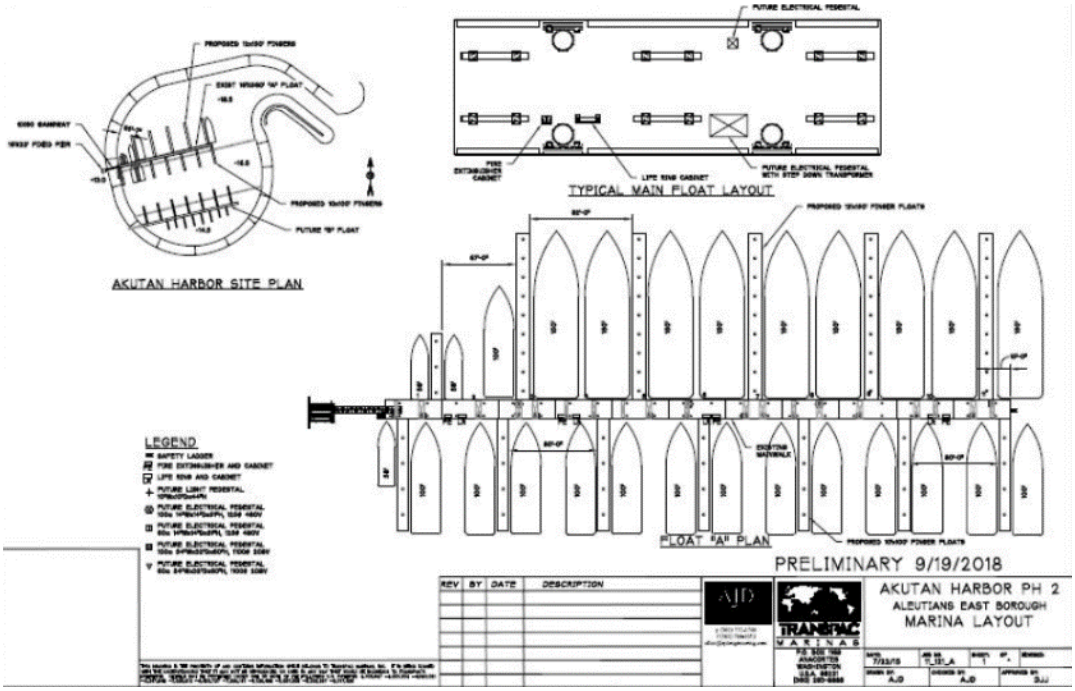

Figure 5. Akutan Harbor Dock Upgrade Plans, Head of the Bay
Source: Aleutians East Borough, https://www.aleutianseast.org/project/akutan-floating-dock-project/

2.4.2. Airport

Prior to 2012, Akutan had only been accessible by boat and amphibious aircraft. The land based Akutan Airport was opened in September 2012 on the neighboring Akun Island, and services Akutan via a helicopter. Daily scheduled air service is provided by fixed wing aircraft from nearby Dutch Harbor/Unalaska and is federally subsidized by the Essential Air Service. Additional information on transportation utilizing the airport can be found in Section 5.1.2.

Figure 6. Akun Island and Airport Location

2.4.3. Public Services and Utilities

Boardwalks connect the homes and facilities for foot and ATV traffic. Except for a one-mile-long road that leads from the village to Trident, 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, a local store, 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). The Akutan Corporation rents apartments to visitors in the Bayview Plaza Hotel and the Salmonberry House.

3.0 SOCIOECONOMICS

3.1. Demographic Profiles

The population of Akutan island in 2020 was 1,589 individuals; with the population divided between year-round residents and transient fish processing workers who live in bunkhouses on the Trident Seafoods campus. Those residing in the village of Akutan totaled less than 8 percent of the overall inhabitants of the island in the year 2020.

Table 2. 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, along with ADF&G Technical Paper 371.
Note: *The population identified as living in "group quarters" in the dataset are those workers employed by, and living on, the Trident Seafoods campus.

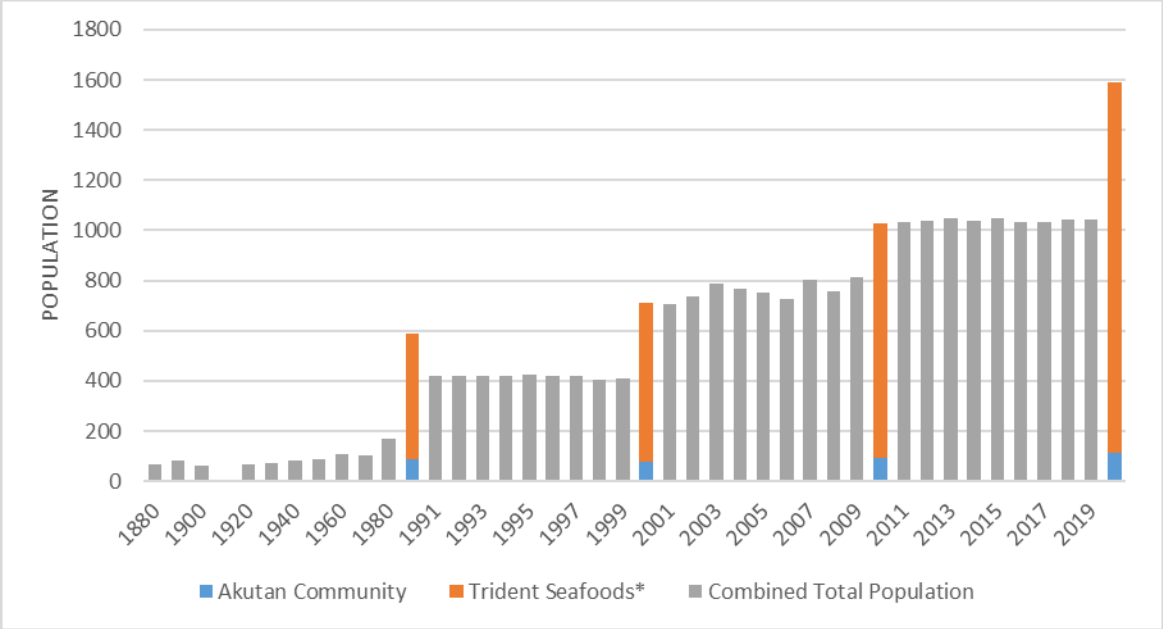

Figure 7: Historical Akutan Village vs Trident Populations, 1880 through 2020
Source: State of Alaska, Division of Community and Regional Affairs and Department of Labor and Workforce Research and Analysis Section, along with ADF&G Technical Paper 371.
Note: *Trident Seafoods expanded to its shore-based processing facility in the 1980's.The population identified as living in "group quarters" in the dataset are those workers employed by, and living on, the Trident Seafoods campus.

According to Alaska Department of Fish and Game subsistence household surveys for 2009, an estimated 88.9 percent of the 40 households of the Village of Akutan had an Alaska Native as head of household, with the total estimated population of Alaska Natives being 81.1 percent.[4] Census records reflect a smaller distribution of Alaska Native in the overall population due to the migratory workers of Trident Seafoods being included within the estimates (see Table 3.) While many population statistics

[4] ADFG Technical Paper 371: Subsistence Harvest and Uses in Three Bering Sea Communities 2008 Akutan Emmonak and Tokian

encompass both populations, there is little interaction between the two populations on the island.

Table 3. Overall Akutan Island Population by Race, 2020

Race	Percent of Total Island Population (includes both Akutan residents and Trident Seafood workers)
American Indian or AK Native	12.15%
Asian	37.98%
Black or African American	15.47%
Native Hawaiian or Pacific Islander	2.81%
White	21.36%
Other Race	8.57%
Two or More Races	1.66%

Source: Division of Community and Regional Affairs, Community Resource Hub

Table 4. Aleutians East Borough Population Projections, 2025 through 2050

Forecast Year	Population Projection	Estimated Population Change from Prior Period	Growth Rate
2025	3,362		
2030	3,353	-9	-0.1%
2035	3,343	-10	-0.1%
2040	3,333	-10	-0.1%
2045	3,308	-25	-0.2%
2050	3,292	-16	-0.1%

Source: Alaska Department of Labor and Workforce Development, Research and Analysis Section

The large numbers of individuals living in group quarters in Akutan, and the Aleutian Islands in general, make island 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, primarily due to forecasted birth and death rates, rather than migration. However, historical populations of Akutan 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 through the study period and does not include Trident Seafoods workers (as the study is formulated to meet the needs of the community of Akutan).

3.2. 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, 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.[5]

Per capita income in Akutan is $34,515, compared to the US at $38.332. However, when observing just the American Indian and Alaska Native segment of the population (which is the best available proxy for eliminating the transient workers from the dataset), the per capita income for Akutan drops to $15,316. 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 (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.

[5] 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>

Table 5. Akutan Employment by Industry

Occupation	Estimated Number Employed
Civilian employed population 16 years and over	585
Agriculture, forestry, fishing and hunting, and mining	0
Construction	3
Manufacturing	445
Wholesale trade	0
Retail trade	9
Transportation and warehousing, and utilities	0
Information	0
Finance and insurance, and real estate and rental and	0
Professional, scientific, and management, and administrative and waste management services	6
Educational services, and health care and social assistance	11
Arts, entertainment, and recreation, and accommodation and food services	11
Other services, except public administration	0
Public administration	100
Total	**585**

Source: American Community Survey, 2021

Business licenses for the community consist of the Akutan Corporation, the Bayview Plaza Hotel, the McGlashan Store, the Salmonberry Inn, the Surf Inn, and the A.C. Apartments[6].

3.2.1. Commercial Fishing

Commercial fishing has played an important role in the local economy of Akutan, although in terms of participation and, to a lesser degree, of income, the role has diminished over time. 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.[7]

[6] State of Alaska, Division of Community and Regional Affairs (DCRA) Information Portal for Akutan. https://dcra-cdo-dcced.opendata.arcgis.com

[7] 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,

Akutan participates in the Community Development Quota (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)

As shown in Table 6, commercial fishery participation and earnings of the residents of Akutan has varied from year to year. Most commercial fishing activity and earnings by Akutan residents is centralized on the halibut longline fishery, with lesser contributions from miscellaneous saltwater finfish, sablefish, herring, and crab. According to interviews with community members, commercial catch is currently sold to Trident.

Emmonak, and Togiak. Alaska Department of Fish and Game, Division of Subsistence Technical Paper No. 371, Anchorage.

Table 6. Commercial Fishing Permit & Activity by Year for Akutan Residents

Year	Number of Permits Issued	Number of Permits Fished	Pounds Landed	Estimated Gross Earnings
2021	2	2	X	X
2020	2	0	0	$ -
2019	7	7	22,626	$ 74,067
2018	9	5	20,022	$ 69,189
2017	10	5	21,421	$ 91,681
2016	10	8	2,024,364	$ 612,708
2015	11	7	2,330,914	$ 607,680
2014	13	9	22,261	$ 86,480
2013	11	7	29,662	$ 67,689
2012	13	10	88,105	$ 177,497
2011	13	9	106,231	$ 247,212
2010	12	10	313,112	$ 229,137
2009	13	8	250,103	$ 151,547
2008	12	8	175,451	$ 276,698
2007	9	9	67,623	$ 210,914
2006	11	8	X	X
2005	12	7	X	X
2004	12	9	51,444	$ 140,071
2003	13	6	45,047	$ 119,942
2002	9	6	29,450	$ 35,177
2001	13	5	54,331	$ 114,688
2000	10	6	37,053	$ 114,009

Source: State of Alaska Commercial Fisheries Entry Commission.
Note: “X” indicates a fishery that is masked by the Commercial Fisheries Entry Commission due to confidentiality. Confidentiality requirements involve masking when 3 or less people or permits are involved in the fishery and, if needed, masking the same fishery for another area in order to show statewide and year totals.

Commercial fishing vessels homeported in Akutan range in size from 16’ to 42’ in length, with the most common length being 18’, for the years 2000-2023. There was a minimum of 1 vessel, and a maximum of 7 vessels, permitted per year during that period.

Table 7. Commercial Fishing Vessels Homeported in Akutan by Length for the Years 2000 through 2023

	Vessel Length			
	>=20 feet	>20-25 feet	>25-30 feet	>30 feet
Vessel Count	7	2	1	3

Source: State of Alaska Commercial Fisheries Entry Commission.

3.2.2. Trident Seafoods

The crab and fish processing industry developed in Akutan in the late 1940’s with the use of numerous floating processors operating in Akutan Bay. By the 1980’s, 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.[8]

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.

3.3. Tax Information

Taxes are levied on raw seafood that is sold/transferred. The Aleutians East Borough collects a 2 percent sales tax (per Section 60.20.030 of Borough Code, "The tax due under this chapter shall be computed by multiplying the sale price by two percent. The sale price includes all forms of consideration given for the raw fish. The tax due on a transaction shall be rounded to the nearest whole cent with fractions of one-half cent and more rounded upward.") Fish tax for the Aleutians East Borough are collected from Akutan, Cold Bay, False Pass, King Cove, and Sand Point and therefore include sources other than Trident Seafoods in Akutan.

The City of Akutan collects a 1.5 percent fish tax.

Neither the city nor the borough reported collecting any taxes beyond the fish tax (no sales tax, bed tax, alcohol tax, or property taxes).

[8] Trident Seafoods. http://www.tridentseafoods.com. (Accessed 2022).

Table 8. Annual Fish Tax Collected, Akutan and Aleutians East Borough, 2012-2022

	Akutan (1.5%)	Aleutian East Borough (2%)
2012	$ 1,222,653	$ 4,789,215
2013	$ 1,663,209	$ 4,121,050
2014	$ 1,715,128	$ 4,073,343
2015	$ 1,816,530	$ 3,998,104
2016	$ 2,098,763	$ 4,268,884
2017	$ 3,337,019	$ 4,714,403
2018	$ 3,337,019	$ 4,951,066
2019	$ 1,985,328	$ 4,530,157
2020	$ 1,985,328	$ 4,714,015
2021	$ 1,688,184	$ 4,057,971
2022	$ 2,061,636	$ 6,054,977

Source: State of Alaska Department of Commerce, Community, and Economic Development, Division of Community and Regional Affairs, Alaska Taxable Reports

3.4. School Enrollment

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

Schools in Alaska are required to have a minimum of 10 students to receive state funding. The stable enrollment shown in Figure 8 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.

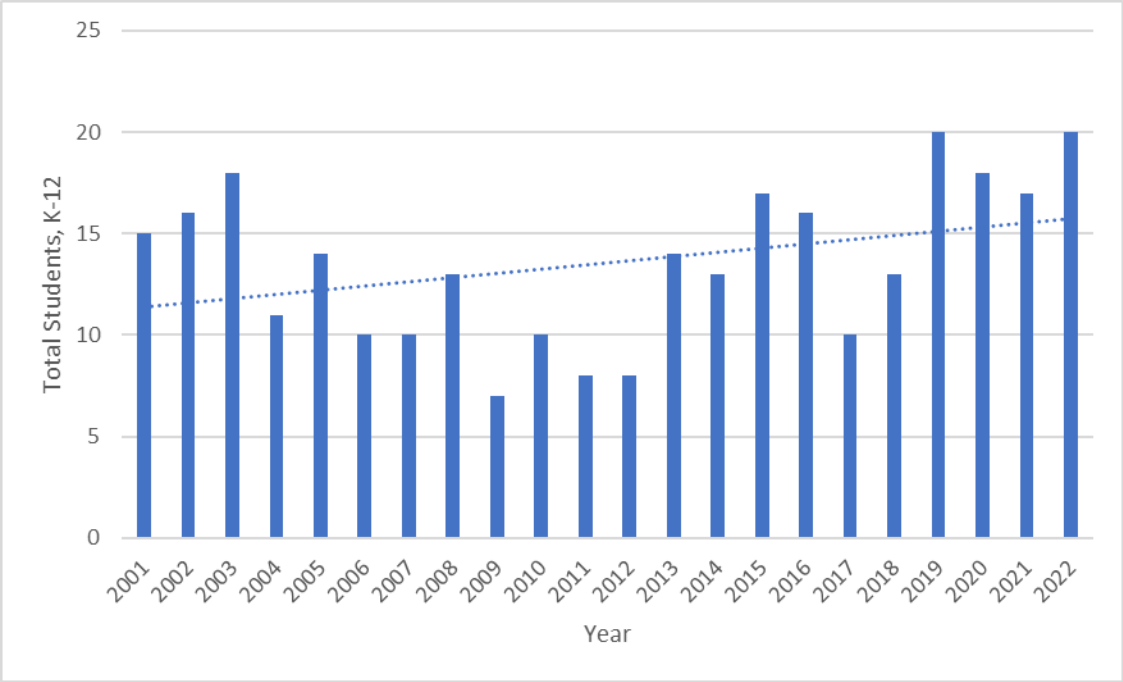

Figure 8: Akutan School Enrollment, 2001-2022
Source: Alaska Department of Education and Early Development

3.5. Subsistence Activities

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.

As is common in many Alaskan communities, subsistence activities in Akutan are an important source of food and cultural tradition. The community 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 snowmobiles, power boats, nets, rifles, and traps, enables individuals to continue to participate successfully in traditional activities across greater distances.

Additional information on subsistence activities is provided in Section 5.3.2.

4.0 MARINE RESOURCE ASSESSMENT

The purpose of a marine resource assessment in an economic analysis is to examine the health of a marine resource stock, potential shifts of marine resources during the study period, and if the baseline marine resources could support any expected potential increases in harvest under a FWP condition. In the case of Akutan, commercial fishing is not anticipated as a primary benefit category under FWP conditions. A minimal marine resource assessment is still presented here to provide background information concerning the primary commercially harvested species in the area and their management.

4.1. Commercial Fisheries Overview

The North Pacific Fishery Management Council (NPFMC) manages the Nation's groundfish and crab fisheries in US Exclusive Economic Zone of Alaska (see Figure 9) through the development of Fisheries Management Plans (FMP). FMPs implement the Council's Groundfish Management Policy "to apply judicious and responsible fisheries management practices, based on sound scientific research and analysis, proactively rather than re-actively, to ensure the sustainability of fishery resources and associated ecosystems for the benefit of future, as well as current generations."

The Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area includes all species of groundfish (pollock, cod, flatfish, sablefish, rockfish, etc.) fished commercially by vessels using trawl, longline, pot, and jig gear.

The NPFMC must coordinate its management of fisheries with state, national, and international agencies, in accordance with the applicable laws and treaties that govern the fisheries.

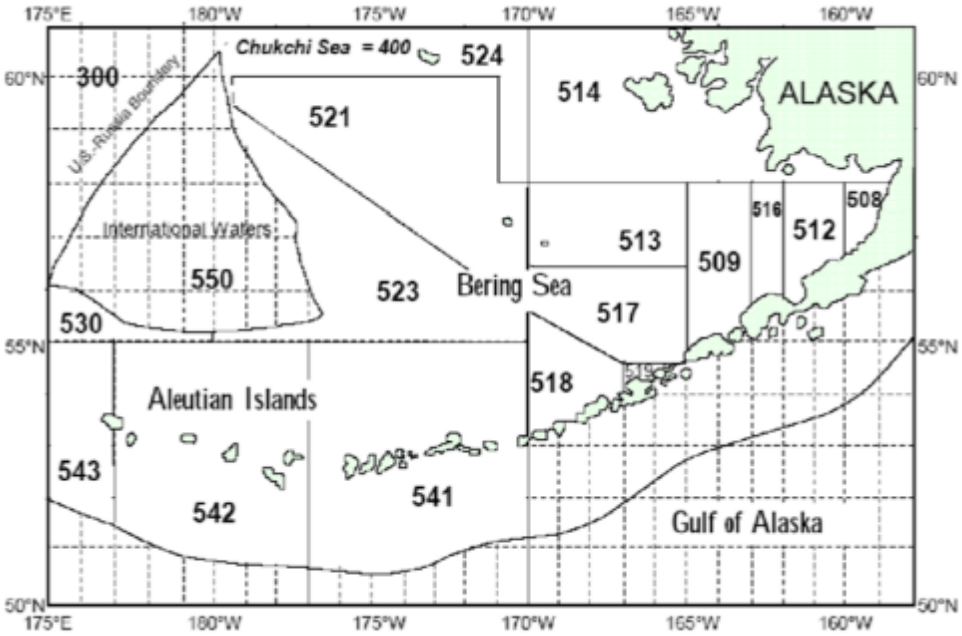

Figure 9: Bering Sea/Aleutian Islands Statistical and Reporting Areas
Source: North Pacific Fishery Management Council, Stock Assessment and Fishery Evaluation Report for the Groundfish Resources of the Bering Sea/Aleutian Islands Regions

4.2. Historical Catch and Value

The National Oceanic and Atmospheric Administration (NOAA) conducts population assessments of fish and shellfish populations as a tool in fisheries management.

The largest commercial fishery by volume for Akutan is Walleye pollock. According to NOAA's 2020 stock assessment, the Aleutian Islands region pollock stock is healthy. The population level is currently above target and not overfished.

