US Army Corps of Engineers®
Alaska District

DRAFT Feasibility Report and Environmental Assessment

Homer Navigation Improvements
Homer, Alaska
Appendix C: Economics

May 2026

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ACRONYMS AND ABBREVIATIONS

AAEQ	Average Annual Equivalent
ACS	American Community Survey
ADF&G	Alaska Department of Fish & Game
ADLWD	Alaska Department of Labor and Workforce Development
AMHS	Alaska Marine Highway System
AVD	Avoided Vessel Delays
BCR	Benefit Cost Ratio
BEI	Business Expansion Impacts
CBU	Community Benefit Units
CE/ICA	Cost Effectiveness/ Incremental Cost Analysis
CFEC	Commercial fisheries Entry Commission
CISPRI	Cook Inlet Spill Prevention and Response, Inc.
CPBI	China Poot Bay Impacts
CPI	Consumer Price Index
ECI	Employment Cost Index
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EGM	Economic Guidance Memoranda
EQ	Environmental Quality
ER	Engineering Regulation
FRC	Fast Response Cutter
FTWE	Full Time Work Equivalent
FWOP	Future Without Project
FWP	Future With Project
FY	Fiscal Year
HSI	Habitat Suitability Index
IDC	Interest During Construction
IFQ	Individual Fishing Quota
IFREA	Integrated Feasibility Report and Environmental Assessment
IPHC	International Pacific Halibut Commission
KBSGI	Kachemak Bay Set Gillnet Impacts
KPB	Kenai Peninsula Borough
LCI	Lower Cook Inlet
LOA	Length Overall
LRO	Local and Regional Opportunities
MLLW	Mean Lower Low Water
MTI	Marne Trades Impacts
NED	National Economic Development
NFS	Nonfederal Sponsor
NMFS	National Marine Fisheries Service

NOAA	National Oceanic and Atmospheric Administration
NPFMC	North Pacific Fishery Management Council
OMRR&R	Operations, Management, Repair, Rehabilitation, and Replacement
OSE	Other Social Effects
PDT	Project Delivery Team
PED	Preconstruction, Engineering and Design
POA	Pacific Ocean, Alaska
PSMFC	Pacific States Marine Fisheries Commission
PUF	Personal Use Fishing
RED	Regional Economic Development
ROM	Rought Order of Magnitude
UDV	Unit Day Value
USACE	Unite States Army Corps of Engineers
USC	United States Code
WCC	Waterborne Commerce Center
WRDA	Water Resources Development Act

APPENDIX C - ECONOMICS

C.1 Overview

C.1.1 Executive Summary

This appendix presents the economic analysis of four structural alternatives for providing navigation improvements for the port and harbor of Homer, Alaska. The alternatives are evaluated using the four accounts established by the U.S. Water Resources Council 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, an NED analysis was performed, which demonstrated that none of the alternatives had a benefit-cost ratio (BCR) greater than 1.0. Because there is no NED plan, a Cost Effectiveness and Incremental Cost Analysis (CE/ICA) was used to support plan selection. The non-monetary metric used in the CE/ICA is Community Benefit Units (CBUs). This metric combines five separate types of non-monetary benefits felt by the local and regional community in a FWP. These include safety, avoided delays for transient vessels, reduced risks of delays to off-road communities which rely on freight shipments from Homer, increased access to personal use fisheries, and benefits to local businesses that are able to expand operations.

Overcrowding in Homer causes frequent vessel delays, which disrupt commercial vessel operations, delay arrivals and departures, and require vessel owners to spend time in port moving their vessel around to accommodate other traffic. This represents an unnecessary cost to vessel owners and crews. Additionally, the Homer fleet includes coastal freight vessels which transport a wide variety of freight to isolated Alaskan communities that do not have connection to the road system. These communities experience risks of late deliveries when vessels are delayed in Homer. The CE/ICA assesses to what degree each alternative reduces risks to these communities by alleviating vessel crowding and associated delays.

In addition to overcrowding in transient moorage, there is insufficient reserve moorage to meet existing or projected demand. As more vessels are able to use the harbor, access is created to personal use fisheries which contributes to local and regional nutrition. Additionally, businesses that operate out of the harbor, or those that serve the fleet, will be able to expand operations if more space is available.

The results of the NED analysis (BCRs and net Average Annual Equivalent NED benefits), and the OSE CE/ICA are summarized in Table 1. Because none of the alternatives had BCRs above 1.0, none of the alternatives are NED justified.

The CE/ICA identified Alternatives 1a, 1b and 2 as Cost Effective, meaning that no other plan gives the same or a higher level of output for less cost. The CE/ICA identified the No Action Alternative and Alternative 3 as a Best Buy plans, meaning that these alternatives provide the greatest increase in output for the least increase in cost. (Note that the No Action Alternative is always identified as a Best Buy plan because it is always the lowest cost.) These analyses informed plan selection as detailed in the main report of the Draft Integrated Feasibility Report and Environmental Assessment (IFREA).

After considering the OSE benefits, as assessed by the CE/ICA, Alternative 2 was identified as the Total Net Benefits Plan. Under USACE policy, the plan with the highest net NED benefits is identified as the NED plan, however because no plan had positive net benefits, it was determined that there was no NED plan.

Table 1: Four Accounts Summary

Alternative	Benefit-Cost Ratio (BCR)	AAEQ Net NED Benefits	EQ (Retained Cumulative HSI Score)	OSE (CE/ICA)
No Action (FWOP)	0.00	$0	152.3	Best Buy
Alt 1a	0.44	($9,793,000)	60.9	Cost Effective
Alt 1b	0.73	($6,195,000)	47.7	Cost Effective
Alt 2	0.77	($5,664,000)	44.2	Cost Effective
Alt 3	0.79	($6,043,000)	9.0	Best Buy

C.1.2 Purpose and Scope

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

C.1.3 General Methodology

This section describes the methods used to conduct the economic analysis of the proposed navigation improvements at Homer. The study was conducted, and the report prepared in accordance with goals and procedures for water resources planning as contained in Engineer Regulation (ER)1105-2-103, Policy for Conducting Civil Works Planning Studies, and ER 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.

Data was provided by harbor staff. Additional data was sourced from focus groups, personal interviews, 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. NED 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 alternative 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 (e.g., income and employment). The environmental quality (EQ) account measures positive and negative benefits to the environment and is analyzed consistent with current guidance. 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.

All prices listed in this appendix are reported in FY26 dollars. All costs were calculated using Fiscal Year (FY) 2026 (October 2025) price levels and then converted to Average Annual Equivalent values using the FY 2026 Federal discount rate of 3.25%, assuming a 50-year period of analysis.

NED benefits are assessed for the alternatives identified in Section C.7.4 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 Homer, the main NED benefits equal the difference between future without- and future with-project costs associated with rafting delays, fueling delays, avoidable fuel consumption, vessel damages, and harbor staff labor costs associated with managing rafting.

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, and further modified by WRDA 2024. Additional information on the authorities utilized, the requirements that must be fulfilled, and how the Homer study meets those requirements, can be found in Section C.4.1. The authority specifies that "the Secretary may recommend a project without the need to demonstrate that the project is justified solely by national economic development benefits if the Secretary determines that [. . .] the project would be located in the State of Hawaii or Alaska [. . .] and over 80 percent of the goods transported through the harbor would be consumed within the United States." (33 US Code § 2242).

Implementation guidance for the Remote and Subsistence Harbor authority states, "If there is no NED Plan and/or the selection of a plan other than the NED Plan is based in part or whole on non-monetary units (Environmental Quality (EQ) and Other Social Effects (OSE) accounts), then the selection will be supported by a cost effectiveness/incremental cost analysis consistent with ecosystem restoration evaluation procedures." The future with-and without-project evaluation frameworks are similar for the NED analysis and CE/ICA and are described in subsequent sections.

C.2 Introduction

C.2.1 Problem Statement

Homer Harbor experiences navigation inefficiencies. This has led to negative economic impacts to a large region of Alaska. The navigation inefficiencies stem from overcrowding in the harbor. The harbor entrance channel and moorage basin depth also limit the ability for larger and deeper vessels to access the harbor.

Negative economic impacts are directly experienced by 50 non-road connected communities that depend upon Homer Harbor for essential goods such as fuel, freight, and food. Additional impacts are experienced by 147 communities in the region as users of Homer Harbor travel to perform their functions.