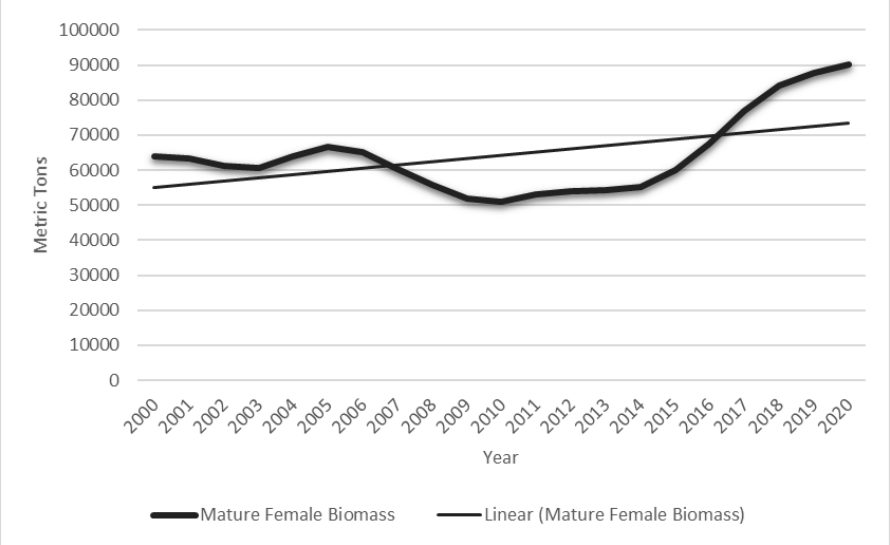

Figure 10: 20-Year Pollock Stock Abundance
Source: NOAA Fisheries

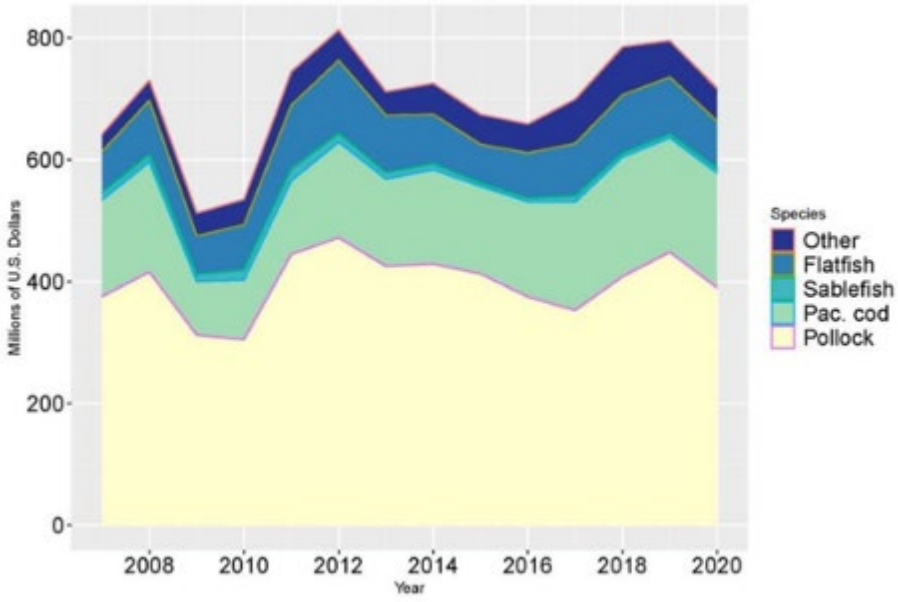

Figure 11: BSAI Groundfish Catch Ex-vessel Value, 2007-2020
Source: https://apps-afsc.fisheries.noaa.gov/refm/docs/2021/BSAIintro.pdf

4.3. Commercial Fisheries Outlook

Overall, the status and health of the stocks continues to appear favorable.

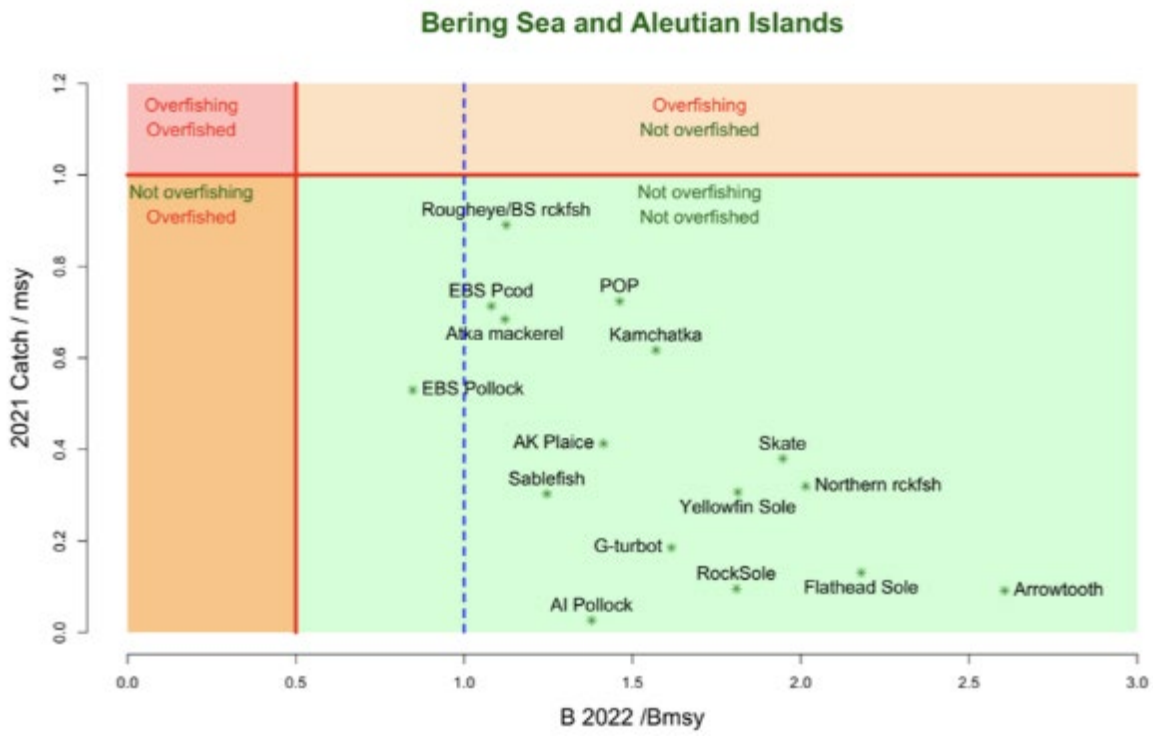

Figure 12: Summary of Bering Sea Stock Status Next Year, Base 2022
Source: Source: North Pacific Fishery Management Council, Stock Assessment and Fishery Evaluation Report for the Groundfish Resources of the Bering Sea/Aleutian Islands Regions

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. A significant decline in the short- or long-term is not anticipated.

5.0 EXISTING CONDITIONS

5.1. 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.

5.1.1. Alaska Marine Highway System Ferry

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 MV Tustumena. The Aleutian chain, including Akutan, does not have scheduled service in the winter due in part to adverse weather conditions. Besides weather, scheduling of ferry service is also heavily dependent on funding levels. According to AMHS Traffic Volume Reports, budget uncertainty resulted in multiple service reductions from 2015 through 2018 which led to subsequent reductions in ridership. As of 2022, once monthly trips through Akutan are scheduled for July through September on the MV Tustumena.

Figure 13: Alaska Marine Highway System, Southwest Route
Source: AMHS Traffic Volume Report, 2019

The MV Tustumena is 296 feet long and 59 feet wide, with a domestic gross tonnage of 2,174 and a service speed of 13.3 knots. This ferry has the shallowest draft of all the AMHS mainline ferries at 14 feet 4.5 inches fully loaded. The MV Tustumena is designed to carry 160 passengers and has a vehicle capacity of 680 linear feet, which is equal to approximately 34 twenty-foot vehicles. There are 6 four-berth and 17 two-berth cabins, as well as 1 wheelchair-accessible cabin. The Tustumena is equipped with a dining room offering sit down food service, observation lounges, a covered heated solarium, a movie lounge, and showers.

Figure 14: MV Tustumena of the Alaska Marine Highway System
Source: AMHS website, https://dot.alaska.gov/amhs/fleet/tustumena.shtml

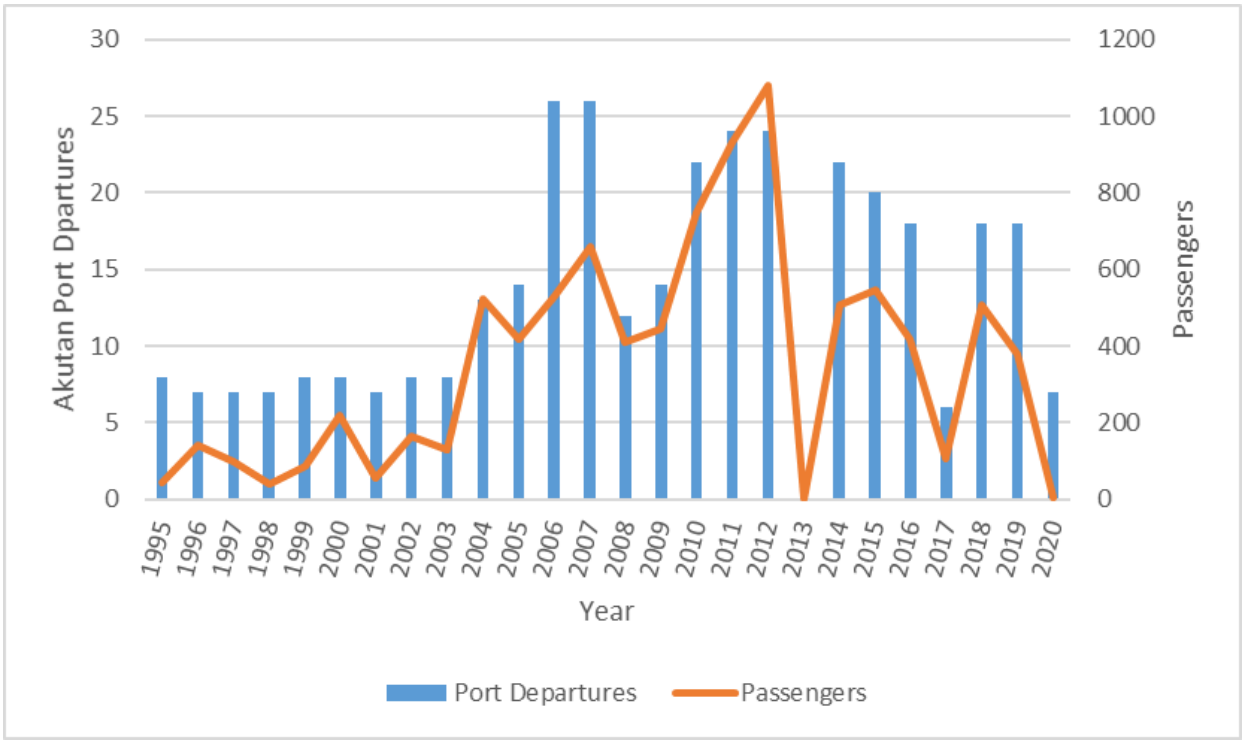

Figure 15. AMHS Akutan Passenger and Port Departures, 1995-2020
Source: 2005-2020 AMHS Traffic Volume Reports
Notes:
-During 2013 service in the Southwest region was severely impacted by delays in the MV Tustumena's annual maintenance project. Limited service to the Aleutian Islands was provided by MV Kennicott, but its moorage requirements exceed what is available in Akutan.
-Passenger counts in 2020 were anomalous due to the COVID-19 pandemic.

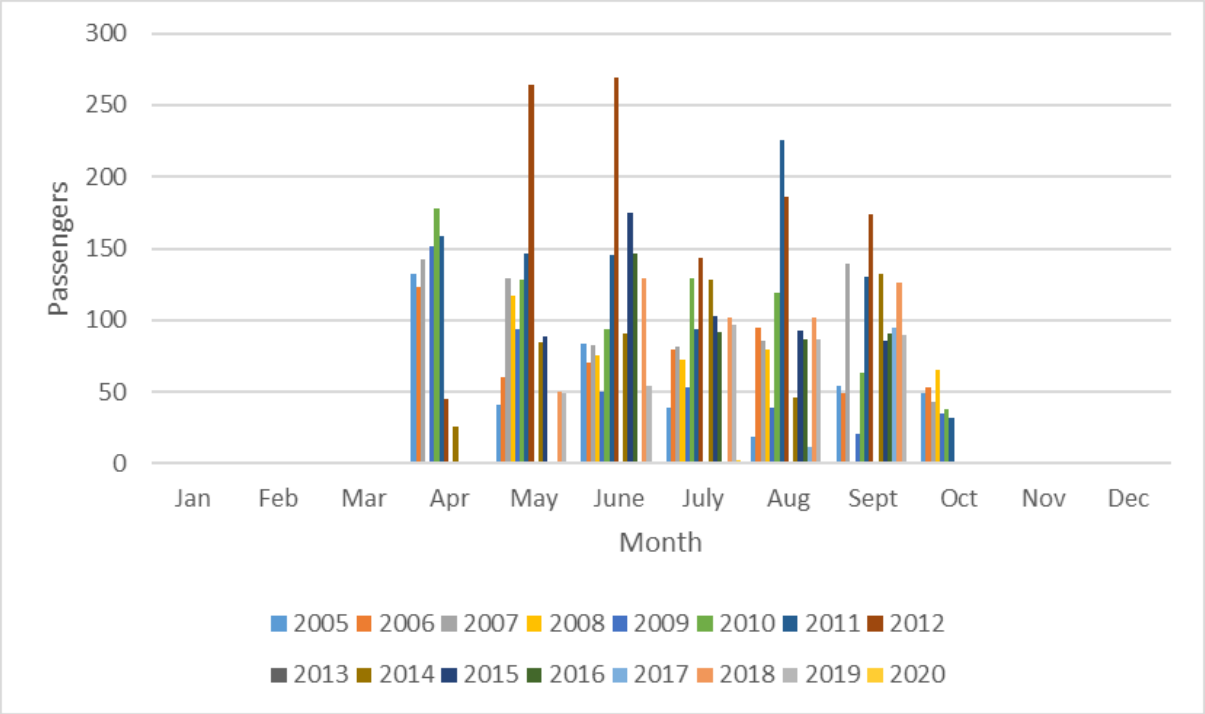

Figure 16. AMHS Akutan Total Monthly Passenger Count, 2005-2020
Source: 2005-2020 AMHS Traffic Volume Reports
Notes:
-During 2013 service in the Southwest region was severely impacted by delays in the MV Tustumena's annual maintenance project. Limited service to the Aleutian Islands was provided by MV Kennicott, but its moorage requirements exceed what is available in Akutan.
-Passenger counts in 2020 were anomalous due to the COVID-19 pandemic.

As evident in Figure 17, over 85 percent of all Akutan AMHS passengers start or end their trip to/from Akutan at Unalaska/Dutch Harbor. Dutch Harbor serves as the regional hub for the Aleutian Islands. Trips on AMHS can last several hours or several days depending upon embarkation and disembarkation ports; the Akutan to Dutch Harbor leg of the journey is estimated to last 3.5 hours.

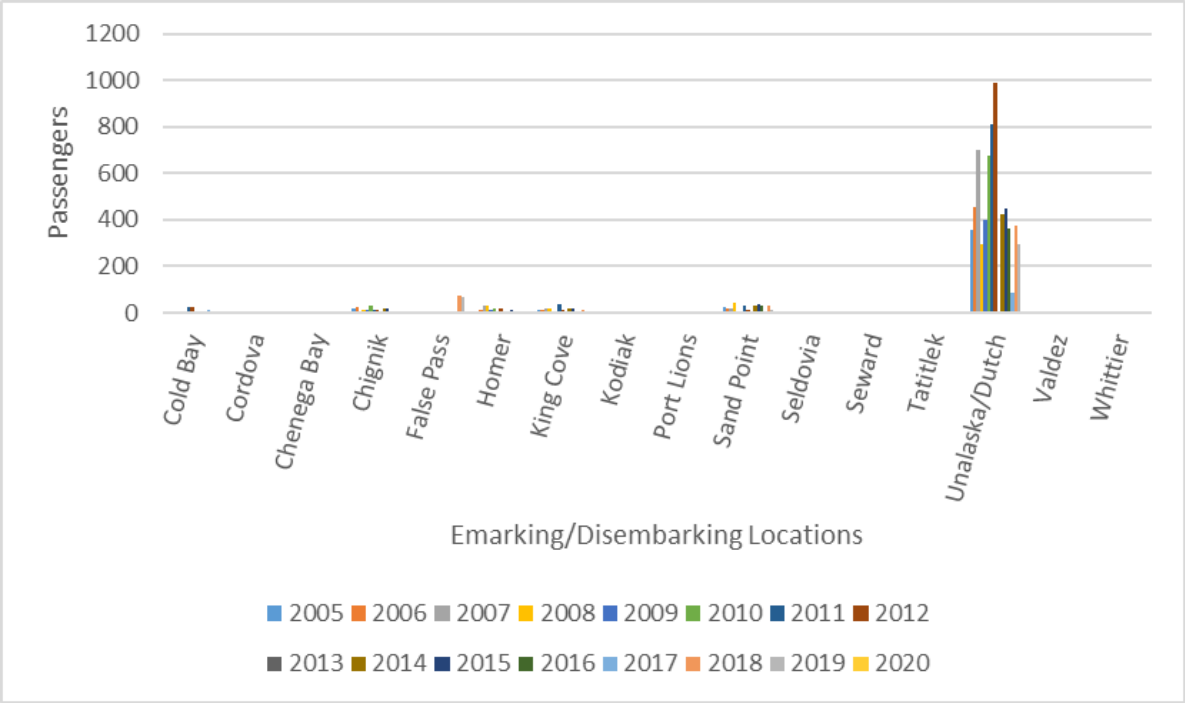

Figure 17. Akutan AMHS Passengers by Embarkation/Disembarkation Port, 2005-2020
Source: 2005-2020 AMHS Traffic Volume Reports
Notes:
During 2013 service in the Southwest region was severely impacted by delays in the MV Tustumena's annual maintenance project. Limited service to the Aleutian Islands was provided by MV Kennicott, but its moorage requirements exceed what is available in Akutan.
Passenger counts in 2020 were anomalous due to the COVID-19 pandemic.

Akutan has utilized the AMHS for limited vehicle transportation to/from the island, with a maximum of 17 vehicle movements in a single year (2010, with 8 vehicles embarking to Akutan and 9 vehicles disembarking). An average of just over 4 vehicle movements per year occur at Akutan, see Figure 18.

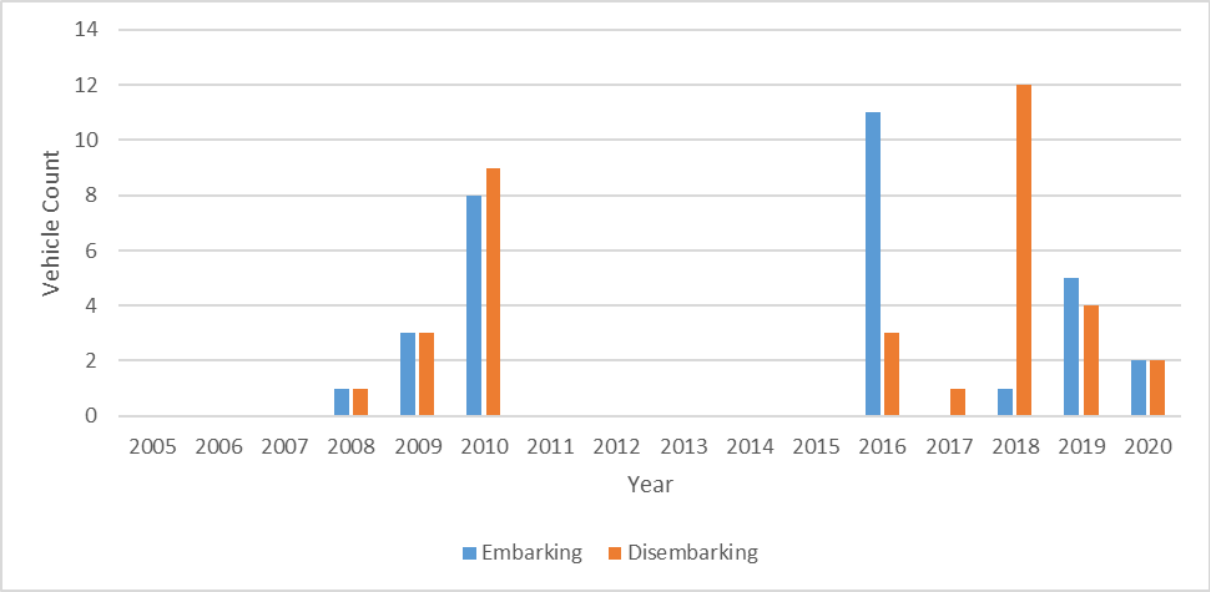

Figure 18. Akutan AMHS Vehicles Shipped, 2005-2020
Source: 2005-2020 AMHS Traffic Volume Reports
Notes:
-During 2013 service in the Southwest region was severely impacted by delays in the MV Tustumena's annual maintenance project. Limited service to the Aleutian Islands was provided by MV Kennicott, but its moorage requirements exceed what is available in Akutan.

5.1.2. Air Transportation

The existing transportation system for Akutan consists of both a helicopter and a fixed-wing aircraft. The helicopter is housed at Akutan Harbor (at the head of the bay) and makes trips back and forth between the community 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.

When a fixed-wing flight is inbound to Akutan Airport, the helicopter crew take a skiff from Akutan to the hangar where the helicopter is based near the small boat Akutan harbor. After coordinating with the fixed-wing aircraft,the crew flies the helicopter to Akutan to pick up passengers. 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 community of Akutan before returning the helicopter to the hangar at the small boat Akutan Harbor. The crew are transported back to the community of Akutan via skiff. Two round trips per day are scheduled, but more or less trips may be necessary. In FWOP conditions, the skiff to and from the hangar will be eliminated since a road to the Akutan Harbor is being constructed.

Figure 19. Akutan Transportation System

5.1.2.1. Essential Air Service

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 9. 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

Source: US Department of Transportation EAS Status Reports
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 two 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.

5.1.2.2. Fixed Wing Service

Access to the airport on Akun is provided by fixed wing aircraft out of Unalaska/Dutch Harbor, Alaska. 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.[9] Flights are scheduled twice daily, six days a week (with no flights on Sundays) on a Beechcraft King Air B-200 or a Piper PA31-350 Navajo Chieftain but the regular schedule may be altered due to demand or weather. They 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.

For the contracted period of April 1, 2021, through March 31, 2023 the Department of Transportation established a 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.[10]

Information on delays due to weather and mechanical issues is included in Section 5.1.2.4.

[9] US DOT Oder 2022-10-2 served October 4, 2022, number DOT-OST-2000-7068-0108 attachment 1
[10] US DOT Oder 2022-10-2 served October 4, 2022, number DOT-OST-2000-7068-0108 attachment 1

5.1.2.3. Maritime Helicopters

Maritime Helicopters provides flight services between Akutan's land-based airport on Akun Island to the village of Akutan. Prior to helicopter operations, a hovercraft was utilized to transport passengers back and forth from Akutan to Akun. The Bell 206L4 helicopter is stationed in Akutan and replaced the hovercraft in 2014 as a more reliable and affordable option (passenger/trip data for the hovercraft service are unavailable).

Cost for the helicopter service is funded through a combination of Essential Air Service grant funds and the Aleutians East Borough (AEB) under two-year contractual agreements. Under this subsidy, 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[11]. As part of that agreement, the AEB provides support services to Maritime for operations according to an agreement with the US Department of Transportation. A few of the highlights of the agreement are shown in Table 10.

Table 10. Essential Air Service Responsibilities

Maritime Responsibilities	**AEB Responsibilities**
Operate the Helicopter to provide Essential Air Service between the community located on Akutan Island the airport located on Akun Island.	The AEB shall provide fuel for the helicopter operation including permitting, owning, and maintaining the remote fuel systems and the fuel dispensing system and billing Maritime for its use.
At Maritime's discretion, be available to operate the helicopter for other missions (i.e., medevacs).	The AEB owns and maintains the Helicopter hangar at the head of Akutan Bay. The Borough shall lease space to Maritime for usage of the hangar for helicopter operations and shall provide transportation for the Maritime personnel between Akutan and the helicopter hangar located at the head of Akutan Bay for a fee.
Conduct mail transport services between the Akutan Airport and the City of Akutan. Coordination with Grant Aviation and U.S. Postal Service is required.	
Maritime shall be responsible for all costs related to lodging for Maritime Personnel.	
Maritime shall establish the fare schedule and be responsible for ticketing and fare collection.	The AEB agrees to pay Maritime for helicopter services.
Maritime agrees to pay AEB a monthly payment for fuel, transportation, and hangar usage services.	

A breakdown of estimated annual helicopter service costs and subsidies are presented in Table 11 for the year 2023.

[11] US DOT Oder 2022-10-2 served October 4, 2022, number DOT-OST-2000-7068-0108 attachment 1

Table 11. Annual Essential Air Service Helicopter Contract Rate Estimate (2023)

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.

Starting in 2012, the Aleutians East Borough committed to providing access between Akutan and the Akun Airport for a period of 20 years 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[12].

Helicopter flights are aligned with the fixed-wing flights, and are scheduled twice daily, six days a week (with no flights on Sundays) year-round.

Table 12. Scheduled Helicopter Operations

Departure	**Arrival**	**Mon**	**Tues**	**Wed**	**Thurs**	**Fri**	**Sat**	**Sun**
Akutan (KQA) 9:50am	Akun (7AK) 10:00am	X		X		X		NA
Akutan (KQA) 11:05am	Akun (7AK) 11:15am		X		X		X	NA
Akutan (KQA) 4:50pm	Akun (7AK) 5:00pm	X	X	X	X	X	X	NA
Departure	**Arrival**	**Mon**	**Tues**	**Wed**	**Thurs**	**Fri**	**Sat**	**Sun**
Akun (7AK) 10:35am	Akutan (KQA) 10:45am	X		X		X		NA
Akun (7AK) 11:50am	Akutan (KQA) 12:00pm		X		X		X	NA
Akun (7AK) 5:35pm	Akutan (KQA) 5:45pm	X	X	X	X	X	X	NA

Source: EAS proposal DOT-OST-2000-7068-0112 dated October 2022

Each flight (either going from Akutan to Akun, or from Akun going to Akutan) is counted as a trip for tracking purposes in this analysis. These trips include a combination of passenger trips and mail/light freight trips. Passenger trips are scheduled as indicated in Table 12, but additional passenger “catch up” trips are made during good weather windows. Freight and mail can be transported on passenger trips when capacity allows, or additional unscheduled trips may also be made to fully deliver packages. While the

[12] Information provided during Project Delivery Team meeting on March 8, 2023 by the Aleutians East Borough

schedule presented in Table 12 would indicate 1,248 annual total trips would be attempted (6 days per week x 4 one-way trips per day x 52 weeks per year), the number of attempted trips is typically much higher when the unscheduled “catch up” and mail/freight trips are included. Typically, four flights per day are scheduled but up to 8 flights (four round trips) can occur when the carriers are attempting to catch up when there is high demand following long-term weather closures.

For the years 2019 through 2022, an average of 1,593 successful helicopter trips were made annually. Unfortunately, trip count data prior to 2019 is not available and trips during the tracked period may be reduced due to the COVID-19 pandemic. Trips for 2019 were 1,729 compared to 2020 (which was the lowest year on record) at 1,472 helicopter trips. See Figure 20 for additional trip counts.

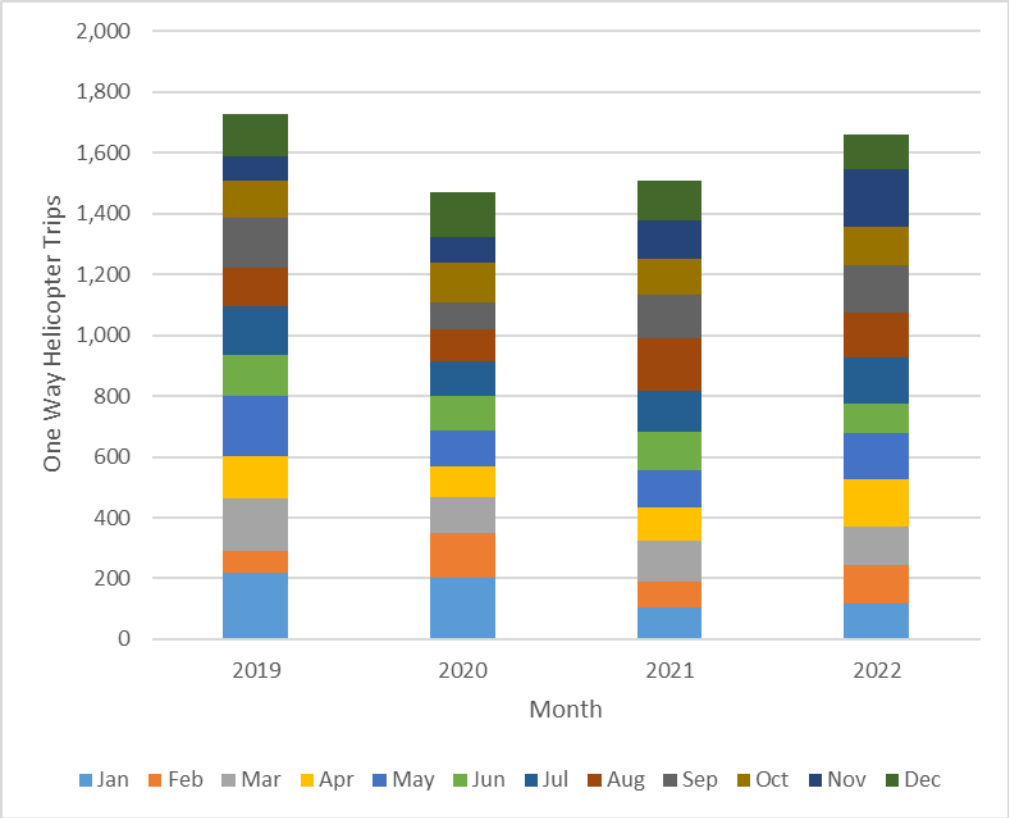

Figure 20. Akutan/Akun Helicopter Trip Segments, 2019-2022
Source: Aleutians East Borough and Maritime Aviation
Notes: Trip counts in 2020-2022 were anomalous due to the COVID-19 pandemic.

The two carriers (helicopter and fixed-wing) coordinate closely prior to each flight. If one carrier must cancel, neither fly. Weather is the primary driver for cancellations of flights in and out of Akun. Weather cancellations can be due to a variety of factors ranging from wind to fog conditions. Weather systems can change quickly in the Aleutian Islands and vary widely between islands. It is not uncommon for the carrier to have to cancel a flight because of bad weather on Akun when the weather at Dutch Harbor is

flyable (and the same in reverse). The fixed-wing carrier, therefore, must cancel fights due to weather more often than the helicopter due to the weather variability caused by the distance between Akun and Dutch Harbor.[13] Over the 2020 to 2022 period, of all cancellations for scheduled flights 29 percent were due solely to the fixed-wing carrier, while 17 percent of the cancellations were solely due to the helicopter, and the remaining 54 percent of cancellations were caused by both carriers being unable to fly due to poor weather conditions. Over this period an average of 519 scheduled flights were cancelled annually due to poor weather.

Usually, two to three times a year severe weather will cause flights to be canceled for 5-7 days in a row. Both the fixed-wing and helicopter are limited by wind and visibility issues in these cases. In the summer months, fog around Akun can also be a factor. The longest duration without a flight was 9 days in December 2022 when two separate weather fronts came through back-to-back.

In addition to weather cancellations, mechanical and maintenance issues with the aircraft can also lead to cancellations (although to a much lesser extent than weather). Over the 2020 to 2022 period, an average of 46 scheduled flights were cancelled on an annual basis due to mechanical and maintenance issues. Again, in this case, the majority of cancellations were due to the fixed wing aircraft (77 percent) rather than the helicopter (23 percent).

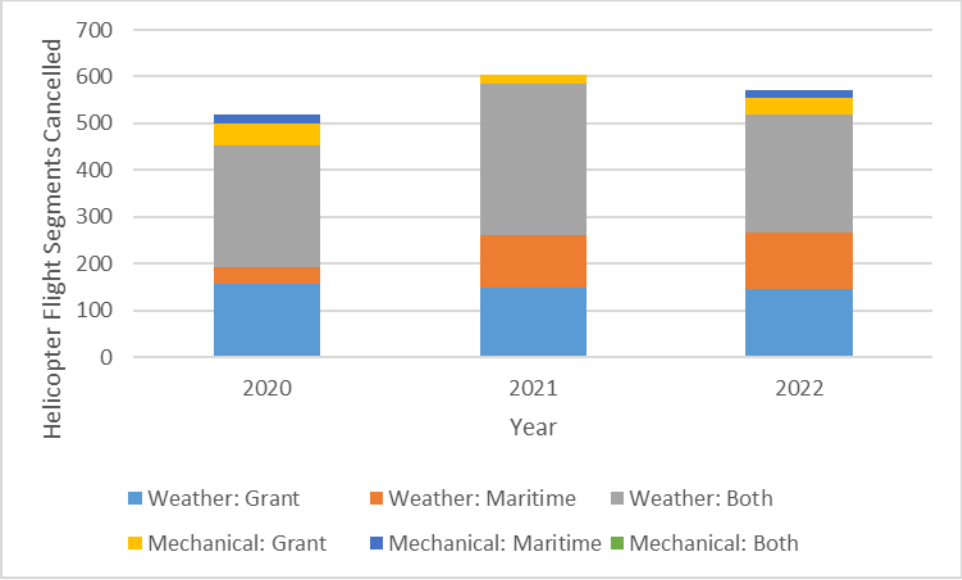

Figure 21. Akutan/Akun Cancelled Helicopter Flight Segments by Cause, 2020-2022
Source: Aleutians East Borough and Maritime Aviation
Notes: Flight segments tabulated as each trip cancelled with a destination of either Akun or Akutan. Information not collected prior to 2020.

[13] Personal communication with Grant Aviation, Vice President of Commercial Operations, January 2023

The helicopter is stationed at a hangar at the head of Akutan Bay. Each day, the helicopter crew travel via skiff from the community of Akutan to the hangar, pull the helicopter out of the hangar, coordinate flights with the fixed wing carrier and complete trips to and from Akun. At the end of the day, the helicopter pilots return the helicopter to the hangar and return to the community via skiff. Maritime Aviation estimates that it is a 20-minute skiff ride plus just under a half-mile walk from the dock to the hangar, requiring approximately 35 minutes transportation time for the crew on each trip.

Occasionally, wave conditions are severe enough in Akutan Bay that safe skiff access to the helicopter is not possible. There is no overall impact of this limitation, however, because when the wave height within Akutan Bay is too high for the skiff to access the hangar, the weather conditions are poor enough that fixed wing or helicopter flights are also prohibited. Additionally, in FWOP conditions the road connecting the harbor to the community will be in place and the skiff will no longer be needed. Therefore, impact of wave conditions on skiff operations within Akutan Bay for accessing the hangar is not considered further in this analysis.

The flight time for the helicopter varies depending on the weather and the load but can take anywhere between 6-10 minutes per one-way flight (not including loading and unloading time). Passengers are prioritized over mail and light freight, and numerous helicopter flights must occur to move one fixed-wing plane of mail. The aircraft burns 38 gallons of fuel per hour and can accommodate approximately 4 passengers per trip (weight dependent).[14] As a result of these limitations, it can require multiple helicopter trips to transport one fixed-wing plane load of passengers and their luggage.

Purchasing a one-way helicopter ticket between Akutan and Akun costs $100 per passenger. In addition to scheduled flights, chartering the aircraft costs $1750 per hour and fuel is billed at an additional cost. In 2022, there were 62 charters for the Akutan-Akun route totaling about 120 round trips. In addition, there were also 10 chartered flights to areas other than Akun in 2022.

Historical helicopter passengers as shown in Figure 22. A slight overall increase in traffic is typical in April and November, which are the beginning and ending of fishing season. Passenger counts starting in 2020 are lower than average because of the COVID-19 pandemic.

For the period from 2014 through 2022, the average annual helicopter passenger count was 2,643, however passenger counts have been significantly reduced in recent years. For the years 2019 through 2022 the helicopter transported an annual average of 1,585 passengers annually (compared to 3,489 passengers for 2014 through 2018). Passenger counts during this period were likely reduced due to the COVID-19 pandemic. See Figure 22 for additional information.

[14] Personal communication with Maritime Helicopters, Chief Pilot, October 2021 and the Maritime Helicopters website at https://maritimehelicopters.com/akutan-booking/

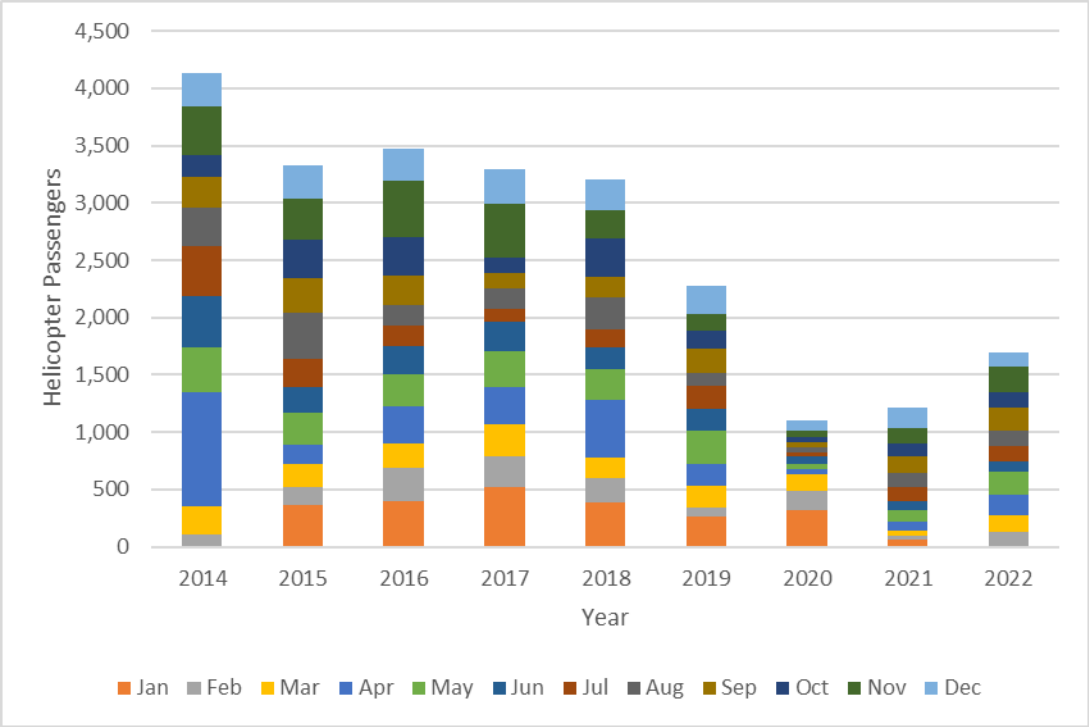

Figure 22. Akutan/Akun Helicopter Passengers by Month, 2014-2022
Source: Aleutians East Borough and Maritime Aviation
Notes: Passenger counts in 2020-2022 were anomalous due to the COVID-19 pandemic.

5.1.2.4. Delays

The helicopter can transport up to four passengers with luggage. Additional trips are required to transport any additional luggage and any mail or freight that also was brought in on the fixed-wing aircraft. Due to capacity limitations, multiple helicopter trips are required to transport a full fixed-wing plane load of passengers or freight.

Delays in transportation occur due to a variety of seasons (both weather and mechanical, caused by either the fixed wing, the helicopter, or both). Individuals who are delayed are typically located either in the community of Akutan (when headed outbound to Akun), or on Unalaska/Dutch Harbor (when headed inbound into Akun). Due to the continual coordination of fixed-wing and helicopter flights, delays experienced on Akun are extremely rare. While data on cancellations starting in 2020 and going through 2022 is available, data on delay times (count of occurrences and duration) is not tracked and no data is available.

In addition, short-term delays have a minimal impact to passengers in Akutan as they can continue with their day in the community and are notified by the carrier via telephone when the helicopter is resuming operations. Without data regarding the delays experienced by helicopter passengers and given the complexity of forecasting a change in transit times, delay durations, and frequencies for a helicopter in FWOP

conditions and a ferry in FWP conditions (particularly when no historical information is available), passenger delays are eliminated from further analysis.

5.1.3. Trident Seafoods Transportation Methods

5.1.3.1. Staff/Employees/Visitors

Trident Seafoods employs significant numbers of people to staff their Akutan processing plant. The employees of Trident are typically not residents of Akutan, but instead travel from around the world to the plant at the beginning and end of their employment seasons. Marine vessel transportation from Dutch Harbor to Akutan is the most frequently utilized method as it is more cost effective and efficient due to several factors.

One reason that Trident does not use the fixed-wing/helicopter as their main transportation method is crew and freight capacity limitations are too restrictive for them when they are doing major crew shifts. Currently, plant employees are flown from Anchorage (or a similar hub) to Dutch Harbor, and then most travel by a Trident tramper vessel from Dutch Harbor to Akutan in groups of approximately 40 people.

In addition to the capacity limitations, weather conditions which lead to multi-day flight cancellations can have significant impacts on schedules. Additionally, Trident already has vessels going to/from Dutch Harbor for product runs and it is more cost effective for them to have processing crew and supplies transported on their own vessels.

While the bulk of their processing crew movements would not impact FWOP helicopter traffic data of the study, there are associated individuals or small groups of employees, contractors, VIP guests, inspectors, etc directly tied to Trident operations which travel to/from Akutan throughout the year utilizing the helicopter link between islands.

Sporadically, Trident also will utilize their fishing vessels or trampers to transport smaller numbers of non-Trident employees or visitors (up to about 8 individuals) when the need arises (particularly when flight cancellations would otherwise prevent small groups from accessing Akutan). In these cases, individuals are provided with the opportunity to ride along on existing trips the fishing vessels are already making between islands. Trident does not receive any funds for these passengers.

5.1.3.2. Frozen Seafood Products

Frozen processed fish products are transported out of the community directly from Akutan on Trident vessels. Frozen seafood is not transported on the helicopter or fixed-wing aircraft due to cost and weight limitations.