C.2.1.1 *Problems*

Problems, in the context of USACE planning procedures, refer to existing negative conditions as described in the problem statement above.

As stated, negative economic impacts are directly experienced by 50 non-road connected communities that depend upon Homer Harbor for essential goods such as fuel, freight, and food. Harbor congestion and overcrowding are expected to continue. This expectation is supported by the increasing number of boats added to the waitlist for an assigned slip space in the harbor over time. In 2019 there were 270 boats on the harbor waitlist; in 2023 there were over 400. Inefficiencies and delays will continue or increase for all harbor users. Homer will forego opportunities for local and regional economic growth. Isolated regional communities that rely on Homer Harbor will continue to experience inefficiencies related to delays in fuel and freight that are transported via Homer Harbor.

C.2.1.2 *Opportunities*

Opportunities, in the context of USACE planning procedures, are desirable future conditions.

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

- Improve access for vessels that serve communities without road access.
- Increase moorage facilities for large and small vessels.
- Reduce damages to floats and docks.
- Reduce vessel damages due to collisions and congestion in the harbor.
- Increase NED and OSE economic activities.
- Improved access for recreational activities may also occur.

C.2.1.3 *Objectives*

Objectives, in the context of USACE planning procedures, are results which can be achieved by solving problems or by taking advantage of opportunities.

The objective for Homer is to provide safe, reliable, and efficient navigation for commercial, subsistence, private, and government users over the 50-year period of analysis from 2034 to 2083.

C.2.1.4 *Constraints*

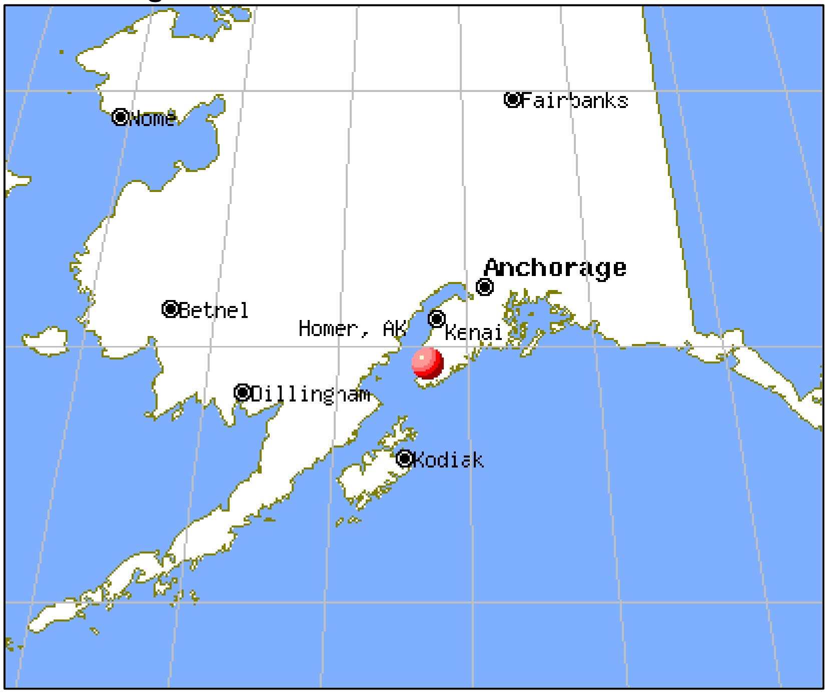
Constraints, in the context of USACE planning procedures, are actions which cannot be taken or which should be avoided. There are no known legal constraints, but study-specific considerations include:

- Avoid or minimize impacts to existing commercial and subsistence fisheries.
- Avoid or minimize impacts to existing significant economic activities.
- Avoid or minimize impacts from sedimentation within Kachemak Bay.
- Avoid or minimize impacts to floodplains and wetlands.
- Avoid or minimize impacts to Essential Fish Habitats (EFH) and Anadromous Waters.
- Avoid or minimize taking of marine mammals, migratory birds, and eagle populations that utilize the area.

C.2.2 Location and Setting

Homer is located on Kachemak Bay toward the southwestern end of the Kenai Peninsula at 59.6481 degrees north latitude, 151.5299 degrees west longitude. The Sterling Highway ends at Homer, making it the southernmost point on the Alaska Highway system, and its port a point of connection for non-road-connected communities in the region. Homer’s location within the state is shown in Figure 1.

Figure 1: Location of Homer within Alaska



(Image retrieved from https://www.city-data.com/city/Homer-Alaska.html#, October 2024)

C.2.2.1 *The Homer Spit*

The Homer Harbor is located at the end of a narrow peninsula known locally as “the Spit”. The Homer Spit is approximately 4.5 miles long and divides Kachemak Bay to the northeast from Cook Inlet to the southwest (Figure 2).

Figure 2: The Homer Spit

(image retrieved from Google Earth, October 2024)

C.2.2.1.1 Tourism on the Homer Spit

In addition to the harbor, many businesses are located on the Spit, including restaurants, tourist shops, fishing charters, and small hotels. The Spit is a popular tourist attraction and draws significant crowds, especially between late May and early September. Water taxis provide hikers with access to trail systems on the other side of Kachemak Bay, and R.V. parking is available for those who want to camp on the Spit. The Nick Dudiak Fishing Lagoon, commonly referred to as the Fishing Hole, just north of the harbor, is a public park and is stocked with coho (silver) and Chinook (king) salmon for sport fishing (City of Homer).

C.2.2.1.2 Traffic on the Homer Spit

The Spit is accessed via Homer Spit Road, and parking is available at the harbor, however the narrowness of the Spit makes expanding existing parking or widening the two-lane road difficult. Traffic on and off the Spit can frequently be delayed, and a need for additional parking has been highlighted as a concern by community members. In the event of an emergency, existing traffic conditions would make evacuating the Spit time-consuming and inefficient.

There have been discussions in the community about developing additional parking near the Spit where it connects to the mainland, however this area is already developed, with limited space available.

C.2.2.1.3 Erosion Concerns on the Spit

The southwestern side of the Spit, which faces Cook Inlet, is being impacted by erosion. While this erosion is not directly impacting the harbor, which is located on the sheltered side of the Spit, if unaddressed, it could threaten businesses and even the road. The Homer community is investigating options to mitigate this problem.

C.2.3 Climate

Homer has a mild, temperate climate with an average yearly temperature of 36°F, with a summer high of 63°F and a winter low of 9°F. Homer receives an average of 18 inches of precipitation yearly, with an average wind speed of 13 mph.

C.2.4 History

The Homer area has been home to indigenous peoples for thousands of years. In 1895, the U.S. Geological Survey arrived to study the area's coal and gold resources. Homer Pennock, a gold mining company promoter, arrived in 1896 to mine the beach sands for gold and coal from Homer north to Ninilchik. The community eventually took his name.

Coal became the predominant economic activity from the late 1800s through World War I. In 1899, the Cook Inlet Coal Fields Company built a town and dock on the Homer Spit, a coalmine at Homer's Bluff Point, and a 7-mile-long railroad to carry the coal to the end of Homer Spit. Various coal-mining operations continued until World War I.

In the 1950s, the moderate temperate climate created a high level of interest in agriculture homesteads in Homer and other parts of the Kenai Peninsula. A special homestead program for World War II veterans fueled growth in Homer and the surrounding areas. The City of Homer incorporated in March 1964.

C.2.5 Demographics

The following demographic information provides relevant characteristics to the local economy: population, age distribution, race and ethnicity, household and per capita income, education level, poverty status, and employment.

C.2.5.1 *Population*

The 2020 Census reported the population of Homer at 5,522. This is an increase of 519 over its 2010 Census population of 5,003. Homer's population has been increasing steadily over the last 40 years, according to decennial census data (U.S. Census Bureau 1990, 2000, 2010, 2020). The four most recent census reports of Homer's population are shown in Table 2.

Table 2: Homer Population by Census Year

Census Year	Population
1990	3,660
2000	3,954
2010	5,003
2020	5,522

Source: U.S. Census Bureau decennial census data.

Annual population estimates from the Alaska Department of Labor and Workforce Development (ADLWD) for 2021 through 2023 show a slight decline in 2021, with population increase resuming in 2022 and 2023 (ADLWD 2024a). These estimates are shown in Table 3.