5.1.3.3. Fresh Seafood Products

The value added in fresh seafood is highly dependent on product quality. While Trident has done small scale research projects to explore potential expansion into the fresh seafood market, logistics and the cost of moving fresh catch through the multiple transportation legs (Akutan to Akun to Dutch Harbor to Anchorage and then on to the

global fresh seafood market) has made fresh seafood from the Akutan processing plant unfeasible.

Air transportation for fresh product is preferred over marine transportation. Utilizing the existing Trident fishing vessel fleet is not viable since fishing vessels are not designed to provide transport for fresh, processed seafood that is destined for market. Even if an appropriate vessel were to be identified, adding a significant amount of transport time into the supply chain (5 to 8-hour transport from Akutan to Dutch Harbor plus offload and loading time in Dutch Harbor), impacts quality and market access.

According to Trident, the inability of fresh catch from Akutan to compete in the market is not only due to the Akutan/Akun transportation link, but the distance overall. Other locations in Alaska such as Kodiak, Sand Point, Cold Bay, or other landing locations on the mainland outcompete fresh catch from Akutan due to transportation distances.[15] Due to these considerations, growth in the fresh seafood market is not anticipated under any future scenario. All the product from Trident's Akutan plant is frozen food products, dehydrated byproduct, or bulk packed oils, which are all shipped via marine methods.

5.1.4. Fuel and Freight

5.1.4.1. Trident's Operations

Both the community of Akutan and Trident own fuel storage tanks. Fuel is primarily transported directly to Akutan by barge.

Trident does occasionally sell fuel to the community of Akutan, but the volume is "minimal".[16]

5.1.4.2. Akutan Community Operations

5.1.4.2.1. Mail and Light Freight

Cargo is delivered by fixed wing aircraft between Dutch Harbor and Akun, and then carried on the helicopter between Akun and Akutan.

Mail and light freight are transported via helicopter as a secondary priority (below passengers). As often as possible, mail is moved along with luggage or on empty return flights to maximize efficiency. According to the helicopter operators, a general estimate is around 85% of the scheduled service days would have cargo on at least one of the flights.

Mail and light freight are transported between Akun and Akutan on the helicopter using two methods. 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

[15] Personal Communication with Trident Seafoods Plant Manager, 31 March 2022
[16] Personal Communication with Trident Seafoods Plant Manager 4 March 2022

the transport of cargo outside the aircraft, suspended on a special hook or other type of attachment – often referred to as “sling loading.”

Mail is normally slung only if the quantity is such that moving the mail internally in the helicopter would result in multiple trips being necessary. This can happen if the fixed wing has not delivered mail in several days and then brings a large load, or sometimes during high volume times (such as the holidays). Sling loads of mail can usually be up to approximately 800 pounds and are estimated to occur at a rate of 2-10 slings per month. Weather limitations do impact sling operations. Usually winds of 15-20 knots or more, ceilings below 300’, or visibility below 2 miles will postpone any planned sling operations. Due to increased risk to the helicopter while undergoing sling load operations, optimal weather conditions are required. Despite the care taken in preparing for sling load operations to/from Akutan, loads of mail and light freight have been lost (intentionally dropped) during aborted operations to protect the safety of the operators.

Figure 23. Helicopter Sling Load Operations
Source: Maritime Helicopters, https://maritimehelicopters.com/photo-library/

In the case of flight cancellations due to weather or other factors, cargo can be stored inside the hangar on Akun. Due to the high cost of the helicopter operations, it is common for the pilots to wait until a full sling load has been acquired before making a trip.

49 USC 41903 requires that duly licensed U.S. certificated carriers transport mail on their authorized foreign air transportation service and their services within Alaska. 49 USC 41901 and 41907 require the Department to “set fair and reasonable rates” that

the U.S. Postal Service will pay air carriers to transport mail within Alaska. The Office of Aviation Analysis issues orders setting mail rates[17].

The USPS stops tracking mail shipments at Dutch Harbor, so Akutan community members lose the ability to track their package or anticipate its delivery for the final legs of its journey. Given that packages are a lower priority than passengers, and the impacts of weather on sling load operations, these delays for the Akun/Akutan leg can be significant.

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 USPS mail). Of the total for 2018 through 2021, over 90 percent of the combined mail and light freight was delivered to the community for use, with less than 10 percent (by weight) utilized elsewhere. See Table 13 for additional information.

Table 13. Annual Mail/Freight by Inbound and Outbound, 2018-2021

		2018	2019	2020	2021	Total
Inbound (lbs)	USPS	71,511	68,718	106,597	108,526	355,352
	Non-Mail Freight	68,964	91,298	162,037	74,529	396,828
	Total	**140,475**	**160,016**	**268,634**	**183,055**	**752,180**
Outbound (lbs)	USPS	13,196	12,294	13,205	14,386	53,081
	Non-Mail Freight	4,251	3,873	5,800	4,981	18,905
	Total	**17,447**	**16,167**	**19,005**	**19,367**	**71,986**
Percent Inbound	% of USPS that is Inbound	84%	85%	89%	88%	87%
	% of Non-Mail Freight that is Inbound	94%	96%	97%	94%	95%
	Overall % Inbound	**89%**	**91%**	**93%**	**90%**	**91%**

Source: Maritime Helicopters and Grant Aviation

Frozen foods, bulk freight, lumber, and other building supplies, etc are transported directly to Akutan (bypassing Akun) via barge. Barge trips can occur every two weeks.

5.1.4.2.2. Fuel

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 an 8,000-gallon capacity.

There are no aircraft fueling facilities on Akun so neither the fixed wing planes nor the helicopter refuel there. Small amounts of fuel are transported from Akutan to Akun by

[17] https://www.transportation.gov/policy/aviation-policy/small-community-rural-air-service/alaskan-mail-rates

the helicopter (sling loads) or by skiff in drums, and is transferred twice per year (spring and fall) to provide for airport operations including the generator and maintenance equipment.[18]

5.1.5. Marine Transportation (Skiff Operations)

Skiffs are commonly owned by Akutan community members and utilized for personal and subsistence purposes. Given the natural wave protection provided due to the finger of water known as Akutan Harbor, the skiffs are frequently simply dragged on the beach, dry stored on land, or temporarily moored in the skiff harbor near the helipad. Despite the natural protection provided at Akutan, weather conditions can occasionally still be severe enough to damage skiffs. For example, in 1991 the community lost all skiffs that were unprotected (about 12 vessels).

In favorable weather conditions, airplane passengers may choose to have a family member or friend transport them across Akun Strait via skiff rather than purchase the $100 one-way helicopter ticket. Currently, no protected moorage areas are available on Akun Island. In these instances, the skiff will be dragged onto the beach in Akun for loading and unloading before returning to Akutan. Given that Akun does not benefit from the same natural wave protection, community members are not able to leave skiffs unattended on Akun. These skiffs are small vessels which are open to the weather and need optimal conditions (wind, wave and tide) to operate safely. Despite those limitations, passengers can choose to be transported via skiff rather than pay for a helicopter ticket.

In addition to wind, fog, and wave conditions, tidal currents are a significant consideration for small marine craft when traveling through the Akun Strait (also called Akutan Strait). Current practice is for skiffs to cross over to Akun during the slack tide, or else head north of the strait in a wide arc before heading south to Akun to avoid standing waves and strong tidal currents off the west coast of Akun.

See the Hydraulic appendix (Appendix A) for additional information.

5.2. Trident Seafood's Operations/Employment

Trident Seafoods is a significant employer on the island, with more than 1,400 company housed employees during peak seasons. However, the direct impact to employment and housing in the village of Akutan is minimal as most workers are transient and not residents of the community.

5.3. Other Social Effects

Remote Alaska communities face challenges that are complex and multifaceted. The viability of a community is based on its ability to survive and thrive. Factors impacting

[18] Information gathered during community meeting in Akutan on 12 October 2022

community viability include many other social effects (OSE) criteria that are difficult or impossible to quantify monetarily but are of critical importance.

In order to determine the key OSE criteria for Akutan, data gathering began at the charette and continued throughout the study process. A site visit specifically targeted to inform this topic was conducted in October of 2022 and included multiple public meetings (including one-on-one and group communication opportunities) along with a focus group. The overall question being investigated during this trip was “What are the struggles of your community and how can this project help or hurt?”

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 fishers, elected government officials and representatives, tribal members, village corporation members, and Aleut corporation members). In all, a total of nine key community members were invited to participate in the focus group (in accordance with OMB survey approval requirement maximums) and every invited individual attended.

The focus group was held in two sessions at a central location in the community (the Bingo Hall), with an afternoon session on 11 October 2022 followed by a morning session on 12 October. The first session included a general discussion of the conditions experienced by the community and the proposed project sites, an explanation of how CE/ICA and MCDA are conducted and their importance to the analysis process, with most of the time invested in refining the key OSE criteria. Preliminary criteria had been established based on prior information gathered from community members, which was expanded during the focus group. The final criteria 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. The participants then each assigned weights to the criteria as either low, medium, or high importance on individual scoring sheets to determine which criteria are viewed as the most critical to making a project decision.

The second session of the focus group allowed for a recap of the prior day’s discussions followed by an in-depth exercise to score each individual criteria under various alternative scenarios to determine how well the criteria was met under each. Analysis of data which was gathered is presented later in this appendix (Section 7.9), and each criterion is discussed individually in the following subsections.

Figure 24. OSE Focus Group, October 2022

5.3.1. Health and Safety

Health and Safety was the top concern for the community, as indicated by the criteria weighing exercise conducted during the focus group. Medicines currently come into the community from the Alaska Native Medical Center in Anchorage and are delivered to the community using USPS via the helicopter[19]. Under existing conditions, the community experiences inconsistent and unreliable delivery of medicine and other critical supplies caused by weather delays and flight cancellations. When storm conditions settle into the Aleutians, the community can be without mail deliveries for days or weeks at a time due to flight cancellations. When the weather breaks, the helicopter prioritizes people and their luggage above packages, which can lead to additional delays in delivery of critical supplies. After long weather closures, a backlog of passengers must be transported on and off the island, with mail and light freight being transported as space and weight limitations allow. Delays in the delivery of medicines can also be lengthened in cases of back-to-back weather systems, which are not uncommon in the Aleutians. In addition to delays, both community members and the helicopter pilots indicated that mail has been lost in transport. If a critically needed medication is unable to be delivered to the community, it can become a crisis situation. Delays in delivery of medications can reduce the quality of life and can cause worsening medical conditions.

Medical care within the village is conducted at Anesia Kudrin Memorial Clinic which is a community health center run by Eastern Aleutian Tribes. While this clinic provides urgent care, community members requiring significant or specialized medical attention, surgeries, childbirth, etc. must access those services off-island at a hub community (for example, Anchorage or Seattle).

In addition to the community members seeking medical care outside of the community, certain medical teams will occasionally come to Akutan to provide care (for example, a dental team will visit the community and provide care to the village before departing to

[19] Information provided by the Mayor of the Aleutians East Borough during the Planning Charette.

repeat the process at another village). When weather cancellations prevent the medical teams from reaching Akutan, the community drops to the bottom of the waitlist and can experience significant delays waiting for the medical team to return.

When a member of Akutan experiences a medical emergency, they are transported out of the community for medical care using the helicopter and are met on Akun Island either by a scheduled fixed wing flight, or a medivac emergency fixed-wing plane. On average, about 10 medivac helicopter trips occur per year with most originating from Trident workers[20] (likely at least in part due to the size of the Trident worker population compared to the community of Akutan). When a weather event occurs at the same time as a medical emergency, the community relies on the US Coast Guard to provide medical evacuations along with a private medivac company which has a fixed wing based in Dutch Harbor.

Occasionally, search and rescue operations occur when an individual or small group of community members that traveled to Akun via skiff for subsistence purposes become stranded when weather blows in preventing a return trip to Akutan. In the past, community members have been stranded long enough that in one instance a deteriorated historical wooden structure was torn apart to be used as survival firewood for the individuals while they waited for help to arrive. Other examples of emergency situations on Akun included not having enough fuel for a skiff to return to Akutan, and weather preventing a return trip which led to individuals running out of food and provisions while waiting for the weather to break.

The helicopter also supports regional search and rescue and medivac operations. One example provided was when a vehicle rolled off a mountain in Unalaska and the Akutan-based helicopter provided search and rescue support. According to Maritime Aviation, there is no tracking of regional SAR occurrences, but it is estimated that they occur 1-3 times per year.

5.3.2. Subsistence

Subsistence activities are an important source of food and cultural tradition for the community of Akutan. A significant amount of the historical subsistence information presented in this section was informed by the Alaska Department of Fish and Game (ADF&G), Division of Subsistence Technical Paper No. 371. The technical paper was an outcome of a large research project conducted in 2008 aimed at gathering subsistence data for a small number of Bering Sea communities including Akutan. The study was coordinated through the Akutan Community Advisory Board which was formed specifically for the research project, the Akutan Tribal Council, and the City of Akutan. The research had 2 components: collecting subsistence harvest data through comprehensive household surveys, and key respondent interviews with Akutan residents particularly knowledgeable about the local environment. Out of 40 year-round resident households present in 2008, 36 households (90%) were interviewed. Of the

[20] Personal Communication with Maritime Aviation, February 2022

households not interviewed, 3 refused to be interviewed and the remaining household was not able to be contacted.

Harvest 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 each 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 community of Akutan harvested nearly 27,000 pounds of wild foods, averaging 327.3 pounds per capita. This compares to a 2015/16 survey done by the University of Alaska Institute of Social and Economic Research that estimated Akutan subsistence harvests at 439 pounds per capita.[21] 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 lb per person; followed by fish other than salmon (25%, 80 lb); shellfish (10%, 34 lb); marine mammals (8%, 26 lb); wild plants and berries (5%, 16 lb); land mammals (4%, 15 lb); and birds and eggs (3%, 10 lb). See Figure 25.

[21] Adapting to Environmental and Social Change: Subsistence in Three Aleutian Communities. Schmidt, Jennifer and Berman, Matthew. Institute for Social and Economic Research, University of Alaska Anchorage.

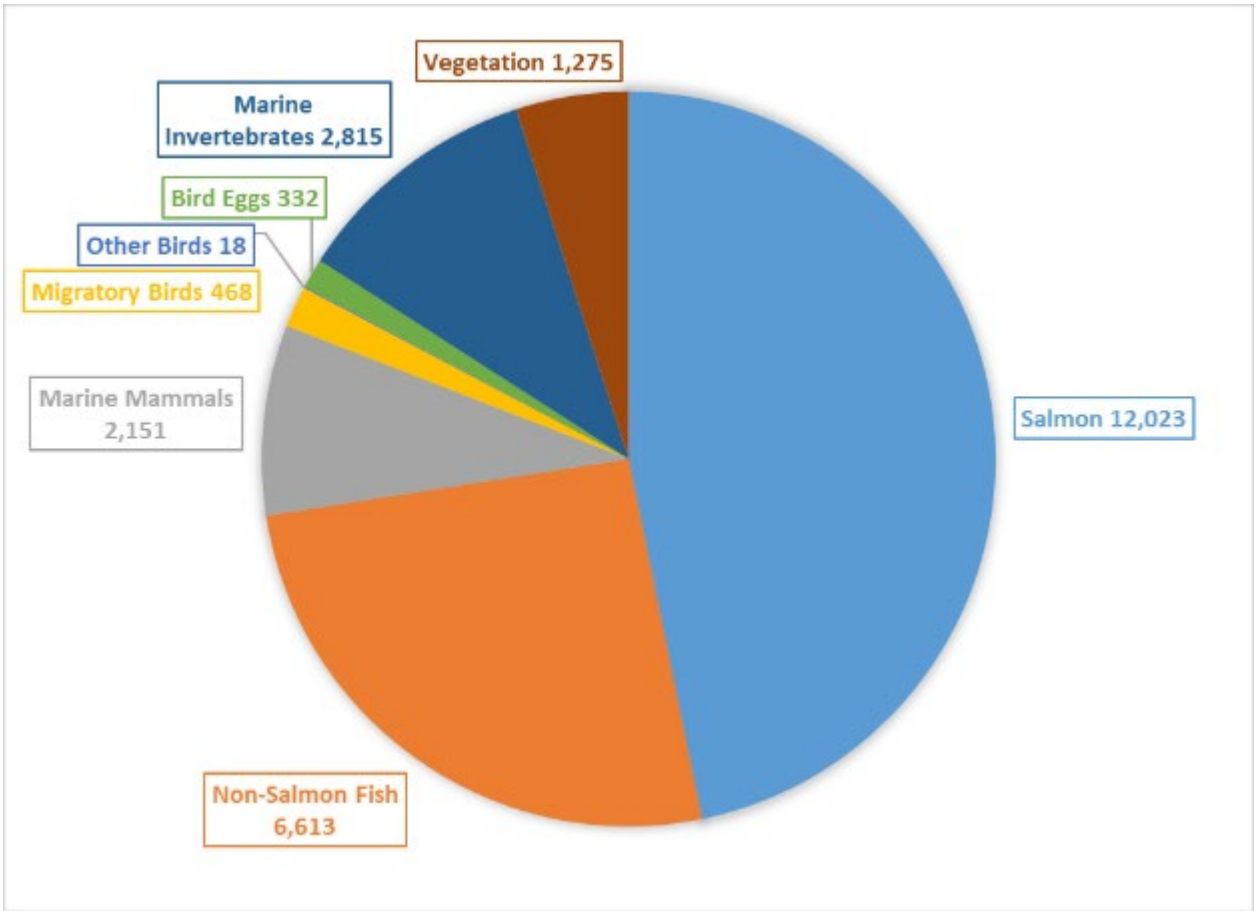

Figure 25: Estimated Total Pounds of Subsistence Resources Harvested in Akutan Annually

Source: Alaska Department of Fish and Game, Subsistence Division. Based on year 2008 data which is considered representative.

In the 2008 study year, 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. In addition, 97% of households engaged in fishing, hunting, or gathering activities, and 86% of households shared at least one 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.

The importance of subsistence to the community of Akutan is evident when the comparable per capita subsistence harvest amounts for communities within the Aleutians East Borough are reviewed. Akutan per capita harvests are approximately 20 pounds higher than the average for the borough (327.28 pounds for Akutan, compared to an average of 307.86 for the borough).

Table 14. Per Capita Subsistence Harvests for Aleutians East Borough Communities

Community	Representative Year	Pounds Per Capita
Akutan	2008	327.28
Cold Bay	2016	231.73
False Pass	1988	412.51
King Cove	2016	297.40
Nelson Lagoon	1987	253.92
Sand Point	2016	324.35

Source: Alaska Department of Fish and Game, Subsistence Division

As in most other rural Alaska communities, specialization by households in subsistence harvesting is evident in Akutan. About 11% of Akutan households accounted for 71% of the community's total harvest of wild foods as estimated in usable pounds. These "super-households" shared their harvests with others in the community.

In 2008, there were numerous personal skiffs and 4 larger boats (between 16-60 feet in length) owned by Akutan residents. The 4 larger boats were used for commercial halibut and cod fishing as well as subsistence fishing and hunting. The owners of these boats were also some of the main providers and distributors of subsistence caught fish, marine mammals, and birds in Akutan. It is worth noting that Akun Island has no moorage facilities and therefore vessels larger than skiffs are not able to access that island and its resources under existing conditions. Skiffs were also used to support subsistence fishing, hunting, and gathering (weather permitting).[22]

Subsistence harvests and uses documented by the Division of Subsistence in 1990 and 2008 were shown to be of continuing importance and need for Akutan. Timing for local resource harvest and use procurement activities is much the same as has been done historically by Unangan people. Resources harvested throughout the year were variable depending on resource availability, ocean conditions and weather (which impact access). For example, in the spring, Akutan residents focused their attention on fishing halibut, cod and Dolly Varden; summer consisted of egg gathering, geese hunting and salmon fishing and berry and plant gathering; fall activities included marine mammal and waterfowl hunting; and winter activities included marine mammal, waterfowl, and octopus hunting.

Subsistence resource harvest use areas were mapped in 2008. All subsistence hunting, gathering, and fishing by Akutan subsistence hunters and fishers occurred on and between Akutan, Akun, Anatanak, and Rootok islands, with most marine resource harvesting concentrated along the shores and within the waters of Akutan Bay and

[22] 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.

Akun Strait, located between Akutan and Akun islands. Geographic range for harvesting is typically limited to less than 10 miles from the village, or 1 hour by boat. This is due in part to fuel costs (particularly for larger vessels) and wave conditions (smaller skiffs with outboard motors limit travel to relatively calm weather).

Resources hunted and gathered from the land for subsistence, including gathering of eggs, berries, beach greens and other plants, freshwater fishing, and hunting of ptarmigan and some migratory waterfowl, took place primarily in the land near and hills behind the village, beach front areas surrounding Akutan Harbor, and throughout Akun Island including the rock outcrops south of Akun Island. Migratory waterfowl, geese, ducks, seabirds, and marine mammals (harbor seals, sea lions and migrating fur seals) were also hunted throughout Akutan Bay and in the waters of Akun Strait and on Akun Island. Gull eggs were taken primarily at Akun Head, the cliffs at the northeast point of Akun Island.

In 2008, most species of salmon (sockeye, coho, Chinook, chum) were frequently caught with subsistence gillnets off the point of land just east of the village at the entrance to Akutan Harbor. Pink salmon were mostly taken at the head of Akutan Harbor above Trident. All other species of salmon were harvested in the bays and tributaries from Akutan Harbor and northwest to the island's northern most point, called "North Head." Sockeye and coho salmon were also caught near the old Unangan village of Chulka, located on the southwest side of Akun Island, next to the long, curved beach called "Surf Beach" or "Surf Bay."

Akutan informants remarked that Akun Island is fairly flat, with lots of protected bays and streams and is far more productive in terms of harvestable subsistence resources than Akutan Island, which is mostly mountainous. When weather and tides permit, it is common for Akutan residents to boat to Akun Island (particularly near Surf Beach and Chulka) to have a picnic, camp, or hunt, fish, or gather a variety of subsistence resources including salmon, non-salmon marine fish, freshwater fish, seals or sea lions, geese, ducks or other seabirds, berries, plants, bird eggs, firewood, or marine invertebrates. In addition, feral cattle live on Akun Island and about 2 are harvested annually for the village. This abundance of resources is undoubtedly why many ancestral Unangan people lived on Akun Island prior to moving to Akutan when cash economy was introduced with the arrival of the fur, whale, and fisheries businesses established in Akutan Bay starting in 1878.

Non-salmon saltwater fish such as Pacific cod, sablefish (blackcod), and rockfish were generally harvested while targeting halibut. Greenling and greenling roe were obtained in Akutan Harbor and near the point of Akutan Harbor, and saltwater Dolly Varden were fished along the northern shores of Akutan Harbor and in 2 bays of Akun Island. Halibut fishing occurred in the broadest area from the northeastern end of Akutan Island in Hot Springs Bay, east to Lost Harbor on Akun Island, and south throughout Akutan Bay, Akun Strait, Avatanak Strait (between Akun Island and the 2 islands to the south, Avatanak and Rootok islands), as well as along the south side of Akutan Island and

west to the Baby Islands. Key respondents in 2008 commented that if halibut are available they will fish (or hunt) as close to the village as possible, and generally in the waters of Akun Strait, just west of Akun Island.

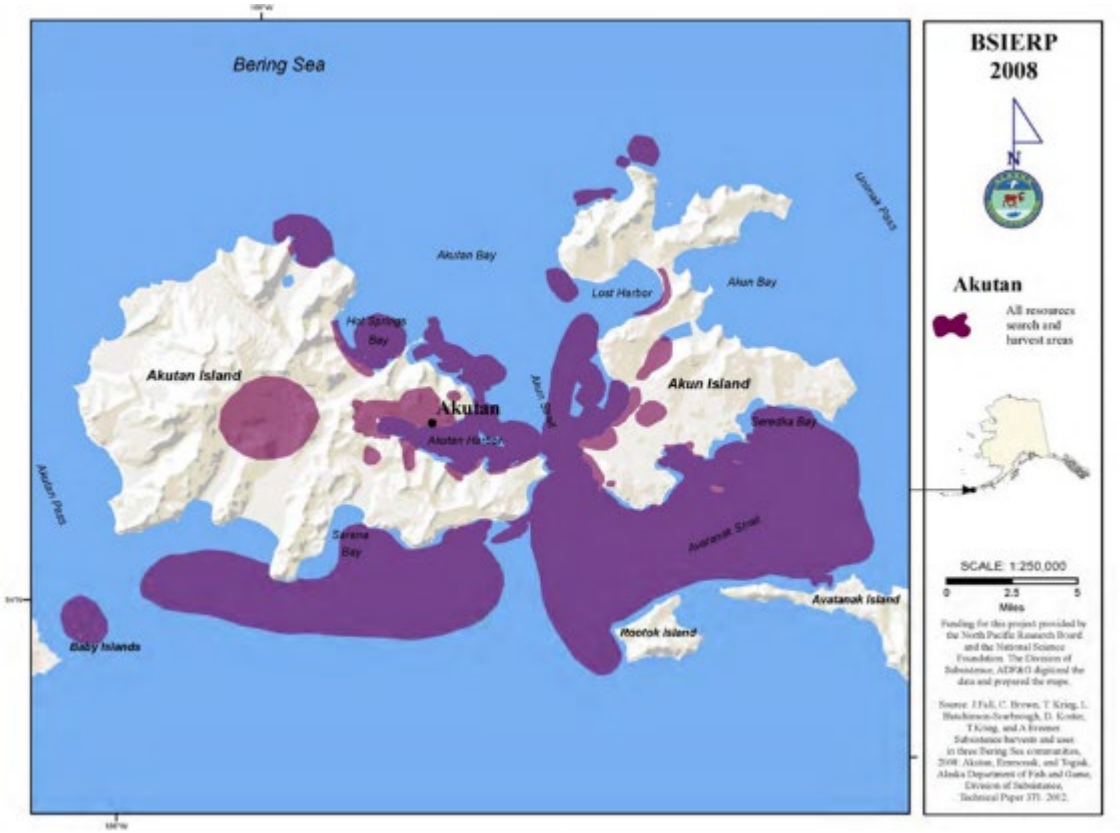

Figure 26: 2008 Subsistence Harvest Locations and Search Areas, All Resources
Source: Alaska Department of Fish and Game, Subsistence Division

Subsistence harvesting is critical to the residents of Akutan for nutritional and cultural reasons. Akun, as a traditional territory, is a key location for harvesting everything from plants to animals. The helicopter is generally not used for subsistence harvest trips due in part to the high cost involved to purchase tickets, but also due to the space/weight limitations of the helicopter to transport the tools needed for harvesting, the material that is harvested, and the harvesters themselves. Community members that have a skiff will transport a small group to Akun for harvesting. However, the crossing to Akun can be difficult and unsafe in a small, flat bottom, open skiff; therefore, subsistence harvesting participation by the very young and very old is limited due to access.

Weather conditions can also negatively impact harvest of target species. Subsistence resources that have short harvest durations (for example, a salmon run or spring egg harvesting) can be missed if weather prevents access to Akun via skiff during harvest windows.

Subsistence is about more than just access to a harvestable resource. To successfully subsist, individuals must also have reliable access to skiff repair parts, gasoline, etc. Currently, deliveries can be hindered when weather conditions prevent USPS helicopter deliveries to Akutan, and subsistence harvest windows change with the seasons. A delay receiving the necessary parts required for a skiff repair, for instance, could prevent that vessel from being used to subsist.

Additionally, there is currently no ability for community members to transport 4-wheel ATV's to Akun. The distances between harvest sites on Akun can be significant, and the terrain marshy, which makes accessing them challenging on foot. Community members have expressed a strong desire to transport ATV's to Akun for subsistence harvesting purposes.

5.3.3. Delivery of Essential Non-Medical Goods

Many community supporting goods come to Akutan by helicopter – occasionally as a sling-load operation. These goods include everything from mail and packages, food, skiff repair parts and other supplies/materials required for subsistence and traditional practices. Fuel (which is transported from Akutan to Akun to fuel the generators used for the airport) is also transported in barrels by the helicopter and skiff. The helicopter prioritizes people and their luggage above general freight so freight delays can occur, particularly during peak travel times on and off the island. In addition to delays, both community members and the helicopter pilots indicated that mail has been lost in transport.

5.3.4. Cultural Identity (non-food gathering traditional practices)

Maintaining a strong cultural identity is essential for Alaska Native communities to thrive. Cultural traditions are passed from one generation to the next and include both oral and physical components. With a traditional village site on Akun, access to Akun Island is even more important for the cultural practices of this community. The community has identified graves on Akun, along with repatriating some remains that had become exposed due to erosion. Artifacts are very prevalent and can easily be observed. The PDT experienced this while exploring potential project sites on Akun – countless stone tools were witnessed while walking between the preliminary proposed project site locations.

Culture camps are hosted on Akun Island, which includes youth participants not only from Akutan but also from neighboring villages.

Non-food materials are harvested on Akun as part of cultural practices (for example, grasses are harvested for traditional basket making).

5.3.5. Income Opportunities

Income opportunities that could be quantified would be included in the NED or RED analysis, however there are potential areas for growth that the community has identified but due to high levels of uncertainty are not able to be quantified. Some of these areas

include potential for tourism expansion on Akutan and Akun, along with cattle harvesting on Akun. The Aleutians Pribilof Islands Community Development Association has expressed an interest in expanding tourism in Akutan/Akun, particularly focusing on bird viewing and/or whale watching opportunities, however tourism development is expensive and there are no immediate plans for implementation.

5.3.6. Community Growth and Expansion

The community of Akutan is unable to expand its geographic footprint at its current location due to being bounded on all sides by water and bounded inland due to topography. The hillsides are steep and there is little available buildable land. Historically, the community was located on the island of Akun prior to relocating to the island of Akutan. During the project charette, community members indicated that they have been looking into options to expand the community back to Akun. While it would be considered somewhat unlikely to split the population geographically due to hesitancy of community members, under this scenario it is possible that homes and businesses would slowly be built on Akun if/when buildable locations on Akutan are unavailable. Having the airport, the Surf Inn hotel, and traditional territory on the island of Akun encourages this expansion between the neighboring islands.

5.3.7. Transportation Mode Preferences

Each individual's level of comfort with transportation via helicopter, skiff, or ferry varies. However, during the charette a participant from the community indicated that there is distrust of the helicopter by some in the community and that they prefer marine travel as a method of transportation whenever it is available. This comfort with marine transportation is natural given the remote, Aleutian Island maritime traditions. Additionally, the helicopter can be challenging for those with mobility issues.

5.3.8. 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 Akutan or from a narrow ramp near the skiff moorage area.

Larger vessels capable of commercial fishing seek transient moorage at the skiff moorage area and at Akutan Harbor at the head of the bay.

Residents use their skiffs to cross Akun Strait to reach Akun during optimal weather windows. On Akun, skiffs are tied or dragged onto the beach. However, skiffs are not generally left unattended on Akun and at least one community member often stays behind with the vessel (preventing that individual from engaging in subsistence or other activities on Akun with the remainder of their group.)

There are no reported incidents of vessel damage due to lack of moorage on Akun by community members.

5.4. Summary of Existing Conditions

Existing conditions for the community of Akutan include a multi-modal transportation network between islands (fixed wing and helicopter) with annual helicopter service costing approximately $2.3 million dollars per year which is heavily subsidized by both the Aleutians East Borough and Essential Air Service. Despite the high cost of the annual contract, critical community needs such as transportation for medical services, delivery of critical medical supplies, delivery of non-medical goods, and subsistence access remains hindered.

6.0 FUTURE WITHOUT-PROJECT CONDITIONS

6.1. 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 (see Section 3.1 for additional information.) At this time, 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.

It is assumed that helicopter service will continue throughout the FWOP condition. Helicopter costs are subsidized through both the essential air service and the Aleutians East Borough. While there is inherent uncertainty associated with the assumption of ongoing subsidies and helicopter service throughout the FWOP study period, there is no information available that would support high confidence in an altered FWOP condition. However, (while not reflected in this analysis or the FWOP conditions assumptions) given the high annual cost of the helicopter service, if funding for the helicopter were not sustained through the study period not only would the helicopter be removed from the region but there would be no effective marine transportation option which would leave an even more severe situation faced in FWOP.

As this project is formulated for the community of Akutan, rather than for the transient population of the Trident Seafoods processing plant, transient workers are not included in 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. The company is currently researching closure of the Akutan based plant and is building a new facility in Unalaska. Plans for the future utilization of the Trident plant in Akutan are unknown at this time, as is the exact timing of any relocation of the processing operations to Unalaska. Given that this project is formulated for the permanent resident population, the baseline population utilized in this analysis is not expected to change. However the impact of a closure of the Trident plant could make the high cost of the helicopter contract and the impact of weaknesses with the FWOP condition transportation network on long-term community viability even more critical after losing the fish tax if the Trident plant were to cease operations in Akutan.

6.2. Transportation

Transportation between the Akutan airport on Akun Island and the community of Akutan on Akutan Island will continue to rely on the costly helicopter service in the FWOP condition, which is often hindered by weather. The Essential Air Service subsidy which provides supporting funding for the helicopter must be renewed every two to three years, and no backup plan currently exists to maintain the transportation link to the community if that subsidy were to not be renewed. Cancellation 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 USPS deliveries of medicines needed from Anchorage will continue to be delayed. Delays in delivery of medications can reduce the quality of life and can cause worsening medical conditions.

6.2.1. Alaska Marine Highway System Ferry

The Alaska Marine Highway System experiences funding and staffing challenges, which can lead to difficulties in maintaining service levels across the state. Despite that, it is critical to the transportation network of Alaska (particularly since so many Alaskan communities are not connected through a road system) and it remains a priority for the State of Alaska. 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. AMHS staff were interviewed in March and April of 2023, and no specific information was available that would inform a different assumption on the future of AMHS service for Akutan.

6.2.2. Fixed Wing Service

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

While participation in the EAS subsidy must be renewed every few years, no changes to the EAS service provided by Grant Aviation are anticipated under FWOP conditions. In support of these assumptions, Grant 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.

6.2.3. Helicopter Operations

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

While participation in the EAS subsidy must be renewed every few years, no changes to the EAS service provided by Maritime Aviation are anticipated under FWOP conditions. While future EAS subsidies are dependent on factors such as congressional funding, support of leadership, etc. it is unlikely that congress would stop supporting the program

(particularly for Alaska)[23], Maritime (similarly to Grant Aviation) applied for and received an extended 3-year EAS contract in the most recent subsidy cycle, supporting the assumption that they plan to remain providing service to the community in the FWOP condition.

Starting in 2012, the Aleutians East Borough committed to providing access between Akutan and the Akun Airport for a period of 20 years which would expire in 2032. At that time, the borough assembly would need to approve a funding 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[24]. 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 annual Bell 206 helicopter cost is forecasted as $2.3 million based on the total cost for operations including the EAS subsidy, AEB subsidy, and revenue associated with ticket sales and freight movements. Additional information can be found in Section 5.1.2.3. According to Maritime Aviation, 25 percent of that amount is attributed to non-transportation related costs such as profit, financing charges, administration staff, office rent, office supplies, utilities, and misc overhead. While those costs are expected in support of the transportation services that are provided, they are eliminated from this economic analysis as they are not direct transportation costs.

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 see if it could address some of the community's needs. A comparison of the cost and specifications of the existing helicopter, along with a larger Bell 412, are listed below. The larger helicopter alternative was included in the Cost Effectiveness and Incremental Cost Analysis. For further information see Section 7.9.1.

[23] As per discussion with DOT EAS Associate Director, 2 August 2023.
[24] Information provided during Project Delivery Team meeting on March 8, 2023 by the Aleutians East Borough

Table 15. 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.

6.3. Marine Transportation (Skiff Operations)

In future without-project 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.

6.4. Trident Seafood's Operations/Employment

There is significant uncertainty regarding future operations of Trident Seafoods in Akutan. The company is currently investigating moving their Akutan based processing facility to Unalaska, and future use of the processing plant in Akutan is unknown at this time.

This USACE study is formulated to meet the goals and objectives of transportation improvements serving the community of Akutan, rather than serving the needs of a single business (Trident Seafoods). Due to the significant amount of separation between the two populations (transient workers vs village residents) the impact of a closure of the Akutan based processing facility to the overall analysis is not significant.

While some level of reduction in the transportation demand associated with VIP guests, inspectors, etc. directly associated with plant operations would be expected when the plant relocates, the primarily transportation method for Trident processing employees is Trident vessels rather than the helicopter/fixed-wing, and any changes to transportation demand would be similarly borne across FWOP and all FWP condition scenarios and is not likely to impact FWP plan selection.

The FWOP assumption maintains traffic demand at historical levels. However, to account for the uncertainty associated with the future operation of the processing plant, a reduced level of traffic demand (similar to that of comparably sized communities) is included in a sensitivity analysis.

6.5. Fuel and Freight

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 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.

6.6. Other Social Effects

Significant changes to OSE conditions in Akutan are not expected during the study period. 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.

For the community members, expansion to the island of Akun has been proposed to address the land limitations. A community member explained that development of lots on Akun has been proposed, including approval for a greenhouse; however, that development has yet to occur and is not likely enough to be included in the FWOP condition forecast.

Limitations to access, impacts to safety, and all other key criteria are assumed to remain relatively static for the study period. Any unidentified shifts are anticipated to have a low risk to the project as they would be similarly borne by the FWOP and any FWP alternative scenario.

6.7. Summary of Future Without-Project Conditions

Absent federal action to provide navigation improvements to Akutan, transportation cost inefficiencies and negative impacts to OSE are expected to continue throughout the study period. These adverse impacts are incurred as a result of current and expected future conditions.

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.

7.0 FUTURE WITH-PROJECT CONDITIONS

7.1. Assumptions

This project is formulated to meet the transportation needs of the residents of the community of Akutan. As a large private employer in the community, potential significant shifts in employment levels at the Trident processing facility could occur. These shifts are particularly likely given the new processing plant Trident is constructing in Unalaska, leading to the potential for the Akutan plant to close or be repurposed. In existing and FWOP conditions, the primary method of transportation for Trident workers is via Trident vessels going directly from Unalaska to their Akutan plant. Additional VIP guests, onboard observers for commercial fishing vessels and processing plant inspectors, etc. do utilize the Akun airport and Akun to Akutan transportation link. While significant changes to the levels of Trident-specific passengers may occur, the primary project purpose is to meet the needs of the community and therefore shifts in demand levels for Akun to Akutan transportation by Trident 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 current contract for the helicopter. In all future with-project harbor alternatives, it is assumed that the helicopter service in Akutan would be eliminated and replaced with the marine ferry. This assumption was verified with the Aleutians East Borough and Maritime Aviation Helicopters.

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 helicopter service.

All ferry alternatives will accommodate a similar vessel class and allow for utilization of the harbor on Akun. Therefore, differences between FWP benefits are largely dependent on access capability, OSE focus group response data, and the cost for implementing the alternatives.

All FWP alternatives are expected to take a total Preconstruction Engineering and Design (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.

7.2. Project Alternatives

7.2.1. 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 City of Akutan will remain expensive and inefficient. Residents of Akutan would continue to experience reliability concerns for airline passengers, medical supplies, and freight.

7.2.2. Alternative 1

General Navigation Features (GNF)

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 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.

Local Service Facilities (LSF)

Local service facilities required would include a 560 foot long by 12 foot wide rubble mound causeway, 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.

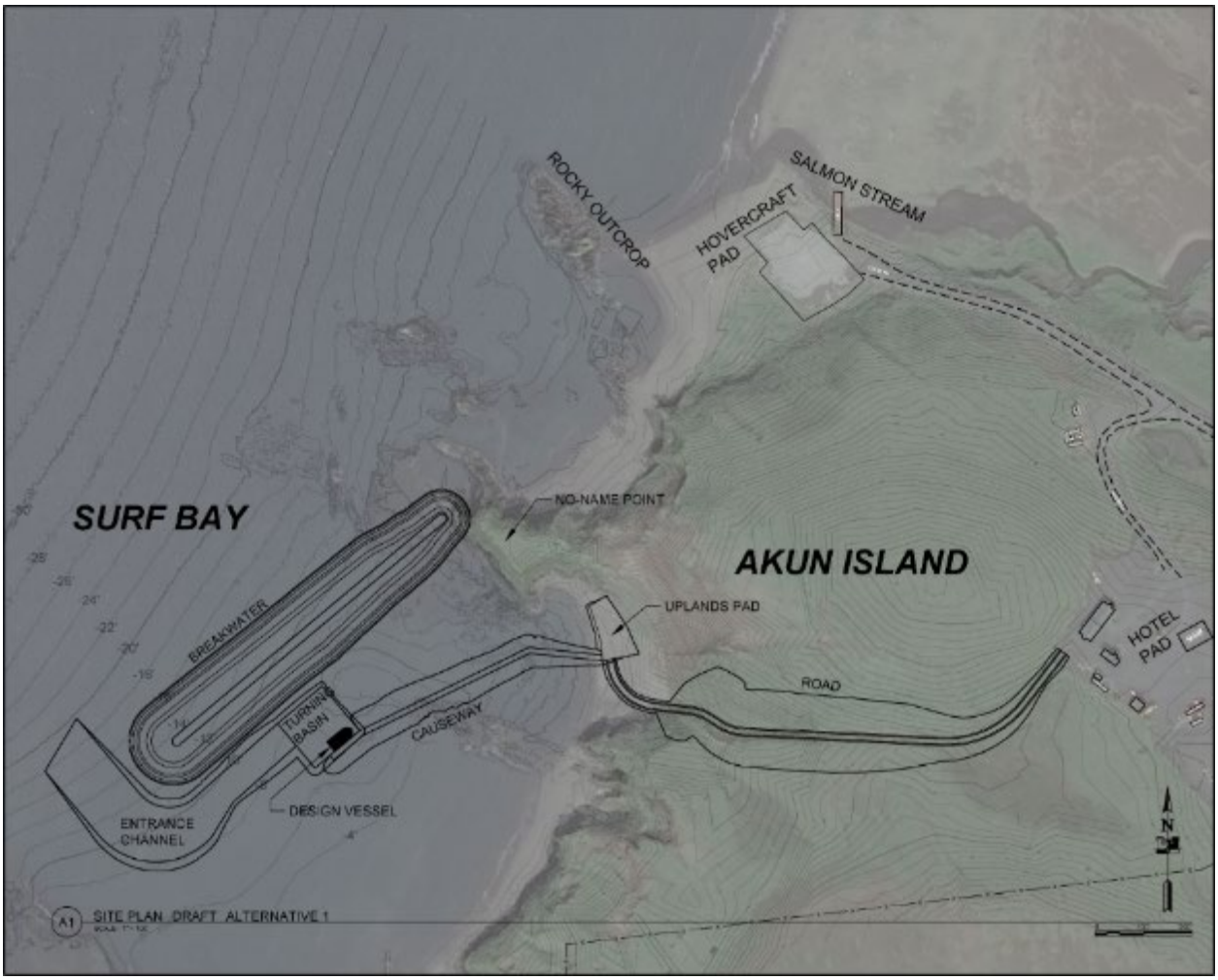

Figure 27: Alternative 1 Concept Plan

7.2.3. Alternative 2

General Navigation Features (GNF)

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 (LSF)

Local service facilities required would include a 560 foot long by 12 foot wide rubble mound causeway, 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.