Table 3: Homer Population Estimates, 2021-2023

Year	Population Estimate
2021	5,509
2022	5,516
2023	5,669

Source: ADLWD 2024

While population projections for the city of Homer are not readily available, the ADLWD released *Alaska Population Projections 2023 to 2050,* which includes population projections at the state, regional, and borough (Alaska county equivalent) levels. Homer is located in the Kenai Peninsula Borough (KPB) and accounted for approximately 10.6% of its population in 2020, according to the census. Table 4 shows population projections for the KPB for the years 2025-2050 (ADLWD 2024b).

Table 4: Kenai Peninsula Borough Population Projections, 2025-2050

Year	Population Projection	Percent Change
2025	62,090	N/A
2030	63,138	+1.7%
2035	63,581	+0.7%
2040	63,417	-0.3%
2045	62,771	-1.0%
2050	61,784	-1.6%

Source: ADLWD 2024

These projections suggest that the population of the KPB will continue to increase through 2035 and will begin declining thereafter. This is consistent with the expected trends at the regional and state levels discussed in the same publication. Driving factors for these population projections include negative net migration, and death rates (the number of deaths per 1,000 people), which are expected to increase as Alaska's population ages.

This analysis makes the assumption that Homer's population will remain stable throughout the period of analysis. While it's possible the local population will decrease with the population of the borough, it's also possible that, as smaller communities shrink, people may relocate to Homer as it is one of the larger communities in the borough.

C.2.5.2 *Age Distribution*

According to population estimates, 60% of Homer's population is between the ages of 18 and 65, with 20% each below 18 and above 65. Homer's above-65 population is higher than in the state generally (14%), indicating its attractiveness to retirees. Per the 2021 American Community Survey (ACS) 5-year estimates, the median age in Homer is 39.7, as compared to the state median of 35.6 years.

C.2.5.3 *Race and Ethnicity*

According to the 2020 Census, the population of Homer is 83% white, which is higher than the state percentage (57.5%) but is on par with the rest of the KPB. Race and ethnicity statistics are shown in Table 5.

Table 5: Local, Regional, and State Population by Race, 2020 Census

	Homer		Kenai Peninsula Borough		Alaska	
White alone	4,587	83.1%	46,382	78.9%	421,758	57.5%
American Indian/ Alaska Native alone	242	4.4%	4,228	7.2%	108,838	14.8%
Asian alone	63	1.1%	809	1.4%	43,449	5.9%
African American alone	34	0.6%	386	0.7%	20,731	2.8%
Native Hawaiian/ Other Pacific Islander alone	14	0.3%	182	0.3%	12,455	1.7%
Some Other Race alone	70	1.3%	824	1.4%	4,575	0.6%
Two or More Races	512	9.3%	5,988	10.2%	71,761	9.8%
2020 Census Total Population	5,522		58,799		733,391	

Source: U.S. Census Bureau decennial census data 2020

C.2.5.4 *Education*

The 2022 ACS indicates that 95.1% of Homer residents aged 25 or older are high school graduates, which is comparable with the state percentage of 93.3%. Tertiary education rates are higher in Homer than in the rest of the state: 40.5% of people over 25 in Homer have a bachelor's degree or higher, compared with 30.6% in the state generally.

C.2.5.5 *Household and Per Capita Income*

The 2022 ACS reports the median household income in Homer at $69,757, which is lower than both the KPB median ($76,272) and the state median ($86,631). Per capita income in the city is $42,604, which is slightly lower than the state per capita income ($42,828), but higher than the KPB per capita income ($40,720).

C.2.5.6 *Poverty Status*

The 2022 ACS reports that 12.7% of Homer's population is in poverty, compared to 10.4% for the state overall. The Census Bureau determines poverty status using income thresholds that vary by family size and composition. If a family's total income is less than the income threshold associated with a family of that size, then that family is considered to be in poverty. The Census Bureau utilizes the same thresholds nationally, but they are updated for inflation using the Consumer Price Index (CPI-U). The official poverty definition uses income before taxes and does not include capital gains or noncash benefits such as public housing, Medicaid, and food stamps (U.S. Census Bureau 2020).

C.2.5.7 *Employment*

The City of Homer's website identifies fishing, tourism, marine trades, and education and health services as noteworthy industries.

The 2022 ACS reports Homer's unemployment rate as 9%, as compared with the state rate of 4.6%. Table 6 shows the percentage of Homer's population employed in various industries as compared with employment in the state as a whole. Notably, "agriculture, forestry, fishing and hunting and mining," "retail trade," and "arts, entertainment, recreation, accommodation, and food service" are all higher than the state percentages. This is consistent with an economy that is focused on commercial fishing and tourism.

Table 6: Employment by Sector, Homer and State Comparison

Sector	Percent of Homer Population Employed	Percent of Alaska Population Employed
Agriculture, forestry, fishing and hunting, and mining	6.4%	4.7%
Construction	5.6%	7.3%
Manufacturing	4.5%	4.4%
Wholesale trade	1.4%	1.4%
Retail trade	13.9%	10.5%
Transportation and warehousing, and utilities	8.9%	8.7%
Information	1.7%	1.7%
Finance and insurance, and real estate and rental and leasing	3.3%	4.2%
Professional, scientific, and management, and administrative and waste management services	7.1%	8.6%
Educational services, and health care and social assistance	25.4%	24.5%
Arts, entertainment, and recreation, and accommodation and food services	11.4%	8.1%
Other services, except public administration	4.1%	4.6%
Public administration	6.1%	11.3%

Source: ACS, U.S. Census Bureau 2022

C.2.6 Infrastructure

C.2.6.1 *Harbor Layout and Infrastructure*

The Homer Harbor, shown in Figure 3, has a basin size of roughly 50 acres and ranges in depth from -2 feet Mean Lower Low Water (MLLW) at the harbor entrance to -10 feet MLLW at the opposite side of the harbor. Homer is subject to wide tidal variations and can experience tidal ranges of over 20 feet.

The harbor has approximately 876 reserve slips and approximately 6,000 feet of transient moorage space. As stated on the City of Homer website, amenities at the harbor include potable water, electricity, used oil collection, garbage and battery disposal, and fish cleaning tables at the top of ramps 4 and 6. A sewage pump-out “eco barge” is made available seasonally.

Locations within the harbor are identified in Figure 3.

These include:

1. Boat Launch Ramp
2. Barge Ramp
3. Small Fuel Dock
4. Main Fuel Dock
5. Fish Dock
6. Deep Water Dock
7. Pioneer Dock

Figure 3: Homer Harbor Layout

Source: Google Earth 2024

C.2.6.1.1 Boat Launch

The boat launch is primarily used to launch and haul out trailer-able vessels which are used seasonally. It is used heavily, though not exclusively, by recreational boaters. Day-use passes and seasonal passes, which allow any number of launches during the summer, are both available for purchase. There were 7,299 passes sold in 2023, of which 356 (4.9%) were season passes.

Users may launch once at the beginning of summer and keep their boat in a reserve slip or in transient moorage until fall, or may only use the harbor once and then trailer their boat again. Because user information is not tracked by the harbor for sales of day passes, frequency of use cannot be determined by pass type purchased. However, as season passes are equivalent in price to 10-day passes, it can be inferred that users who purchased season passes expected to launch their boats at least 10 times.

C.2.6.1.2 Barge Ramp

The barge ramp is used by “landing craft” style vessels to load gear and freight. Landing craft are a type of shallow-draft vessel that can be beached in order to load and unload. Vessels of this type are frequently used to deliver freight to small communities along the western Alaskan coast or along the larger rivers, as many communities are not accessible by road.

C.2.6.1.3 Fuel Docks

The Homer Harbor has two fuel docks. Of these, the larger one (4) is kept open consistently, while the smaller one (3) is sometimes unavailable if the company that operates them, Petro Marine, is understaffed. The primary fuel dock (4) is frequently congested, especially between 3:00 p.m. and 6:00 p.m. When large vessels moor there for fuel, they may block much of rest of the dock and will do so for a longer time as larger vessels take on more fuel. Delays at the fuel dock are common, and the increased traffic created by boats queuing can increase the risk of accidents. This is exacerbated by the location of the fuel docks near the mouth of the harbor, where vessels queuing for fuel must avoid vessels entering and exiting the harbor, and the wakes they create.