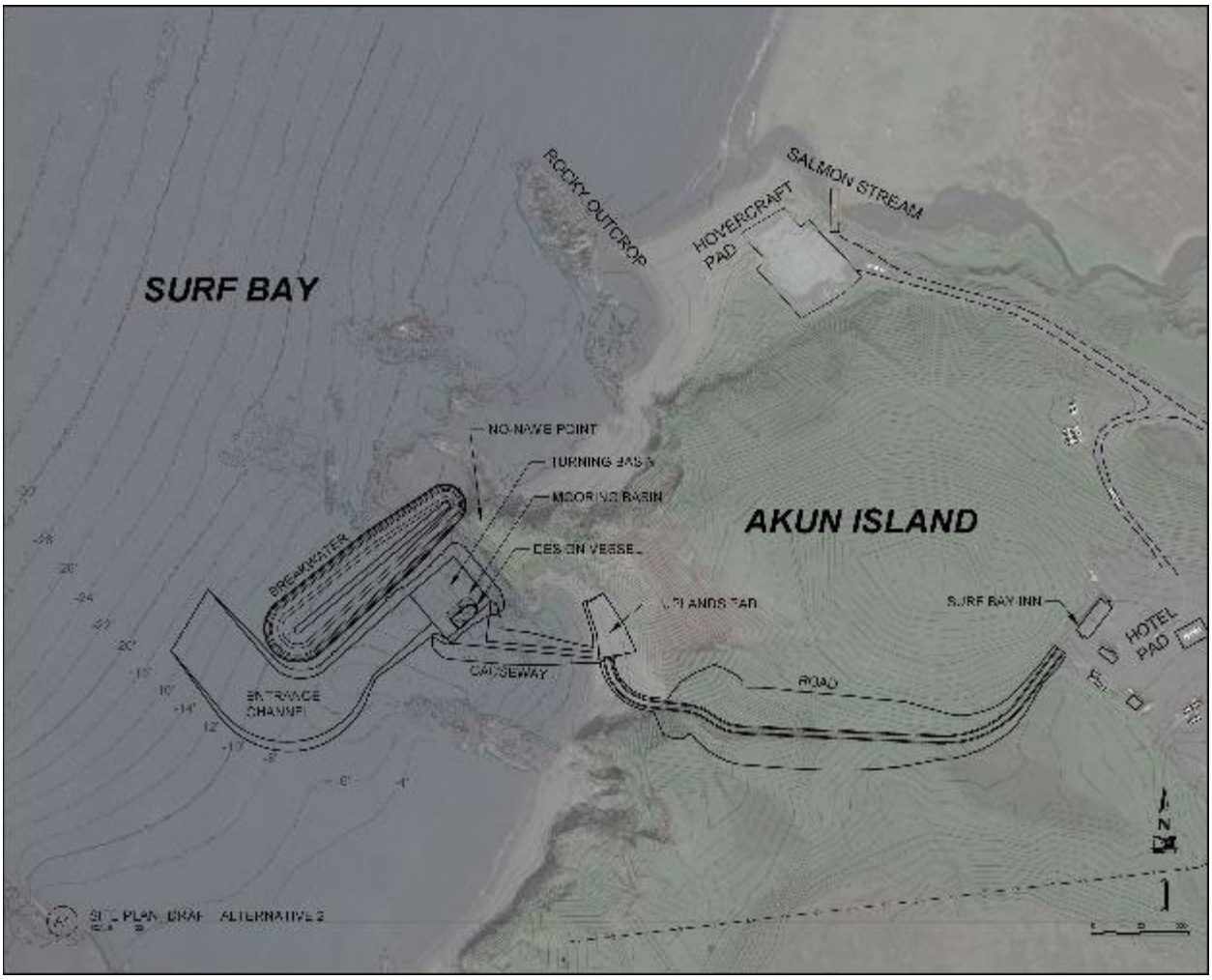

Figure 28: Alternative 2 Concept Plan

7.2.4. Alternative 3
General Navigation Features (GNF)

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 an updated dredge depth of -17 feet MLLW and -14 feet MLLW respectively. Note that quantities presented in this report reflect a previous calculation of entrance channel and turning basin depths of -13 feet MLLW. 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.

Local Service Facilities (LSF)

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.

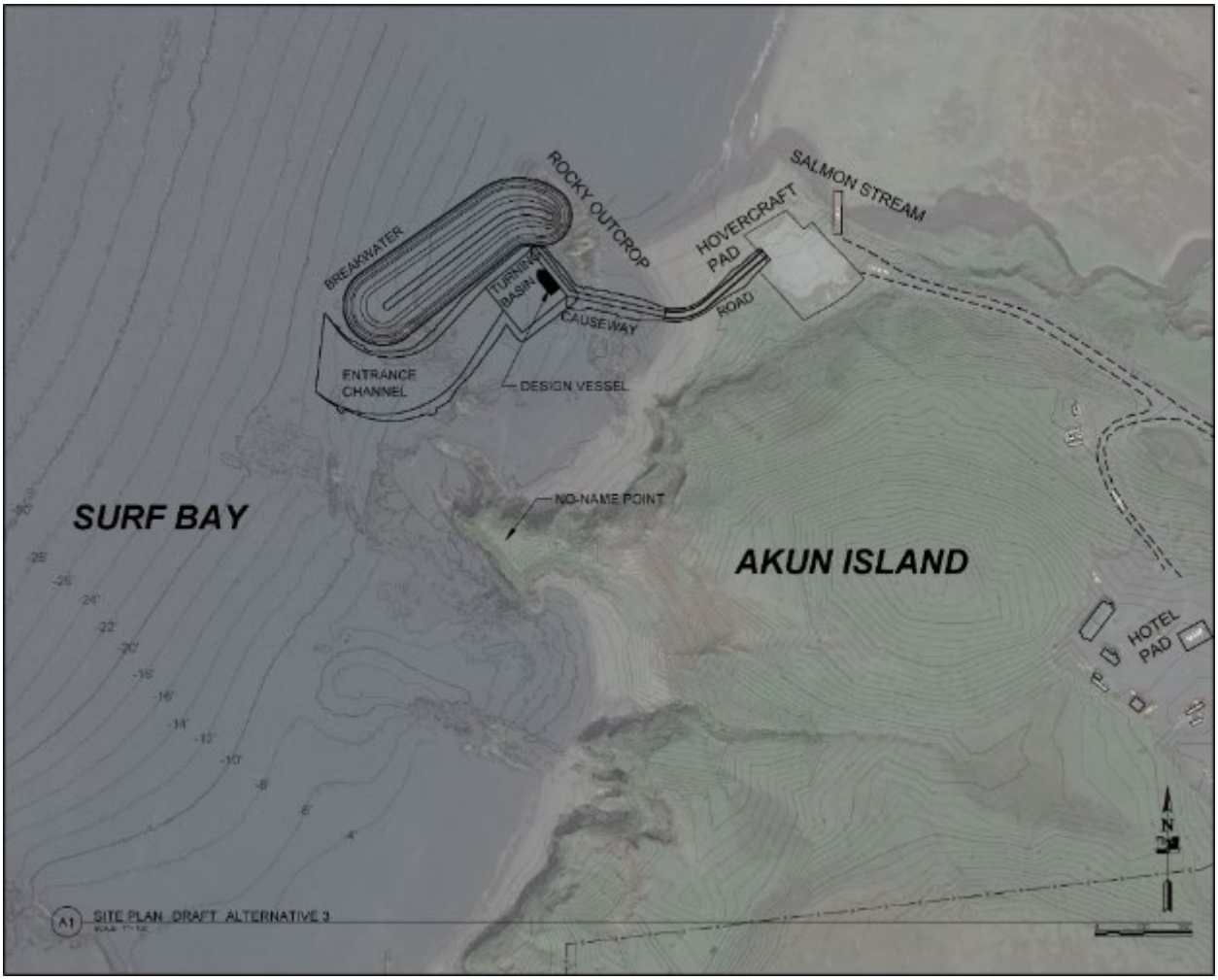

Figure 29: Alternative 3 Concept Plan

7.2.5. Akutan-side FWP Considerations and Ferry Operations

The facility upgrades on Akutan island will be the same for alternatives 1-3. At this time, it is assumed that the ferry vessel will moor in Akutan Harbor. Before each ferry trip, crew to pilot the vessel will board a skiff at the City Dock in Akutan and travel 2 miles to the ferry at Akutan Harbor (or drive on the harbor access road that is currently being constructed). The ferry vessel and crew will travel back to the City Dock where passengers and freight will board the ferry vessel. 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 Akutan City Dock with any passenger and crew from Akun. Once all runs for the day are completed, the ferry will be moored at Akutan Harbor, and crew will travel back to the Akutan City Dock via skiff or access road.

Upgrades will need to be applied to the Akutan City Dock in order 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. Rough order of magnitude costs has been included in the construction cost estimates for Akutan-side upgrades.

7.3. Description of Future With-Project Conditions

7.3.1. Transportation

7.3.1.1. Marine Ferry Operations

It is anticipated that the ferry service 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.

7.3.1.1.1. *Design Vessel Characteristics*

The design vessel of this study is based upon two factors, regularly available vessels in the region and minimum size requirements to safely operate trips between Akutan and Akun in conditions that allow aircraft to land in Akun (see Section 4.1 “Design Vessel” in the H&H appendix for additional information). Minimization of the vessel size allows for lower annual contract costs which has long term community viability benefits for Akutan. While a larger vessel would likely have additional weather operability, given the limitations of the fixed wing additional operability would provide a minimal change to transportation while having a significant increase in costs, and was therefore eliminated from consideration.

The design vessel chosen for this study is the F/V Magnus Martens, a 58-foot-long twin screw steel monohull with a 26-foot beam and an 8-foot draft that operates across Alaska, including in the Aleutians. While the exact vessel selected will be a decision of the entity granting the contract (the AEB or similar), for purposes of this analysis it is anticipated that the ferry vessel would be a seiner/crabber/trawler type vessel due to their availability in the region.

Figure 30: Design Vessel F/V Magnus Martens

Table 16. Design Vessel Dimensions (feet)

Vessel	F/V Magnus Martens
Length Over All (LOA)	58
Beam	26
Load Draft	8

The design vessel determination is heavily influenced by wave/tide conditions and other H&H considerations (see Section 4.1 “Design Vessel” in the H&H appendix for additional information). Passenger counts and freight requirements are not a limiting characteristic since any vessel that can handle the marine conditions in the Akun Strait 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.

The harbor as designed would accommodate a range of vessel sizes and the ultimate vessel will be determined by the service contract when that is established.

7.3.1.1.2. Vessel Operations

This type of vessel can be expected to conduct operations in Beaufort Sea State 3 (BSS3) with a windspeed of 7 to 10 knots and a maximum wave height of 3 feet and survive in SS4 with a windspeed of 11 to 16 knots and a maximum wave height of 5 feet. Wave conditions originating from 290°- 330° and 160°- 220° would filter through the Akun straight and impact the ability of the ferry to operate for the percent of time shown in the figure below (for additional information, see the H&H appendix).

Table 17. Design Vessel Expected Operational Conditions

Likely Operation	Cease Operation
Seas 5 feet or less Winds 20 knots or less Tide 0.0 feet MLLW or greater	Seas greater than 5 feet Winds greater than 20 knots Tide less than 0.0 feet MLLW
78%	22%

Note: Statistics are based on significant wave heights (approximately one-half maximum wave height) generated by WIS point 82327 and do not consider wind, fog, and maintenance that may also affect operations.

Transportation times of the ferry are estimated to take 45-50 minutes each way, 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, luggage, and light freight thereby eliminating the multiple trips required by the helicopter. 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.

7.3.1.1.3. Vessel Operating Cost Methodology

Bristol Harbor Group, under a contract through the Marine Design Center, 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’ design vessel, the costs include an assumption of 2 crew, and a deck anti-icing system.

Table 18. Marine Ferry Cost Analysis Components

Estimated Revenues from Scheduled Operations	Operating Expenses	Administrative Cost	Profit as a percentage of expenses
Passenger Revenue	Crew Comp, Benefits & Travel	Admin Salaries incl. payroll tax	10%
Freight Revenue	Fuel & Lubes	Professional and Contracting	
Mail Revenue	Insurance P&I & H&M	Alaska Worker Compensation Est., Crew & Admin Personnel	
	Vessel Maintenance & Repair	Office Rent/HQ Allocation	
	Vessel Expense	Travel & Exp (3 times per year)	
	Crew Housing & Meal Allowance	Office Supplies	
	Dockage	Utilities	
	Equipment est.		

Source: Bristol Harbor Group Memorandum dated 07March2023

Information from the Marine Design Center estimated an annual contract cost of $1.352 million per year for an existing vessel with no conversion, $1.937 million per year for a converted vessel, and $2.3 million per year for a new vessel. In addition to the Marine Design Center estimates, daily contract rates for existing applicable vessels were also gathered and ranged from $3,400 to $4,000 per day or $1.06 to $1.25 million per year.[25]

The 58’ new vessel option was eliminated from further analysis as the converted and existing vessel options are more much likely (for additional information see the H&H appendix) and while still higher than the daily rates gathered from existing operators, they are more representative of the contract rates by comparable operators. 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 at $1.937 million per year, and an existing vessel at $1.352 million per year) are utilized. According to Bristol Harbor Group, 30 percent of those estimates can be attributed to non-transportation related costs such as profit, financing charges, administration staff, office rent, office supplies, utilities, and misc overhead. While those costs are expected in support of the transportation services, they are eliminated from the subsequent transportation cost savings economic analysis as they are not direct transportation costs. Therefore, a

[25] Daily contract rates for Babkin Charters (58’ vessel) and Mac Enterprises (Miss Alyssa 43’ vessel) rcvd via personal communication with USACE staff. Annual rates estimated using 6 days per week and 52 weeks per year to mirror FWOP condition trip schedules)

range in direct transportation costs from $1.356 million to $946 thousand form the basis for the annual transportation cost savings analysis throughout this study.

Table 19. 58’ Ferry Annual Contract 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

7.3.1.2. Alaska Marine Highway

A focus group held in Akutan in October 2022 was asked whether their AMHS ferry 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.

7.3.1.3. 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.

7.3.1.4. 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.

For additional discussion on the anticipated changes from FWOP to FWP and the associated impact on benefits, see Table 20.

7.3.1.5. 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. 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 is not formulated to incorporate benefits associated with transportation of plant employees.

7.3.2. Marine Transportation (Skiff Operations)

In future with-project conditions, it is assumed that the residents of Akutan will continue to utilize their personal vessels to access Akun Island at a similar rate when compared to historical and existing conditions.

7.3.3. 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 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.

7.3.4. Other Social Effects

While it can be difficult to quantify a direct link between a navigation project and improvements to the viability of a community, 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” (ASCE 2017).

A marine ferry which is large enough to handle the wind and wave conditions in the area would not have the same capacity limitations of the helicopter and could therefore simultaneously transport both passengers and freight, thus eliminating the need to prioritize passengers after weather cancellations (which exacerbate the already significant delays in the transportation of mail and freight, including critical medicine and medical supplies) as described in Section 5.3.1. A marine ferry would result in increased reliability in delivery of critical medicines and medical supplies by eliminating lost medication deliveries due to aborted sling-load operations, avoiding potentially significant delays caused by prescriptions being refilled and redelivered from Anchorage. Having reliable access to medications and medical supplies could avoid occurrences of some medical emergencies entirely.

Having affordable and dependable transportation to and from the community will allow scheduled medical transport to occur more reliably, 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.

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 the medivac transportation (a typical scenario would involve flying a patient from Akutan to Akun where the patient is transferred to a fixed wing ambulance.) If the ferry were to assist with medivacs for Akutan, transportation times on the ferry are longer than the

helicopter. However the ultimate impact of this increased travel time between Akutan and Akun is offset by the travel time required by the fixed-wing medivac flights. During peak fishing seasons, the Coast Guard often maintains a H-60 or H-65 helicopter in Dutch Harbor or (less often) in Cold Bay that can access either Akutan or Akun. It is anticipated that for medivac purposes the overall impact of a shift from helicopter to marine ferry would be minimal. In addition, the overall potential impact would also be minimized when Trident relocates because the vast majority of the Akutan medivacs are of Trident fish processing workers due to their large population size.

During the off seasons this helicopter is stationed in Kodiak. It is estimated that under a best-case scenario travel time from Kodiak to Akutan would require six hours. Off season search and rescue (SAR) support operations could experience negative impacts as a result of no longer having a helicopter stationed in the region that could provide immediate assistance. In FWP, SAR operations would default to the Coast Guard with travel times varying depending upon where the nearest available helicopter is stationed and weather conditions along the route.

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 Table 20.

Table 20. Summary of Other Social Effects Criteria

Criteria	FWOP Condition	FWP Effect & Relevance to Long Term Viability		Section 2006 Considerations
		Marine Ferry Alternatives 1, 2, and 3	Larger Helicopter Alternative 4	
Health and Safety	• Medication is delivered via USPS on the helicopter. Weather cancellations can lead to multi-day delays in delivery of critical medications such as insulin, with delays being compounded through passenger prioritization of the helicopter when weather clears. • Packages (including medications) are lost due to aborted sling load operations and any lost prescriptions must be refilled from Anchorage, causing additional delays. • Medivacs are provided by the Coast Guard via helicopter. Medivacs and other emergency situations can also be supported locally by the Akutan helicopter. • Medical teams come from outside to serve the community (i.e., dental teams). When those teams are unable to access Akutan due to weather the community drops to the bottom of the waitlist. • Residents are transported to hub communities for specialized care. Delays in transportation can	• A marine vessel will not have the weight/space restrictions that are present in the helicopter, thus eliminating the need for passenger prioritization. Eliminating capacity limitations will result in the soonest possible delivery of needed medications and critical supplies, particularly after weather closures and during times of peak travel demand. • Increased reliability in delivery of critical medicines and medical supplies including elimination of aborted sling-load operations which would avoid potentially significant delays caused by prescriptions having to be refilled and redelivered from Anchorage. • Having reliable access to medications and medical supplies could avoid some medical emergencies entirely. • Increased reliability of access to transportation in the event of medical emergencies. In FWP, a medivac Coast Guard helicopter will remain an option to/from Akutan. However, a marine ferry will provide another avenue for	• Expanded capacity over FWOP, but less capacity than a marine ferry, would reduce but likely not completely eliminate passenger prioritization over FWOP. • Sling-load operations would continue, but at a reduced frequency compared to FWOP since the interior of the larger helicopter can accommodate additional capacity. • An Akutan-based helicopter could continue to assist with SAR and medivac operations. • Without protected moorage on Akun, there would be no benefits associated local vessels.	• Public health and safety of the local community, including access to facilities designed to protect public health and safety • Welfare of the local population

	cause difficulties with off-island appointments and hotel accommodations. • If the helicopter is down, a local skiff can only access the airport if the conditions on Akun are perfect to allow them to pull up on the beach. Local vessels larger than a skiff are unable to access Akun due to a lack of protected moorage. • In existing conditions, Trident occasionally provides (as a backup option) passenger transportation to/from Unalaska and Akutan on their tramper vessels. The trip is long and uncomfortable for passengers. This backup transportation option is not anticipated to exist in FWOP conditions given the likelihood of a Trident relocation.	transportation if a Coast Guard helicopter is unavailable. Diversifying to provide both air and marine methods of emergency transportation could improve the likelihood of successful medivac in varying weather conditions. These benefits will be slightly offset by removal of the helicopter from Akutan, which in FWOP could expedite medivacs. However, since the majority of medivacs occurring in existing conditions are for transient fish processing workers, which are unlikely to be present in future conditions, the overall impact of removing the helicopter from Akutan is minimized. • A marine ferry would provide subsistence harvesters a transportation option other than skiffs to access Akun, avoiding potential strandings on the island due to weather and mechanical issues which can have health and safety implications. • A marine ferry is more reliable mechanically than a helicopter, with parts and the skills for small repairs available in the community or nearby in Unalaska. If the ferry was down due to mechanical issues, a harbor on Akun would allow a local vessel or skiff to safely access the airport so long as they can safely make the crossing.		