C.2.6.1.4 Fish Dock

The Fish Dock is 382 feet long with a depth of -20 feet at MLLW and a deck height above MLLW of 31 feet. The fish dock has six cranes which can lift up to 2.5 tons and two cranes which can lift up to 5 tons. While it is used by commercial fishing vessels to offload fish, the Fish Dock is actually a multipurpose facility and is used by other working vessels to change gear, load supplies, and sometimes even replacement parts for vessels. Ice is available at the Fish Dock, and boats using the dock to offload fish or to take on ice have priority over vessels using the dock's cranes to load gear. The Fish Dock is another congestion point in the harbor, and vessels may experience delays accessing it, or may be required to vacate the dock during usage to allow fish to be offloaded.

C.2.6.1.5 Deep Water Dock

The Deep Water Dock, located outside the harbor, has an inside, an outside, and a side berth, and mobile cranes can be driven out onto it to assist with loading gear. It is used by vessels too long or with too deep a draft to enter the harbor to load gear, change crew, and/or conduct inspections.

C.2.6.1.6 Pioneer Dock

The Pioneer Dock, also located outside the harbor, is primarily used by the *Tustumena*, a ferry vessel operated by the Alaska Marine Highway System (AMHS). When the *Tustumena* is not in Homer, the harbor is able to utilize its berth for large vessels as they do with the Deep Water Dock, however the ferry has priority usage and other vessels must be scheduled around it. Because of this preferential use, and because the ferry does not otherwise interact with the harbor, it is not impacted by harbor conditions and is not considered further in this analysis.

The Pioneer Dock is also used by the Coast Guard vessel *Aspen*, a 225-foot-long buoy tender that is permanently stationed in Homer. The Pioneer Dock has a fuel header, and large vessels which cannot fuel inside the harbor may fuel there, or have fuel trucked to them at the Deep Water Dock if the Pioneer Dock is not available.

C.2.6.2 *Community Infrastructure*

C.2.6.2.1 Marine Trades

Dozens of businesses in Homer provide services needed by the marine industry, including vessel construction, repair services, dry storage, marine electrical and hydraulics work, salvage, towing and gear supply. The wide variety of services available in Homer make it a very attractive location for working vessels looking for a place to homeport or to haul out for the winter.

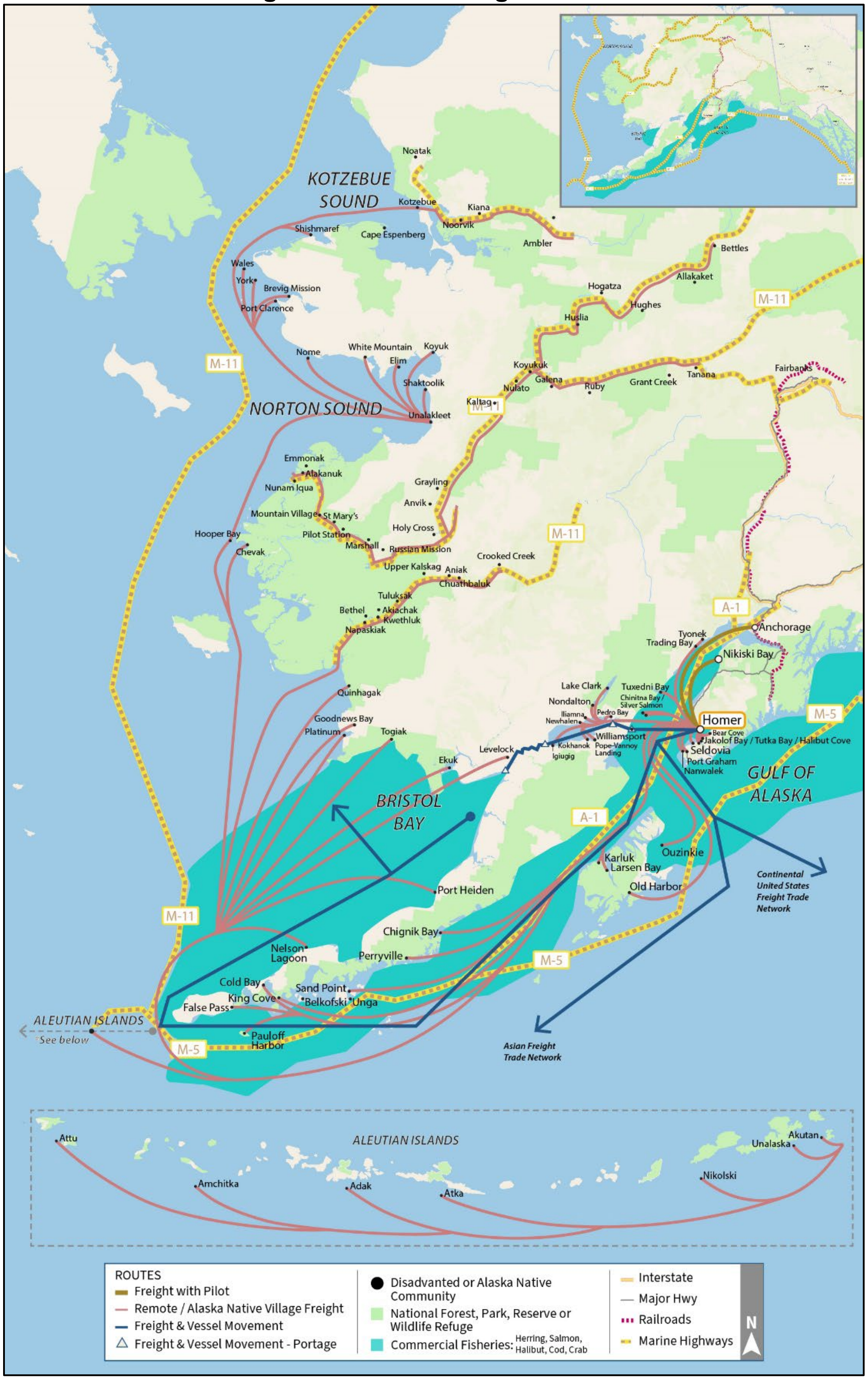
C.2.6.2.2 Road Connectivity

Homer is the southern-most point on the Sterling Highway and is the furthest that freight brought into Anchorage by barge can be sent south by truck. For vessel owners, road connectivity means easier access to supplies and parts than they will find in harbors off the road system, such as Kodiak or Dutch Harbor.

According to the 2025 Alaska Infrastructure Report Card, published by the American Society of Civil Engineers, approximately 82% of the communities in Alaska are not connected to the road system. For these communities, the only ways of receiving goods are either by plane or by boat, and Homer provides the closest connection point for vessel cargo traffic for many of them. Residents of small communities may take a boat to Homer to purchase groceries, and coastal freight operations from Homer transport goods to communities around the State.

The NFS identified that coastal freight vessels departing from Homer serve over 50 communities, including ones as far west as Attu in the Aleutian Islands and as far north as Kotzebue on the northwest coast of Alaska. Freight transportation routes are identified in Figure 4.

Figure 4: Homer Freight Routes



(graphic received from non-Federal sponsor, February 2025)

C.3 Marine Resource Assessment

C.3.1 Overview

The marine resource assessment describes the management and status of fishery resources in the study area as they apply to the economic analysis. A significant component of the Homer fleet is composed of commercial fishing vessels, and recreational users frequently sport fish. Homer is also a major location for sport fishing tourism, as evidenced by its charter fleet. Lastly, personal use fishing activities, which are similar to subsistence fishing, take place in parts of Kachemak Bay. This analysis includes an overview of different institutions responsible for fishery management and describes commercial, sports, and personal use fishing activities for the Homer fleet.

C.3.2 Description of the Cook Inlet Fisheries Management Area

Cook Inlet is broken into two fisheries management areas: Upper Cook Inlet (UCI) and Lower Cook Inlet (LCI). The UCI management area is comprised of all waters of Cook Inlet north of the latitude of Anchor Point and further divided into districts and sub-districts for management purposes. Homer sits near the mouth of Kachemak Bay within the LCI management area. The LCI management area is comprised of all waters west of the longitude of Cape Fairfield, north of the latitude of Cape Douglas, and south of the latitude of Anchor Point.