		• If Trident were to stop regular vessel movements, the backup transportation option for trips to/from Unalaska would be eliminated. A marine ferry could provide this backup transportation option for trips to/from Unalaska and Akutan during long term flight cancellations due to weather, particularly when those closures are due to fog conditions. • Any increase in the reliability of transportation could avoid significant delays to medical teams visiting Akutan, the ability of Akutan residents to access off-island medical care, etc.		
Subsistence	• The helicopter is generally not used for subsistence harvest trips due to multiple reasons including weight restrictions. • Weather conditions can impact the ability to harvest target species (i.e. poor weather can prohibit travel during short duration salmon runs) • No ability to transport ATVs to the island, which negatively impacts the ability to harvest given the significant distances between harvest sites on Akun. • Some residents (particularly the very young and very old that would have difficulty in a skiff, or those with limited disposable	• A marine ferry vessel is capable of handling bulky deck-load cargo, including ATV's, to support subsistence harvesting. • Lower cost bar to start pursuit of subsistence by providing transportation options to Akun beyond skiff ownership. Access to Akun is important to subsistence harvesting as it is a prime harvest location due both to historical and topographic conditions. • Barriers to training of youth are reduced by improving access to subsistence sites on Akun • Increased food security by improving reliable access to	• Access issues for those with mobility issues would continue similar to FWOP. • Expanded capacity over FWOP, but less capacity than a marine ferry	• Welfare of the local population. • Access to natural resources for subsistence purposes • Social & cultural value to the community

	income to pay for tickets on the helicopter or own/operate their own skiff) have difficulty accessing traditional subsistence and cultural sites on Akun. This can impact the ability of elders transferring on traditional subsistence knowledge to youth.	harvest sites on Akun during short harvest windows (ie. Salmon runs) • Health & wellness (traditional foods) is increased through reliable access to a variety of diverse subsistence resources from traditional harvest sites on Akun. • Increased access for those with mobility challenges, including the very young and elders. Vessel access ramps for those with mobility challenges are easily obtained and installed.		
Delivery of Non-Medical Goods	• The helicopter prioritizes people and their luggage above general mail/freight so freight delays can occur, particularly during peak travel times and when resuming flights after weather closures. • Both community members and the helicopter pilots indicate that mail and freight have been lost in transport. • Delays and losses can include critical supplies such as repair parts for ATVs, skiffs, etc which can have significant impacts if those delays occur during critical harvest seasons.	• A marine vessel is sufficiently large enough to transport a full planeload of passengers and freight, thereby eliminating the additional delays caused by prioritization. • Training of youth is improved through more reliable access to equipment, parts, and materials. • Having reliable deliveries to the community make it more appealing for educators, medical staff, etc to move to the community and/or remain in the community long term leading to improvements in professional retention. • Increased food security through improved reliability of deliveries which are important for subsistence harvesting (ie skiff and ATV repair parts).	• Secondary prioritization of freight would be reduced due to a larger capacity helicopter, but not eliminated.	• Welfare of the local population • Local and regional economic opportunities

Cultural Identity **(Non-Food Gathering Cultural Practices)**	• A traditional village site of the community is located on Akun, making access to the island particularly important for cultural reasons. Access in FWOP is hindered due to lack of protected moorage for local vessels, affordability of helicopter tickets, and for those with mobility limitations that would have difficulty getting in/out of a helicopter/skiff. • Culture camps are hosted on both islands, including youth from not only Akutan but also neighboring villages. Hosting culture camps is difficult without reliable transportation between Akun and Akutan for larger groups and supplies. • Non-food materials are harvested from Akun as part of cultural practices (i.e., grass for basket making). Access to these harvest sites can be hindered due to a lack of skiff moorage and a lack of ATV access.	• Access to harvests such as grasses for making baskets would be improved, including the ability to more easily transport those harvests back to Akutan. • Increased access culture camps, including the ability to reliably transport large numbers of camp participants between Akutan and Akun, but also to support the camp through transporting supplies and materials. These improvements include benefits to training of youth, mental health, sharing of cultural values, etc. • Improved access to traditional territory sites, particularly for those with mobility issues such as the very young and elders.	• Expanded capacity over FWOP, but less capacity than a marine ferry	• Welfare of the local population • Access to subsistence resources • Social & cultural value to the community
Income Opportunities	• Limited opportunities for cash employment. • Access challenges hinder the community's ability to support tourism on Akun. • Access challenges hinder the community's ability to transport	• Improved access to/from Akun for tourism and cattle development potential. Expansion of economic opportunities on Akun would have trickle down effects including increasing the available cash to pursue subsistence, available cash to rebuild critical infrastructure,	• A larger helicopter would not result in a significant shift from FWOP.	• Local and regional economic opportunities • Welfare of population

	harvested cattle from Akun to Akutan.	improved health & wellness (through employment). • In a potential scenario where Trident were to relocate away from Akutan, expanding economic opportunities for cash employment would be even more critical to long term community viability.		
Community Growth and Expansion	• Geography/topography limits expansion on Akutan. • While there is a desire to expand on their traditional territory site of Akun, transportation difficulties between the two islands hinder connection and make expansion less likely.	• Efficient connection between Akutan and Akun could enable expansion on Akun.	• Minimal change from FWOP	• Welfare of the local population
Transportation Mode Preferences	• Some community members indicated a distrust of the helicopter. • The helicopter can be difficult for individuals with mobility issues.	• Aleutian communities are very familiar and comfortable with maritime transportation. A marine ferry would provide connection to the transportation network for those less trusting of helicopters. • Access ramp for a marine ferry is easily obtained and can improve access to Akun and the rest of the transportation network for those with mobility issues.	• A larger helicopter would not result in a measurable change from FWOP.	• Welfare of the local population
Local Vessel Access	• Skiffs are launched from the beach or ramp on Akutan and then tied or dragged onto the beach in Akun. Skiffs are generally not left unattended due to a lack of protected moorage areas. • Local vessels larger than a skiff are not able to access Akun at all	• Ability to leave skiffs unattended behind the breakwater (tied, dragged on the beach, or moored at dock). • Protected moorage for local vessels larger than skiffs would be available, extending the weather operability windows for local vessel	• No protected moorage on Akun, therefore there would be no shift from FWOP.	• Welfare of the local population. • Social & cultural value to the community • Access to natural resources for subsistence purposes

	due to a lack of protected moorage.	transportation to/from Akun by allowing utilization of larger local vessels that can handle a wider range of operating conditions compared to the smaller skiffs. • In a situation where the helicopter or ferry were to become unavailable (ie. emergency repairs, etc), protected moorage on Akun would provide a backup transportation option via local vessels larger than skiffs that are based in Akutan. This backup transportation option is not available under FWOP. • Training of youth would be improved by expanding the conditions under which local vessels could access Akun, subsequently expanding the potential for youth for be mentored on safe operation of skiffs between their current and traditional territory.		

7.4. Description of NED Benefits

7.4.1. 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 (as described in Section 7.3.1.1.3). Non-transportation related costs built into the contracts such as profit, financing charges, administration staff, office rent, office supplies, utilities, and misc 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.

For the helicopter, the portion of the annual contract costs that can be directly attributable to transportation is $1.718 million. Given that the marine ferry will be managed via an annual contract which will be available for bidding, the specific vessel and the exact annual contract cost are unknown. To allow for uncertainty, two cost scenarios (a converted vessel with direct transportation costs estimated at $1.356 million per year, and an existing vessel at $946 thousand per year) form the basis for the low and high marine ferry costs directly attributable to transportation services.

It is further assumed that the contract costs utilized are reasonable. The amounts in the FWOP condition 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 in 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.

Table 21. Transportation Cost Savings by Alternative

	Alt 1		Alt 2		Alt 3	
Description	**Low**	**High**	**Low**	**High**	**Low**	**High**
Average Annual Helicopter Transportation Services Cost	$1,718,000	$1,718,000	$1,718,000	$1,718,000	$1,718,000	$1,718,000
Average Annual Marine Ferry Transportation Services Cost	$1,356,000	$946,000	$1,356,000	$946,000	$1,356,000	$946,000
Average Annual Transportation Cost Savings (helicopter minus ferry transportation costs)	$362,000	$772,000	$362,000	$772,000	$362,000	$772,000

Note: Only the portion of the annual contract estimates that can be directly attributed to transportation are included in the benefit estimates shown here. Additional Information on the helicopter service cost can be found in Section 5.1.2.3 and 6.2.3, while additional information on the marine ferry cost can be found in Section 7.3.1.1.3.

7.4.2. Total Project NED Benefits

Total project NED benefits are presented in Table 22 and include a range of values to reflect uncertainty.

Table 22. NED Benefits by Alternative (Present Value)

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

7.5. Project 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. The Cost Engineering Appendix (Appendix D) 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 methods. Project costs were developed without escalation and are in FY2024 dollars.

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. These assumptions inform the interest during construction calculations.

Maintenance dredging and armor rock replacements of varying degrees are assumed for each alternative. 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.

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 Cost Engineering Appendix differ slightly from those used in the benefit-cost analysis. Costs used in the benefit-cost analysis include the project's initial construction cost, interest during construction (IDC), and estimated operations and maintenance costs. The costs for the benefit-cost analysis are referred to as NED costs or economic costs. The economic project costs by alternative for the benefit-cost analysis are shown in Table 23 and Table 24.

Table 23. Project Cost Streams by Alternative (FY24 Price Level)

			Total Construction Costs			Present Value		
Calendar Year	Analysis Year	Present Value Factor	Alt 1	Alt 2	Alt 3	Alt 1	Alt 2	Alt 3
2028	-4	1.11	$4,615,788	$2,967,165	$3,363,041	$5,144,855	$3,307,266	$3,748,517
2029	-3	1.08	$4,615,788	$2,967,165	$3,363,041	$5,007,158	$3,218,750	$3,648,191
2030	-2	1.06	$21,877,665	$14,084,283	$15,960,389	$23,097,481	$14,869,570	$16,850,280
2031	-1	1.03	$39,139,541	$25,201,402	$28,557,737	$40,215,879	$25,894,440	$29,343,074
2032	0	1.00	$39,139,541	$25,201,402	$28,557,737	$39,139,541	$25,201,402	$28,557,737
2033	1	0.97				$0	$0	$0
2034	2	0.95				$0	$0	$0
2035	3	0.92				$0	$0	$0
2036	4	0.90				$0	$0	$0
2037	5	0.87				$0	$0	$0
2038	6	0.85				$0	$0	$0
2039	7	0.83				$0	$0	$0
2040	8	0.80				$0	$0	$0
2041	9	0.78				$0	$0	$0
2042	10	0.76	$1,135,486	$1,261,070	$1,193,301	$865,692	$961,437	$909,770
2043	11	0.74				$0	$0	$0
2044	12	0.72				$0	$0	$0
2045	13	0.70				$0	$0	$0
2046	14	0.68				$0	$0	$0
2047	15	0.67				$0	$0	$0
2048	16	0.65				$0	$0	$0
2049	17	0.63				$0	$0	$0
2050	18	0.61				$0	$0	$0
2051	19	0.60				$0	$0	$0
2052	20	0.58	$1,135,486	$1,261,070	$1,193,301	$660,002	$732,998	$693,607
2053	21	0.57				$0	$0	$0

2054	22	0.55				$0	$0	$0
2055	23	0.54				$0	$0	$0
2056	24	0.52				$0	$0	$0
2057	25	0.51	$2,915,200	$1,601,028	$1,766,759	$1,479,526	$812,555	$896,668
2058	26	0.49				$0	$0	$0
2059	27	0.48				$0	$0	$0
2060	28	0.47				$0	$0	$0
2061	29	0.46				$0	$0	$0
2062	30	0.44	$1,135,486	$1,261,070	$1,193,301	$503,184	$558,836	$528,805
2063	31	0.43				$0	$0	$0
2064	32	0.42				$0	$0	$0
2065	33	0.41				$0	$0	$0
2066	34	0.40				$0	$0	$0
2067	35	0.39				$0	$0	$0
2068	36	0.38				$0	$0	$0
2069	37	0.37				$0	$0	$0
2070	38	0.36				$0	$0	$0
2071	39	0.35				$0	$0	$0
2072	40	0.34	$1,135,486	$1,261,070	$1,193,301	$383,626	$426,055	$403,160
2073	41	0.33				$0	$0	$0
2074	42	0.32				$0	$0	$0
2075	43	0.31				$0	$0	$0
2076	44	0.30				$0	$0	$0
2077	45	0.29				$0	$0	$0
2078	46	0.29				$0	$0	$0
2079	47	0.28				$0	$0	$0
2080	48	0.27				$0	$0	$0
2081	49	0.26				$0	$0	$0
2082	50	0.26	$1,135,486	$1,261,070	$1,193,301	$292,476	$324,824	$307,368

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[1]	$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[2]	**$4,326,000**	**$2,827,000**	**$3,181,000**

Note: Life cycle cost estimates (total construction costs including O&M) were provided for the full suite of alternatives at FY 2024 (October 2023) price levels.

[1] Interest During Construction reflects the opportunity cost of capital occurred during the construction period. While it is an economic cost, there is no financial outlay, and it is not included in the cost estimates. Initial construction costs (Total Project Construction Costs) and the schedule of expenditures were utilized to determine interest during construction by multiplying the Present Value Factor by the annual expenditures. The value above the Total Project Construction Cost from that calculation reflects Interest During Construction.

[2] Average Annual Economist Cost: The FY 2024 Federal interest rate of 2.75 percent was used to discount the costs (including OMRR&R costs) to the base year and then to amortize them over the 50-year period of analysis.

7.6. Net Benefits and Benefit-Cost Ratios (BCRs)

Net benefits and the BCR are determined using the average annual benefits and average annual costs for each alternative. 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 25. NED Net Benefits and BCR's 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 NED 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.

7.7. Regional Economic Analysis

The Regional Economic Development (RED) account measures changes in the distribution of regional economic activity that would result from each alternative. Evaluations of regional effects are measured using a nationally consistent income, employment, output, and population projection. These impacts occur from the construction of the project, continued maintenance of the project, and from the contribution to a regional economy from the functioning of the project.

The U.S. Army Corps of Engineers (USACE) Regional Economic System (RECONS) was used to conduct the RED evaluation. RECONS is a USACE-certified regional economic model, designed to provide accurate and defensible estimates of regional economic impacts and contributions associated with USACE projects, programs, and infrastructure. Regional economic impacts and contributions are measured as economic output (sales), jobs, income, and value added. Estimates are provided simultaneously for three levels of geographic impact area: local, state, and national. RECONS includes three categories of economic impacts including direct, indirect, and induced. RECONS reports indirect and induced effects collectively as secondary effects.

Table 26 and Table 27 display key terms and definitions to assist with interpreting the results of this evaluation.

Table 26: Overview of Economic Measures

Output (sales)	Annual sales are equivalent to annual economic output or the value of production by industry. Output can be measured either by total value of purchases by intermediate and final consumers or by intermediate outlays plus value added.
Jobs	A job is the annual average of monthly jobs in an industry (this is the same definition used by Quarterly Census of Employment and Wages, Bureau of Labor Statistics, and Bureau of Economic Analysis nationally). A job can be full-time, part-time or overtime, and includes proprietors (i.e., self-employed persons). Job estimates are presented in full-time equivalence.
Labor Income	Labor income represents all forms of annual employment earnings; it is the sum of employee compensation and proprietor income.

Value Added	Value added consists of employee compensation, proprietary income, other property type income (which includes industry profits), and indirect business taxes. Value-added is an estimate of the gross regional product (GRP).

Table 27: Overview of Economic Impacts

Direct Impacts	Direct impacts occur in the impact area in which a project or economic activity is located. Direct sales represent that proportion of the spending or sales in each industry that flows to material and service providers in the impact area. For employment, labor income, and GRP measures, the direct impacts represents the jobs, labor income, and gross regional product associated with the directly affected industry.
Indirect Impacts (Secondary)	The indirect impacts include the backward-linked industry suppliers for goods and services that support the directly affected industries, supporting indirect sales, jobs, labor income and value added. For example, if construction activity is the direct impact, indirect business supporting construction would include architectural and engineering, lumber suppliers, trucking, and steel manufacturers, among others; these are considered backward-linked industries supporting the construction activity.
Induced Impacts (Secondary)	Induced impacts occur from household expenditures or consumer spending associated with the direct and indirect workers spending their earnings within the impact area, supporting induced sales, jobs, labor income, and value added.
Total Impacts	Total impacts is the sum of direct, indirect, and induced impacts.

The Civil Works Spending Module 'All Work Activities, with Ability to Customize Impact Area and Work Activity' was used to generate the economic contribution (RED benefits) of spending on project construction, operation, and maintenance (O&M) costs. For purposes of this analysis, the Aleutians East Borough is considered the local impact area, with the state of Alaska and the nation also differentiated.

7.7.1. RED - Alternative 1

The expenditures associated with All Work Activities, with Ability to Customize Impact Area and Work Activity at Aleutians East Borough (AK) are estimated to be $113,573,000 (which is the Total Project Construction Cost plus the present value of O&M). Of this total expenditure, $54,547,086 will be captured within the local impact area. The remainder of the expenditures will be captured within the state impact area and the nation. These direct expenditures generate additional economic activity, often called secondary or multiplier effects. The direct

and secondary impacts are measured in output, jobs, labor income, and gross regional product (value added) as summarized in the following tables. The regional economic effects are shown for the local, state, and national impact areas. In summary, the expenditures $113,573,000 support a total of 620.9 full-time equivalent jobs, $44,503,087 in labor income, $41,489,763 in the gross regional product, and $66,058,618 in economic output in the local impact area. More broadly, these expenditures support 1,812.1 full-time equivalent jobs, $135,380,183 in labor income, $170,194,389 in the gross regional product, and $309,583,076 in economic output in the nation.

Table 28. Alternative 1 RED Summary

Area	Local Capture	Output	Jobs*	Labor Income	Value Added
Local					
Direct Impact		$54,547,086	567.9	$41,387,854	$34,365,652
Secondary Impact		$11,511,532	53.0	$3,115,233	$7,124,111
Total Impact	$54,547,086	$66,058,618	620.9	$44,503,087	$41,489,763
State					
Direct Impact		$79,769,590	774.5	$61,473,518	$48,831,087
Secondary Impact		$70,522,060	355.7	$22,679,733	$41,015,712
Total Impact	$79,769,590	$150,291,649	1,130.2	$84,153,250	$89,846,798
US					
Direct Impact		$106,934,100	904.3	$71,905,320	$61,096,899
Secondary Impact		$202,648,976	907.9	$63,474,863	$109,097,490
Total Impact	$106,934,100	$309,583,076	1,812.1	$135,380,183	$170,194,389

* Jobs are presented in full-time equivalence (FTE)

7.7.2. RED - Alternative 2

The expenditures associated with All Work Activities, with Ability to Customize Impact Area and Work Activity at Aleutians East Borough (AK) are estimated to be $74,238,000 (which is the Total Project Construction Cost plus the present value of O&M). Of this total expenditure, $35,655,187 will be captured within the local impact area. The remainder of the expenditures will be captured within the state impact area and the nation. These direct expenditures generate additional economic activity, often called secondary or multiplier effects. The direct and secondary impacts are measured in output, jobs, labor income, and gross regional product (value added) as summarized in the following tables. The regional economic effects are shown for the local, state, and national impact areas. In summary, the expenditures $74,238,000 support a total of 405.9 full-time equivalent jobs, $29,089,838 in labor income, $27,120,152 in the gross regional product, and $43,179,802 in economic output in the local impact area. More broadly, these expenditures support 1,184.5 full-time equivalent jobs, $88,492,459 in labor income, $111,249,074 in the gross regional product, and $202,361,727 in economic output in the nation.

Table 29. Alternative 2 RED Summary

Area	Local Capture	Output	Jobs*	Labor Income	Value Added
Local					
Direct Impact		$35,655,187	371.2	$27,053,538	$22,463,414
Secondary Impact		$7,524,615	34.7	$2,036,299	$4,656,738
Total Impact	$35,655,187	$43,179,802	405.9	$29,089,838	$27,120,152
State					
Direct Impact		$52,142,101	506.2	$40,182,711	$31,918,873
Secondary Impact		$46,097,371	232.5	$14,824,809	$26,810,284
Total Impact	$52,142,101	$98,239,471	738.8	$55,007,519	$58,729,158
US					
Direct Impact		$69,898,424	591.1	$47,001,551	$39,936,530
Secondary Impact		$132,463,303	593.4	$41,490,908	$71,312,543
Total Impact	$69,898,424	$202,361,727	1,184.5	$88,492,459	$111,249,074

* Jobs are presented in full-time equivalence (FTE)

7.7.3. RED - Alternative 3

The expenditures associated with All Work Activities, with Ability to Customize Impact Area and Work Activity at Aleutians East Borough (AK) are estimated to be $83,541,000 (which is the Total Project Construction Cost plus the present value of O&M). Of this total expenditure, $40,123,252 will be captured within the local impact area. The remainder of the expenditures will be captured within the state impact area and the nation. These direct expenditures generate additional economic activity, often called secondary or multiplier effects. The direct and secondary impacts are measured in output, jobs, labor income, and gross regional product (value added) as summarized in the following tables. The regional economic effects are shown for the local, state, and national impact areas. In summary, the expenditures $83,541,000 support a total of 456.7 full-time equivalent jobs, $32,735,178 in labor income, $30,518,665 in the gross regional product, and $48,590,801 in economic output in the local impact area. More broadly, these expenditures support 1,333.0 full-time equivalent jobs, $99,581,730 in labor income, $125,190,049 in the gross regional product, and $227,720,319 in economic output in the nation.