C.3.3 Fisheries Management Entities

Management of fishery resources in the inland and marine waters around Homer is a shared responsibility, divided between international, Federal, State, and quasi-governmental entities. The entities include the National Marine Fisheries Service (NMFS), the North Pacific Fishery Management Council (NPFMC), the Alaska Board of Fisheries, the Alaska Department of Fish and Game (ADF&G), the Pacific States Marine Fisheries Commission (PSMFC), and the International Pacific Halibut Commission (IPHC).

C.3.3.1 *National Marine Fisheries Service*

NMFS administers the National Oceanic and Atmospheric Administration’s (NOAA) programs that support the domestic and international management and harvest of marine resources. The Alaska regional office coordinates Federal and State resource management and research, and monitors and coordinates openings and closures of fisheries within the Exclusive Economic Zone (EEZ), roughly 200 miles from shore. The office is responsible for planning and implementing fishery-management conservation programs, including fishery management plans established by the NPFMC. Generally, groundfish outside of 3 nautical miles are managed by the NMFS; these controls include limited seasons and Individual Fishing Quotas (IFQs).

C.3.3.2 *North Pacific Fishery Management Council*

The NPFMC is one of eight regional councils established by the Magnuson-Stevens Fishery Conservation and Management Act in 1976 to manage fisheries in the 200-mile EEZ, 3 miles off the coast of Alaska. The people serving on the Council or other Council-sponsored groups are made of up appointees from Alaska, Washington, and Oregon. The NPFMC meets five times a year to allocate resources, set management policy, hear testimony from the industry, and consider issues important to the industry that fall under the Council's authority. Two major functions of the Council are the development and maintenance of fishery management plans for those fisheries under its authority. The Council also has authority under the 1982 North Pacific Halibut Act to develop regulations, including limiting access, for participants in the Alaska halibut fisheries. Resource allocations are divided by species, region, and according to the priorities of the Magnuson-Stevens Act. The Secretary of Commerce must approve all fisheries regulations developed by the Council.

C.3.3.3 *Alaska Board of Fisheries*

The Alaska Board of Fisheries consists of seven members serving 3-year terms. Members are appointed by the governor and confirmed by the legislature. Members are appointed on the basis of interest in public affairs, good judgment, knowledge, and ability in the field of action of the board, with a view to providing diversity of interest and points of view in the membership (see Alaska Statute 16.05.221).

The Board of Fisheries' main role is to conserve and develop the fishery resources of the state. This involves setting seasons, bag limits, methods and means for the state's subsistence, commercial, sport, guided sport, and personal use fisheries, and it also involves setting policy and direction for the management of the state's fishery resources. The board is charged with making allocative decisions, and the department is responsible for management based on those decisions.

The board has a three-year meeting cycle (above) and generally holds meetings from October through March. The Board of Fisheries meets four to six times per year in communities around the state to consider proposed changes to fisheries regulations. The board uses biological and socioeconomic information provided by ADF&G, public comment received from people inside and outside of the state, and guidance from the Alaska Department of Public Safety and Alaska Department of Law when creating regulations that are sound and enforceable.

C.3.3.4 *Alaska Department of Fish and Game*

ADF&G is a research and regulatory agency. The Division of Commercial Fisheries within ADF&G researches and manages the commercial fisheries in Alaskan waters, which covers waters within 3 nautical miles of shore. Division biologists conduct research on migratory patterns, gear types, and the relative abundance of fish stocks. The department also has the authority to open and close commercial fishing periods based on preseason catch goals and biological considerations. Typical controls include open entry permits, gear restrictions, limited fishing seasons, and bag limits. Season times and lengths are adjusted as biomass requirements dictate.

C.3.3.5 *Pacific States Marine Fisheries Commission*

The PSMFC is one of three interstate commissions dedicated to resolving fishery issues. The commission is comprised of 15 members appointed by State legislatures, governors, and fishery directors. Representing California, Oregon, Washington, Idaho, Hawaii, and Alaska, the PSMFC does not have regulatory or management authority; rather, it serves as a forum for discussion and works for coast-wide consensus to State and Federal authorities. The goal is to promote and support policies and actions directed at the conservation, development, and management of fishery resources of mutual concern to member states through a coordinated regional approach to research, monitoring, and utilization.

C.3.3.6 *International Pacific Halibut Commission*

The International Pacific Halibut Commission (IPHC) works for the preservation of the halibut fishery of the North Pacific Ocean and the Bering Sea. Established between the U.S. and Canada in 1923, it was the first international agreement providing for the joint management of a marine resource. Subsequent conventions expanded the commission’s authority. The commission meets annually to review regulatory proposals, including those made by the scientific staff and the Conference Board, which represents vessel owners and fishers. The commission sets area quotas and seasons for the purpose of stock conservation, but the U.S. and Canadian governments must approve the recommendations. Upon approval, the regulations become Federal regulations and enforceable by the appropriate agencies of both governments. The IPHC manages halibut harvests by individual fishing quotas (IFQ).

C.3.4 Commercial Fisheries

During the 2024 calendar year, 102 commercial fishing vessels leased permanent slips in the Homer Harbor while another 610 used the transient facilities. The primary species harvested by the Homer commercial fishing fleet include salmon, halibut, crab, and pacific and black cod. The saltwater salmon season runs from May through August, which coincides with the major tourism months. The halibut season is longer than the saltwater salmon season and runs from May through October. Overlap between seasons contributes to harbor crowding at certain times of year.

C.3.4.1 *Types of Commercial Fishing Vessels*

The primary types of fishing vessels are gillnetters, potters, purse seiners and longliners. Gillnetters and seiners typically focus on salmon and mid-water fish, while longliners tend to focus on halibut, sablefish, and other deep-water/bottom fish. Potters typically focus on crab. To remain viable, fishers will often modify their equipment to allow access to different fisheries depending on the season. Fishers diversify business by holding multiple salmon permits, IFQs for halibut, and/or permits for other groundfish.

C.3.5 Sport Fisheries

The primary sport fisheries in the Homer area include halibut and salmon. The IPHC manages the halibut sport fishery, while ADF&G manages the salmon fishery. Both agencies have limited seasons and bag limits in place.

The LCI Management Area has a diversity of salt and freshwater sport fishing opportunities. Homer is the largest community in the management area and boasts the title of "The Halibut Fishing Capital of the World." Many fishermen travel to the area for halibut fishing in Kachemak Bay, Cook Inlet and the North Gulf Coast. Trolling for Chinook salmon occurs year-round in these waters as well. Several road accessible streams provide opportunities for fishing for Chinook, pink, and coho salmon, Dolly Varden and steelhead. Chinook and coho salmon are also stocked in terminal locations in Kachemak Bay, including the Nick Dudiak Fishing Lagoon on the Homer Spit and in the Seldovia Slough. Historically Cook Inlet supported a diversity of shellfish species but has recently been limited to Tanner crab and razor clams in west Cook Inlet. There are also fishing opportunities for all five species of salmon in streams on the south side of Kachemak Bay, the North Gulf Coast, and West Cook Inlet.

C.3.6 Personal Use Fisheries

In Alaska, "personal use" is a legally defined regulatory category of fishery. It is defined as "the taking, fishing for, or possession of finfish, shellfish, or other fishery resources, by Alaska residents for personal use and not for sale or barter, with gill or dip net, seine, fish wheel, long line, or other means defined by the Board of Fisheries." Personal use fishing is open to Alaskan residents only, and you must have a valid resident Sport Fishing License to participate in personal use fisheries.

The bag, possession, and gear limits in personal use fisheries may not be added to the bag, possession, and gear limits under sport or subsistence regulations.

Many, but not all, personal use fisheries require a permit issued by ADF&G. Personal use fisheries have many different regulations for bag limits, allowable gear, and time and area restrictions.

Two personal use fisheries are accessed via the Homer Harbor: the China Poot Bay sockeye salmon dipnet fishery and the Kachemak Bay set gillnet coho salmon fishery. China Poot Bay is located approximately four miles southeast of the Homer Spit, across Kachemak Bay. This fishery is open from June 15th through August 15th and has a bag limit of six fish. A permit is not required. The Statewide Harvest Survey has estimated annual participants for this fishery since 2022 at an annual average of 2,713, with an average of 1.6 annual fishing days per person.

The Kachemak Bay set gillnet coho fishery does require a permit and has a bag limit of 25 fish for the first member of a household, plus 10 fish for each additional member. This fishery is open from mid-August to mid-September, but may be closed early if the guideline harvest limit is reached. Between 2019 and 2024, there were an average of 141 permits returned for this fishery, and an average of 0.9 days per person.

C.4 Methodology

C.4.1 Section 2006 Remote and Subsistence Harbor Authority

This authority allows the Secretary to recommend a plan not justified solely by national economic development benefits if: (1) the project is located in Hawaii or Alaska, and (2) “over 80 percent of goods transported through the harbor would be consumed within the United States.”

The authority also specifies that, “in considering whether to recommend a project [. . .] the Secretary shall consider the benefits of the project to any of the following:

(1) public health and safety
(2) access to natural resources for subsistence purposes
(3) local and regional economic opportunities
(4) welfare of the regional population
(5) social and cultural value to the local community and communities [. . .] in the region” (33 U.S.C. Subsection 2242(b))

C.4.1.1 *Percent of Goods Used in the United States*

Data on goods shipped through Homer is available from the harbor records, and from the Waterborne Commerce Center (WCC). As is discussed in Section C.2.6.1 *Homer Harbor Layout*, inside the harbor, freight can be moved on the Fish Dock (see No. 5 in Figure 3) and on the barge ramp (No. 2). Outside the harbor, freight can be moved on the Deep Water and Pioneer Docks (No. 6 and No. 7), which are used by especially deep draft vessels, or vessels too long to navigate the harbor entrance. The harbor’s records track freight moved on the internal dock, while the WCC data tracks goods moved on the external docks.

Table 7 shows wharfage for Homer’s internal dock broken out into the general categories of seafood, fuel, and cargo/other. In general, seafood is brought into Homer by commercial fishing vessels and tenders and is either consumed locally in Homer’s restaurants or is sent to Anchorage or Seattle. Fuel, which makes up the majority of cargo tracked by the port, is relied upon by rural Alaskan communities, where it is used to power generators to heat homes, provide electricity, and operate skiffs, four-wheelers, and snow-machines used in subsistence hunting and fishing activities. The last category, cargo/other, is very broad and may include anything from household cleaners or replacement machinery parts, to refrigerators, lumber, or shelf-stable food. The table provides the average tonnage from 2015 to 2023, and also provides the tonnage for 2023 alone to allow for comparison of recent movements to the average.

Table 7: Homer Wharfage in Tons (rounded), 2023 and Average 2015-2023

	Seafood	Cargo/Other	Fuel	Total
Average 2015-2023	3,300	14,000	336,000	353,000
2023	5,400	58,000	322,000	385,000

(Data provided by Homer Harbor staff, June 2024)

The majority of goods moved on the internal dock are consumed within the State of Alaska, and the rest are shipped to other parts of the United States. Seafood brought into the harbor is either sold directly to local restaurants, or trucked to Anchorage and shipped to the contiguous U.S. Some miscellaneous cargo brought into Homer is trucked to Seward and Kenai, but the majority are transshipped to regional Alaskan communities. Fuel brought into Homer is also transshipped to regional communities. Table 8 shows the total goods in tons reported by the WCC as exports from Homer, and of those goods, the total tons that were exported internationally. The table provides the average tonnage from 2015 to 2022, and also provides the tonnage for 2022 alone to allow for comparison of a recent year to the average; 2022 was used because it is the most recent data available from the WCC.

Table 8: WCC Exports (tons, rounded), 2022 and Average 2015-2022

	Tons Exported Domestically	Tons Exported from Homer Internationally	Total Tons Exported from Homer
Average 2015-2022	2,000	35,000	**37,000**
2022	1,000	28,000	**29,000**

(Waterborne Commerce Center, April 2025)

Table 9 shows the total goods shipped through Homer and compares foreign and domestic exports. This table shows that less than 10% of goods transported through the harbor are consumed outside the United States. Because the WCC does not have 2023 data available, the average value is used to estimate the total export value for 2023.

Table 9: Homer Foreign Exports as Percent of Total Exports (tons, rounded), 2023 and Average 2015-2023

Year Range	Annual Port-Reported Wharfage	WCC Data, Total Exports	Homer Total Exports	WCC* Data, Foreign Exports	Percentage Not Used in US
Average 2015-2023	353,000	37,000	390,000	35,000	9%
2023	385,000	37,000*	422,000	35,000*	8%

(Port and WCC Data, April 2025. *WCC data is from 2022) (*2023 data not available, average value used)

Because over 80% of goods transported through the Homer Harbor are consumed within the United States and because the project would be located in Alaska, the Section 2006 Authority can be applied to this study.

C.4.1.2 *Justification*

When a project is recommended under the Remote and Subsistence Harbor authority, benefits to any of the five benefits categories listed in Section C.4.1 may be considered.

The CE/ICA in this analysis considers benefits from the first, second, third, and fourth categories: “public health and safety“access to natural resources for subsistence purposes”; “local and regional opportunities”; and, “welfare of the regional population”. This is discussed in greater detail in Section￼￼.

C.4.2 Data Collection Techniques

C.4.2.1 *Data Provided by the Port*

Data was received at different times throughout the study process as information needs were identified.

C.4.2.1.1 <u>Homer Fleet Demand Analysis Report, 2024</u>

This report was previously prepared by HDR, an engineering firm working as a third-party consultant with the sponsor. This report analyzed 20 years' worth of waitlist data (from approximately 2003 to 2023) to determine and project growth trends over time.

C.4.2.1.2 <u>Homer Port User Survey</u>

As part of a grant application, in April of 2024 Homer Harbor staff sent users a safety survey via email. This survey included questions about frequency of accidents and factors which contributed to them, about impacts of rafting, and frequency of harbor usage. Of the 1,500 users surveyed, 328 responded. Survey data and results were shared with the PDT and are referenced in this analysis.

C.4.2.1.3 <u>Deep Water Dock Replacement Analysis</u>

This analysis was completed by the consulting firm Northern Economics for the Homer Harbor in 2017 and assessed the feasibility of replacing and expanding the Deep Water Dock.

C.4.2.1.4 <u>Data Files received from the Port</u>

C.4.2.2 *The Homer Harbor shared the following information with the PDT:*

- Waitlists for slip sizes: 24, 32, 40, 50, 60 and 75 feet
- 2023 reserve moorage user lists and vessel information, including vessel length over all (LOA) and user type (e.g., recreational, commercial fishing, etc.)
- 2023 transient moorage user lists and vessel information, including vessel LOA and user type
- 2023 boat launch pass sales data
- List of vessels turned away by the harbor due to crowding
- 2023 nightly vessel counts
- End of Year Statistics (e.g., moorage sales, wharfage, etc.) for 2016–2023

C.4.2.3 *Expert Interviews*

The Homer Port Director, Harbormaster, and Port Administrative Specialist were key sources of information throughout the study process, especially in regard to questions of harbor operation, available data, and harbor user patterns.

C.4.2.4 *Focus Groups*

Because data on aspects of harbor user experiences such as delays, risks, and recreational experience are not available through formal sources, the lead and production economists at POA conducted focus groups with harbor users. Focus groups were conducted from 28–30 October 2024 in-person in Homer, and electronically through Microsoft Teams as needed to facilitate participant attendance.

Focus groups were composed of harbor users and ranged in size from three to six participants. Each focus group addressed a different harbor user group. User groups included: commercial fishermen, recreational users, fishing charter operators, water taxis, vessels that use the Deep Water Dock, and vessels that use the harbor's float system 5 (transient vessels over 85 feet in length). The fishing charter focus group had three participants; the water taxi and commercial freight focus groups each had four participants; the System 5, Deep Water Dock, and commercial fishing focus groups each had five participants; and the recreation focus group had 6 participants. Each of these user groups has different use patterns and therefore a different experience of risks, delays, and challenges within the harbor.

The recreational user group focused on assessing the recreational experience afforded by the harbor under existing conditions using the Unit Day Value (UDV) method described in ER 1105-2-100, Appendix E, Section VII. This group also discussed expected changes to this assessment under Future Without Project (FWOP) and Future With Project (FWP) conditions.

Other focus groups focused on use patterns, operating costs, lengths, frequency and causes of delays, passenger and crew counts, and challenges encountered by users in the course of operations.