Table 30. Alternative 3 RED Summary

Area	Local Capture	Output	Jobs*	Labor Income	Value Added
Local					
Direct Impact		$40,123,252	417.7	$30,443,703	$25,278,376
Secondary Impact		$8,467,549	39.0	$2,291,475	$5,240,289
Total Impact	$40,123,252	$48,590,801	456.7	$32,735,178	$30,518,665
State					
Direct Impact		$58,676,193	569.7	$45,218,134	$35,918,729
Secondary Impact		$51,873,979	261.7	$16,682,552	$30,169,966
Total Impact	$58,676,193	$110,550,172	831.3	$61,900,687	$66,088,695
US					
Direct Impact		$78,657,618	665.2	$52,891,465	$44,941,104
Secondary Impact		$149,062,701	667.8	$46,690,266	$80,248,945
Total Impact	$78,657,618	$227,720,319	1,333.0	$99,581,730	$125,190,049

* Jobs are presented in full-time equivalence (FTE)

7.7.4. Summary of Regional Economic Impact Analysis

Since RECONS utilizes project construction costs and the present value of Operations and Maintenance (O&M) expenditures as a basis for determining implementation outlays (construction spending) at the local, state, and national levels, those alternatives with higher construction costs will have higher RED benefits. A summary of RED benefits is shown in Table 31.

Table 31. RED National Summary by Alternative

	Local Capture	Output	Jobs*	Labor Income	Value Added
Alternative 1	$106,934,100	$309,583,076	1,812.1	$135,380,183	$170,194,389
Alternative 2	$69,898,424	$202,361,727	1,184.5	$88,492,459	$111,249,074
Alternative 3	$78,657,618	$227,720,319	1,333.0	$99,581,730	$125,190,049

* Jobs are presented in full-time equivalence (FTE)

In addition to the effects shown above, there is potential to realize local and regional economic opportunities beyond what is captured within RECONS. The regional impact of consistent, affordable transportation into and out of the community of Akutan cannot be overstated. Without affordable access in and out of the community, the long-term viability of the community is threatened (discussed further in the OSE portions of this analysis).

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.

7.8. Environmental Quality

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 of Akutan Bay and Akutan Harbor 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 costal habitat on Akun Island. Confined underwater blasting would be required for alternatives 2 and 3 which would lead to greater impacts to fish 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.

For additional information on environmental quality, see the environmental discussion in the main report.

7.9. Other Social Effects

7.9.1. Cost Effectiveness/Incremental Cost Analysis (CE/ICA)

Section 7.6 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 IWR Planning Suite II tool.

7.9.1.1. 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 community 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 in order 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 plan.

The Engineer Regulation 1105-2-100 states the following:

> Selecting the National Ecosystem Restoration (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.

7.9.1.2. Variable Descriptions

The CE/ICA is performed on Planning Suite II using two variables. First is the non-monetary outputs, and the second variable is the costs for the alternative plans. The non-monetary outputs are measured in Access Capability. In this report, the terms output and metric are interchangeable.

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.

Accessibility metrics for fixed-wing and helicopter aircraft were based on Akutan Airport station data from 5/15/2014 to 5/18/2023 with an average of 3 readings per hour. Applicable data used for the analysis included wind speed, wind gust, wind direction, visibility, sky level coverage, and sky level altitude. Additional information on the determination of access capability for each alternative can be found in the H&H Appendix.

While the fixed-wing operability is the weakest link in the transportation system between Unalaska and Akutan, transportation to/from Unalaska is not the only purpose or value provided when access between Akutan and Akun is improved. OSE benefits for transportation improvements between Akutan and Akun are independent of the fixed-wing and not limited by its operability. Therefore, for this analysis the total access capability is utilized, rather than limiting the analysis to the operability of the fixed wing.

IWR Planning Suite locks the output variable of the FWOP alternative at zero. Because of that, for purposes of this analysis, the baseline FWOP Access Capability (estimated at 69.6% for the Bell 206 helicopter, see Section 5.1.2.3 for more information) is subtracted from the FWP Access Capability at each alternative. See Table 32 for additional information.

Table 32. 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%

As noted in the Planning Guidance Notebook, 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 most efficient, which provide the greatest increase in output for the least increase in cost. These analyses help to inform whether or not 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 total project construction costs, interest during construction,

and operation and maintenance costs. The costs are amortized using the federal discount rate for FY24 over the period of analysis.

For the cost metric, both the AAEQ project cost and the operation cost of the heli/ferry for each alternative had to be considered.

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, see Section 5.1.2.3 for more information) 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 portion that are direct transportation costs. See Table 33 for additional information.

Table 33. Annual Cost Metric

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

7.9.1.3. 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 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.

7.9.1.3.1. 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 34.

Table 34. CE/ICA Results Summary (Ordered by Alternative Number)

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

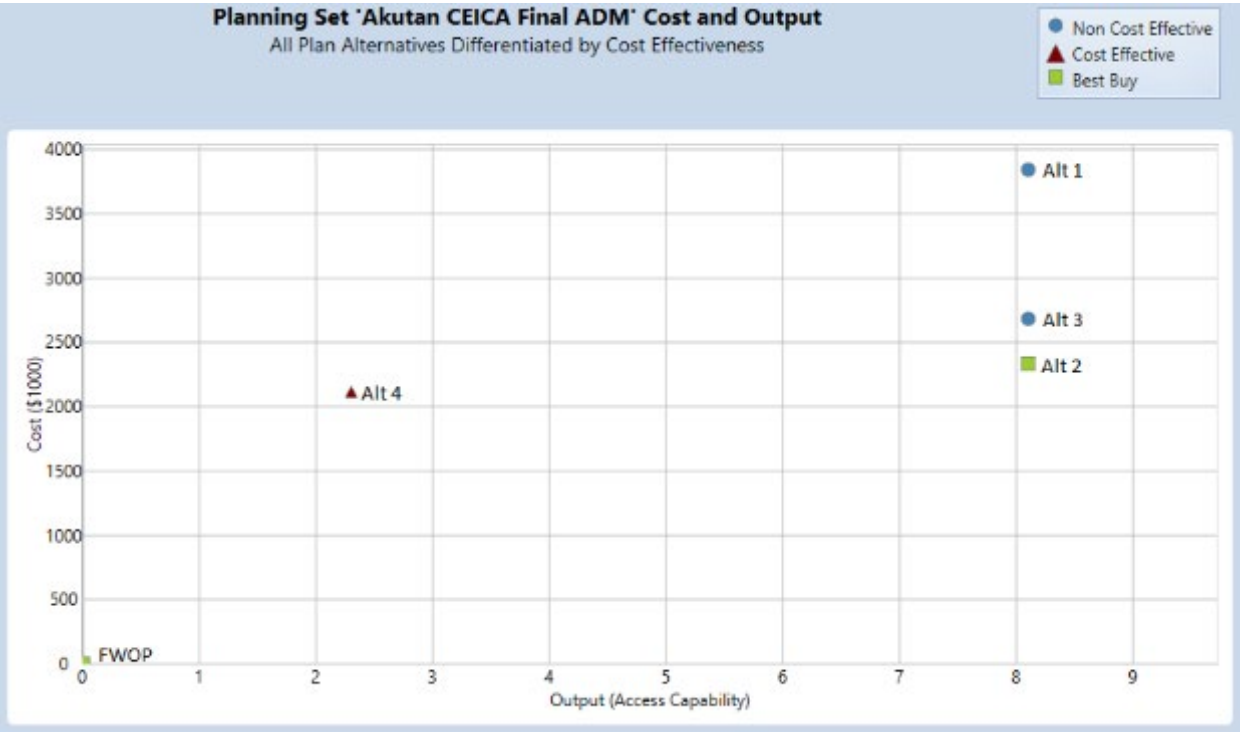

Figure 31: Alternatives Differentiated by Cost-Effectiveness

Figure 31 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 output; and that for any level of investment, the maximum level of output is identified. In Figure 31, it can be seen that 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, it can be seen that 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.

7.9.1.3.2. 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 32 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.

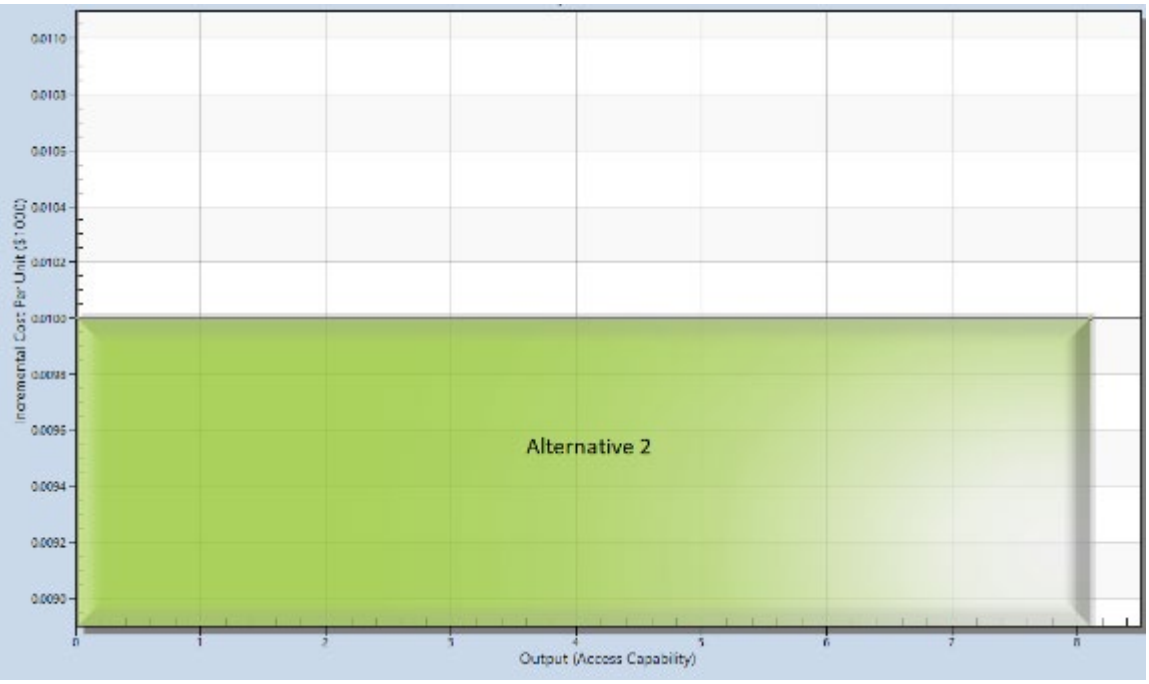

Figure 32: Incremental Cost Analysis of Best Buy Plans

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 35 and further illustrates that Alternative 2 significantly outperforms Alternative 4.

Table 35. Incremental Cost Analysis of Cost-Effective Plans (Ordered by Alternative Number)

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.

7.9.1.3.3. Sensitivity Analysis

To allow for uncertainty, in addition to the CE/ICA already presented, six additional scenarios were also computed.

1. Utilizing only the annual cost of direct transportation (eliminating non transportation costs such as administration expenses from the ferry and helicopter contracts)
2. Formatting the analysis with FWOP as a separate alternative and each FWOP and FWP alternative having individual costs and access (rather than utilizing the change between FWOP and FWP) and the total annual contract costs for the ferry/helicopter
3. Formatting the analysis with FWOP as a separate alternative and each FWOP and FWP alternative having individual costs and access (rather than utilizing the change between FWOP and FWP) and direct transportation costs only (eliminating non transportation costs such as administration expenses from the ferry and helicopter contracts)
4. Reducing the average 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)
5. Utilizing the lowest cost ferry estimate
6. Utilizing the highest cost ferry estimate

In all scenarios the only best buy plans were FWOP and Alternative 2 (matching the analysis that was previously presented). In the case of scenarios 1, 2, 3, 4, and 6, Alternative 4 was found to be cost effective, but not a best buy in any of those scenarios.

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

7.9.2. Multi-Criteria Decision Analysis (MCDA)

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. The Multiple Criteria Decision Analysis (MCDA) is 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 5.3, Section 6.6, and Section 7.3.4.

Multicriteria decision analysis 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. As discussed in Section 5.3, Section 6.6, and Section 7.3.4, these criteria were formulated throughout the study process and then vetted and revised during a community focus group consisting of key stakeholders. Table 36 presents the OSE criteria selected for the MCDA.

Table 36. 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

7.9.2.1. Assigned Quantitative Values

The MCDA follows the methodology set out in the IWR Planning Suite II User Guide (CDM Smith, 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 36 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 exercise rather than alternatives in this case. This was done for two reasons. First, through discussions with community members it

was determined that sites would be the primary driver for differences between scores and that criteria scores would be the same for any alternatives which share a similar location (making the effort to individually score Alternative 1 and Alterative 2, which are both located south of No-name Point, duplicative). The prevalence of the site on MCDA scoring is due to community concerns such as proximity to the subsistence salmon stream and upland subsistence camp sites. 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. Participants were instructed to consider each criterion holistically, including all positive and any negative impacts associated with that criterion when conducting their scoring.

The criteria rankings clarify the incremental benefits of Access Capability across alternatives. Additional information on criteria scores is included in Table 37.

Table 37. 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 38.

Table 38. 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

7.9.2.2. 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 above FWOP) 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 most other criteria is Alternative 3 and therefore they are given zero values. Access Capability is the same across all alternatives and therefore is applied across all alternatives equally. Figure 33 shows the MCDA criteria outputs by alternative, and the subsequent alternative rankings.

Figure 33: MDCA Criterion Weighted Scoring by Range

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 34 and Table 39 for additional information.

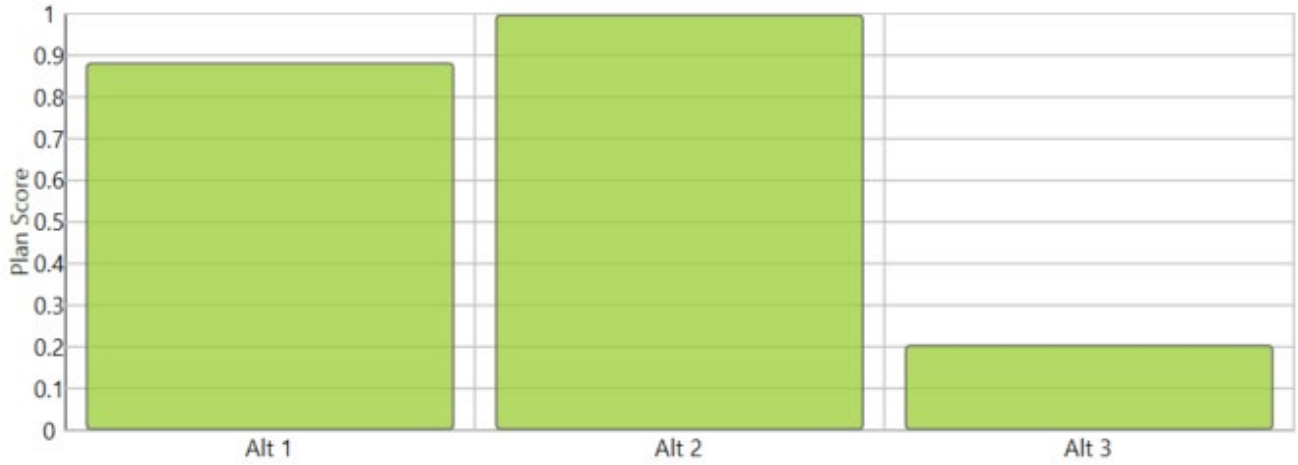

Figure 34: MDCA Plan Outputs by Alternative

Table 39. 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

7.10. Summary of Future With-Project Conditions

Absent federal action to provide navigation improvements to Akutan, transportation cost inefficiencies and negative impacts to OSE are expected to continue throughout the analysis. These adverse impacts are incurred as a result of current and expected future conditions. In

all Future With-Project Alternatives, a marine ferry contract would replace the helicopter with a transportation cost savings of $362,000 to $772,000 annually.

A key point of uncertainty is the future of the Trident Seafoods plant in Akutan. Due to 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 transportation cost savings between the helicopter and marine ferry service contracts even more critical.

Remote Alaska communities face significant challenges. Higher costs of living, limited cash employment, and unreliable and expensive transportation are challenges the village already faces daily. In the event that Trident ceased operations in the community, these challenges would only intensify. In this scenario, the already significant OSE benefits associated with the FWP would become increasingly critical for long term viability of the community.

Each alternative provides varying degrees of improvement as described throughout Section 7.0. Alternative 2 provides the greatest increase in benefits when the benefits across all four economic accounts are looked at comprehensively.

8.0 RISK, UNCERTAINTY AND SENSITIVITY

8.1. Design Vessel

While the PDT has made informed decisions regarding selection of a design vessel, 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 help 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 Marine Design Center ferry analysis.

For additional information on design vessel uncertainty see the H&H appendix and main report.

8.2. Project Benefits

In order to determine project benefits, the change from FWP condition over FWOP condition is quantified. For this purpose, it is assumed that helicopter service will continue throughout the FWOP condition. Helicopter costs are subsidized through both the essential air service and the Aleutians East Borough. While there is inherent uncertainty associated with the assumption of ongoing subsidies and helicopter service throughout the FWOP study period, there is no information available that would support high confidence in an altered FWOP condition.

Contract costs for the helicopter (FWOP) and marine ferry (FWP) form the basis for the transportation cost savings benefit and are considered reasonable for this purpose. 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 or price gouging due to low competition rates. Non-transportation costs such as overhead, profit, etc have been removed from the NED analysis of transportation cost savings.

It is assumed that helicopter service will continue throughout the FWOP condition and ferry service will continue throughout the FWP condition. Helicopter costs are subsidized through both the essential air service and the Aleutians East Borough. While there is inherent uncertainty associated with the assumption of ongoing subsidies and service throughout the study period, there is no information available that would support high confidence in an altered condition.

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, if Trident were to close the Akutan plant and fully shift its operations to the new plant which being constructed at Unalaska, as is currently being explored, transportation demand associated with the plant would similarly be reduced in both FWOP and FWP conditions. If a shift like this were to occur, there is 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. 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.

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 community 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 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.

While conducting expert elicitations and focus groups are an accepted methodology for gaining insight about existing conditions and probable changes in the future, those being elicited often have an interest in the project being successful and likely have strong opinions about a desired outcome. The potential for bias in focus group scoring is acknowledged. In this case, results from the focus group are used to provide a quantitative measure to help

inform the qualitative analysis of the OSE criteria (as per the Comprehensive Benefits memo, “tradeoffs between plans must be described and, where possible, displayed quantitatively.”) Focus group scores are utilized in the MCDA which aims to support and unpack the complexities within the single metric of Access Capability that was utilized in the CE/ICA. In this case; the recommended plan remains the same (the least cost, high access capability alternative) regardless of whether or not the focus group scoring is included. Therefore, the impact of potential bias in focus group scoring is minimal in this case.

8.3. Project Depth/Optimization

Project depth was formulated to accommodate wave/tide conditions and the design vessel. 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 and design are expected to continue to be optimized during PED.

9.0 FOUR ACCOUNTS EVALUATION SUMMARY

This appendix presented the economic analysis of alternatives for providing navigation improvements at Akutan, Alaska. 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 (NED), Regional Economic Development (RED), Environmental Quality (EQ), and Other Social Effects (OSE).

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 benefit-cost ratio (BCR) greater than 1.0. Since there was no NED plan, Cost Effectiveness and Incremental Cost Analysis (CE/ICA) was used to inform plan selection. Additionally, the Multiple Criteria Decision Analysis (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 Alternative 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 40. These analyses inform plan selection as detailed in the Integrated Feasibility Report.

Table 40. 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

9.1. 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.

10.0 RECOMMENDED PLAN ECONOMIC SUMMARY

Updated costs for the recommended plan were completed using MCACES and include a Cost and Schedule Risk analysis for contingency development, resulting in a Level 3 certified cost estimate. This cost update would not alter the plan selection and was not performed for the

full suite of alternatives; therefore, the Level 4 costs for each alternative are carried through the economic analysis for plan evaluation and comparison. Summary of the updated project economics for the recommended plan reflecting the Level 3 certified cost are included below. Note that the costs presented in this table are based on certified costs, which differ from the costs presented in the rest of this appendix that were used to compare and screen alternatives.

Table 41. Recommended Plan Project Cost Summary (Present Value)

Cost Component	**Alt 2**
Total Project Construction Cost	$79,670,000
Interest During Construction[1]	$2,340,000
Operations and Maintenance	$4,135,000
Total Economic Cost	**$86,146,000**
Average Annual Costs	
Interest and Amortization of Initial Investment	$3,038,000
Average Annual OMRR&R	$153,000
Total Average Annual Equivalent Economic Cost[2]	**$3,191,000**

Note: Life cycle cost estimates (total construction costs including O&M) are shown at FY 2024 (October 2023) price levels.
[1] Interest During Construction reflects the opportunity cost of capital occurred during the construction period. While it is an economic cost, there is no financial outlay, and it is not included in the cost estimates.
[2] Average Annual Economist Cost: The FY 2024 Federal interest rate of 2.75 percent was used to discount the costs (including OMRR&R costs) to the base year and then to amortize them over the 50-year period of analysis.

Table 42. Recommended Plan Economic Summary

Item	**Total ($)**
Total Average Annual Equivalent Economic 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 (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.