C.4.3 Estimate Ranges

Throughout this analysis, values are presented at low, expected, and high estimates. This is true both for overall benefits, and for values that are components of benefit calculations (e.g., lengths of delays, numbers of vessel crew or passengers, frequency of trips). In general, where high and low ranges are presented, the high estimate reflects potential outcomes if all of the highest inputs coincide in a calculation. For example, if calculating the cost of delays to vessel operators, this would include both the highest estimate of delay frequency and the highest estimated value of time. Similarly, the low estimate reflects potential outcomes if all of the lowest inputs coincide in a calculation. The "expected" scenario incorporates average values, median values and mid-point values for as many inputs as possible, and is considered to reflect the most likely outcome.

C.5 Existing Conditions

This section discusses the range of vessels and different user groups in the Homer fleet, the demand for moorage in the harbor, and typical patterns of use for different user groups. This section also introduces and discusses the challenges harbor users experience due to crowding and other harbor conditions, and estimates the costs associated with them.

C.5.1 The Homer Fleet

This section covers the vessels which make up the Homer fleet by size, user group, and preferred moorage type. Vessels using the Homer Harbor choose between reserve moorage—in which a user leases a dedicated slip for a year at a time—or transient moorage, in which a user has access to side-tie areas of the harbor on a daily, monthly, semi-annual, or annual basis. The majority of vessels in Homer are either commercial fishing or recreation vessels, however several other user groups are also present, including but not limited to fishing charter vessels, water taxis, and vessels which deliver freight to coastal communities around the state. Data on the Homer fleet was provided by the harbor and reflects transient, reserve, and waitlisted users for the 2023 calendar year.

This section also discusses demand for moorage which is currently unmet. If a user wishes to purchase reserve moorage in a slip size for which there are no available slips, they are waitlisted. Similarly, crowding for large transient vessels has become severe enough in recent years that the harbor has had to turn away vessels that would like to use the harbor. Other transient vessels use the unprotected docks outside the harbor as moorage, because they are too large to navigate the harbor entrance.

Lastly, this section estimates demand that may be “invisible”. When a harbor is known to be badly overcrowded, it disincentivizes potential users from voicing interest and can lead to underestimated demand if only waitlists are considered.

C.5.1.1 *The Homer Fleet by Moorage Type*

C.5.1.1.1 <u>Reserve Moorage</u>

The Homer Harbor sells “reserve” moorage (also called “tenant” and “permanent” moorage, but referred to in this analysis as reserve) in the slip sizes shown in Table 10. Because the size of popularly owned boats has increased over time, and because smaller vessels are easier to store on trailers, there is higher demand for larger slips than for smaller ones. As a result, vessels are frequently assigned to slips that are too short for them, which constricts the open waterways where vessels need to maneuver. The number and size of slips available in Homer, and the length over all (LOA) of vessels allowed in each size of slip, are shown in Table 10.

Table 10: Homer Reserve Moorage

Slip length	Number of Slips	LOA Range Allowed
20’	103	0–23’
24’	199	21’–29’
32a’	32	25’–32’
32’	410	28’–42’
40’	65	38’–47’

Slip length	Number of Slips	LOA Range Allowed
50’	34	47’–60’
60’	9	56’–70’
75’	24	60’–85’
Total Reserve Slips	**876**	

(Information received from harbor staff via email and phone call)
Note: 32a slips are the same length as 32’ slips, but are limited to a 19’ beam.

In June of 2023 there were 809 vessels leasing reserve moorage in Homer. Vacancies are generally attributable to a slip holder ending their lease or losing it due to nonpayment of fees. The harbor does not reassign available slips to new clients until October, so slips that become vacant before this may remain officially unleased until fall. Unleased slips are generally still used, as hot berthing (allowing a boat to use a slip leased by another user while they are not using it) is a standard practice. Table 11 shows vessels which had reserved moorage in Homer in 2023, by user group.

Table 11: Homer Reserve Moorage Fleet by User Group, 2023

Harbor User Group	Number of Vessels
Recreation	554
Government	6
Commercial Fishing	102
Fishing Charters	100
Water Taxi	22
Tugboats	5
Commercial Freight	6
Research	4
Not Specified	10
Total	**809**

(Information received from harbor staff via email, July 2024)

Vessels that would like to lease reserve slips but are unable due to availability can request placement on the waitlist (See “Waitlisted Vessels” in Section C.5.1.1).

Vessels longer than 85 feet cannot be waitlisted for reserve moorage in Homer because there are no reserve slips long enough to accommodate them. Vessels that wish to homeport in Homer but are too large for the waitlist must use transient moorage.

C.5.1.1.2 <u>Transient Moorage</u>

The Homer Harbor sells transient moorage on an annual, semiannual, monthly, and daily basis. In 2023, there were 1,448 vessels that used transient moorage in Homer. Table 12 shows vessels that used transient moorage in Homer in 2023 by user group.

Table 12: Homer Transient Fleet by User Group, 2023

Harbor User Group	Number of Vessels
Recreation	617
Government	20
Commercial Fishing	610
Fishing Charters	44
Water Taxi	14
Tugboats	12
Commercial Freight	18
Research	11
Not Specified	102
Total	**1,448**

(Information received from harbor staff via email, July 2024)

In later sections of this analysis, certain benefits are discussed by user group, while others are discussed in terms of the whole fleet. Where benefits are discussed in terms of the fleet, they include vessels shown here as “not specified.” Where benefits are discussed by user group, they exclude unspecified vessels, due to a lack of information on use patterns for this group.

C.5.1.1.3 Unmet Demand

There is demand for moorage in Homer which is not being met under existing conditions. Because reserve moorage is generally at capacity, vessel owners must join a waitlist and often wait several years for an assigned slip. Additionally, since the winter of 2021–2022, harbor staff have tracked the number of vessels seeking transient moorage in Homer that have been turned away due to the severity of crowding.

C.5.1.1.4 Waitlisted Vessels

Homer maintains a separate waitlist for each size of slip available in the harbor, from 20 feet to 75 feet long. It is typical for vessels to be assigned to slips that are too short for them. Vessels up to 85 feet LOA are eligible for the waitlist. Vessels longer than 85 feet LOA cannot utilize reserve moorage in Homer and must instead utilize transient moorage areas. Users pay an annual fee of $30 to remain on the waitlist and are contacted by the harbor once a year in October regarding available slips.

Demand for different slip lengths varies, and some slip length categories go years without any turnover. Harbor staff state that turnover is faster for 20-foot and 24-foot slips, and especially slow for 50, 60, and 75-foot slips. Two primary factors contribute to this slow turnover for larger slips sizes. Firstly, there are significantly fewer slips of these sizes available (see Table 13). Secondly, vessels of these sizes are more difficult to store on trailers, meaning that vessel owners have a stronger incentive to keep vessels in the water rather than launching them repeatedly.

The number of users waitlisted for different slip lengths as of July 2024 are shown in Table 13. This table also shows when the user who has been on each waitlist the longest was added to the list. These waitlist dates were received in June of 2025 and so do not precisely correspond to the numbers of waitlisted users.

Table 13: Number of Waitlisted Users by Slip Length as of July 2024

Slip Length	Users Waitlisted	Earliest Date User Added to Waitlist
20’	No List Provided	N/A
24’	45	July 2024
32’a*	15	August 2022
32’	179	June 2022
40’	75	November 2019
50’	39	May 2020
60’	4	August 2021
75’	22	October 2023
Total Users Waitlisted	**379**	

(Information received from harbor staff via email, July 2024)
(*32a slips are narrower slips which can only be used by vessels with beams of 19’ or less)

Because waitlist times for slips and crowding conditions are well known, it is likely that the waitlist does not fully reflect unmet demand for moorage in Homer. Boaters who might otherwise have demand for Homer moorage may be discouraged from self-identifying because acquiring a slip can take so long.

C.5.1.1.5 Vessels Turned Away

In 2021 the harbor began keeping a list of boats that contacted them regarding moorage and had to be turned away due to overcrowding. Generally, these are transient vessels too large to be waitlisted for slips. Most of these are seeking moorage for the winter off-season and have expressed interest in homeporting in Homer. Between 2021 and 2023, 18 vessels contacted the harbor and were turned away. Of these, several were later accommodated in transient moorage.

The sizes of the remaining 12 vessels which have not yet been accommodated in Homer are shown in Table 14. According to the harbormaster, these boats would prefer reserve moorage were it available in their size.

Table 14. Sizes of Vessels Turned Away, 2021-2023

Vessel Length	Number of Vessels Turned Away
86–115 feet	8
Over 115 feet	4

(Information received from harbor staff via email, July 2024)

C.5.1.1.6 External Dock Users

There are two docks outside the Homer Harbor, the Deep Water Dock and the Pioneer Dock (See Section C.2.6.1). Some of the vessels which utilize these docks do so because they are too large to enter the harbor. These docks are intended to be used for short amounts of time to take on fuel or load gear and are more expensive than standard transient moorage. Therefore, it is likely that many of these vessels would continue to utilize these docks for their intended purpose, but reduce time spent there if they were able to enter the harbor for moorage.

In 2023, 21 vessels utilized the external docks, 5 of which used them 10 or more times. The most frequent users of the Deep Water Dock are the *Perseverance* and the *Endeavour*, which belong to Cook Inlet Spill Prevention and Response, Inc. (CISPRI). These CISPRI vessels are homeported in Homer, but must regularly use the external docks for crew changes and inspections.

C.5.1.2 *Homer Fleet by User Group*

Vessels in the Homer fleet can be categorized according to purpose. The user groups considered in this analysis are commercial fishing, fishing charters, commercial passenger, recreation vessels, and the U.S. Coast Guard. Vessel counts for these groups are discussed in Tables 15, 16,17, 19 and 20.

C.5.1.2.1 Commercial Fishing Vessels

Commercial fishing is the second-largest user group in the Homer fleet, with over 700 vessels. The commercial fishing user group also accounts for 64% of vessels over 85 feet which utilize Homer Harbor. Commercial fishing vessels are shown by moorage type in Table 15.

Table 15: Commercial Fishing Vessels by Moorage Type, 2023

Moorage Type	Number of Vessels	Percentage
Reserve	102	14.3%
Transient	610	85.7%
Total	**712**	**100.0%**

(Information received from harbor staff via email, July 2024)

C.5.1.2.2 Fishing Charters

Homer promotes itself as the “Halibut Capitol of the World” and has an active fishing charter fleet. These vessels tend to rely more on the consistent dock access afforded by a reserve slip to facilitate loading passengers. The majority of fishing charter vessels in Homer are smaller vessels with a capacity of six passengers, however a smaller number of charters can carry 24 passengers. Table 16 shows the breakdown of fishing charter vessels by moorage type.

Table 16: Fishing Charter Vessels by Moorage Type, 2023

Moorage Type	Number of Vessels	Percentage
Reserve	100	69.4%
Transient	44	30.6%
Total	**144**	**100.0%**

(Information received from harbor staff via email, July 2024)

C.5.1.2.3 Coastal Freight Fleet

One of the harbor user groups in Homer is the coastal freight fleet. These vessels transport cargo to non-road connected communities around the State. They range in size from 20 feet to over 150 feet LOA, and are often “landing craft”-style vessels, which are broad and have shallow drafts. This makes them well suited to making deliveries to coastal communities which may have little or no marine infrastructure, or to navigating Alaska’s large rivers.

Due to its location in southcentral Alaska, Homer is well-situated to serve as a regional hub for freight transport. According to the American Society of Civil Engineers, approximately 82% of Alaska’s communities are not connected to the road system, making these communities reliant on planes and marine vessels to bring in virtually all goods.

Homer’s coastal freight fleet is shown by moorage type in Table 17.

Table 17: Coastal Freight Vessels by Moorage Type, 2023

Moorage Type	Number of Vessels	Percentage
Reserve	6	25.0%
Transient	18	75.0%
Total	**24**	**100.0%**

(Information received from harbor staff via email, July 2024)

Homer Harbor staff report, based on their experience and familiarity with their users’ work patterns, that over 100 non-road connected communities around Alaska receive coastal freight shipments from Homer. However, the NFS provided USACE with a list of approximately 50 communities which they had specifically identified are served by the Homer coastal freight fleet, and this more focused list was used in this analysis.

Because communities in different parts of the state do not all receive shipments of the same type, size, or frequency, and because different sizes of vessels may make shipments to some areas and not others, these 50 communities were organized by geographic region. These regions are identified in Table 18 and shown on the map in Figure 5. Table 18 also indicates the number of communities in each region that receive shipments from Homer, as well as the estimated number of deliveries, based on harbormaster information, the communities receive between May and September. This time range was used as it is during the spring and summer that most freight shipments take place, and many communities are not accessible by boat at other times of year.

Table 18: Coastal Freight Shipments per Community and Communities per Region Served by the Homer Coastal Freight Fleet

Map Reference Number	Region	Communities Receiving Shipments	Deliveries per Community, May-September
1	Kachemak Bay	6	90
2	Cook Inlet	6	20
3	Williamsport	9	25

Map Reference Number	Region	Communities Receiving Shipments	Deliveries per Community, May-September
4	Kodiak	4	13
5	Alaska Peninsula	13	13
6	Aleutians	7	13
7	Western Alaska	5	1

(Based on focus group data and Harbor staff interviews, October 2024 and May 2025)

Figure 5: Regions Receiving Coastal Freight Shipments from Homer

(Image retrieved from Bing, June 2025)

There is a wide variety of goods which communities may receive from Homer. These may include but are not limited to groceries, household items, appliances, mail, construction materials and equipment, replacement parts, and fuel.

C.5.1.2.4 Water Taxis

Water taxis are smaller vessels, generally between 25 and 40 feet long, which offer transportation between Homer and off-road communities in the area. Residents of communities such as Seldovia, on the opposite side of Kachemak Bay, may take water taxis to go into Homer to shop for groceries or to transport small freight loads. Tourists utilize water taxis to visit small communities on day trips and to access hiking trails on the opposite side of Kachemak Bay.

Water taxi operators stated that they generally run 2 trips per day in the winter, 5 per day in the spring and fall, and 7-10 per day in the summer for a total of 1,450 trips per vessel per year. According to the survey conducted by the port, there is an average of 5 passengers per trip. Table 19 shows the breakdown of the water taxi fleet by moorage type.

Table 19: Commercial Passenger Vessels by Moorage Type, 2023

Moorage Type	Number of Vessels	Percentage
Reserve	22	61.1%
Transient	14	38.9%
Total	**36**	**100.0%**

(Information received from harbor staff via email, July 2024)

C.5.1.2.5 Recreational Vessels

Recreational vessels are the largest user group in the Homer fleet. Harbor staff also report that this group is growing as a percentage of the fleet. Homer's smaller population, beautiful scenery, and fishing opportunities make it an attractive retirement location, especially for boat owners. The harbor is also appealing as a homeport for many people in Anchorage and other southcentral Alaska communities that do not have harbor access. Recreational vessels are shown by moorage type in Table 20. Recreational vessels which utilize the boat launch, but do not purchase either transient or reserve moorage are not reflected in these numbers.

Table 20: Recreational Vessels by Moorage Type, 2023

Moorage Type	Number of Vessels	Percentage
Reserve	554	47.3%
Transient	617	52.7%
Total	1,171	100.0%

(Information received from harbor staff via email, July 2024)

C.5.1.2.6 U.S. Coast Guard

The Coast Guard buoy tender *Aspen* is permanently stationed at Homer but uses a berth outside the harbor on the Pioneer Dock because it is too large to use the harbor. This berth is dredged twice annually by USACE on behalf of the Coast Guard. The average annual cost to dredge this berth from 2015 to 2024 was $258,000.

The commander of the *Aspen* has stated that 2–3 times in a year, wind conditions are such that *Aspen* is unable to moor up in its berth outside the harbor. These delays generally last about 24 hours while the vessel waits for the wind to change.

The *Aspen* is a Juniper-class vessel and has a crew compliment of 7 officers and 42 enlisted crew. The commander has stated that when delays occur, the crew is able to continue work onboard, but delays reduce their leave time. According to ER 1105-2-100, leisure time is evaluated at 1/3 of the labor rate. The value of this lost leisure time is shown in Table 21.

When *Aspen* is delayed due to wind conditions, one of the ship's generators must be kept running. This adds an additional fuel cost which would not be experienced were *Aspen* able to moor up. According to the ship's commander, *Aspen*'s generator burns fuel at a rate of 25 gallons per hour or 600 gallons per day. The fuel cost per delay event and per year is shown in Table 21.

Table 21: Costs of Lost Leisure Time and Expended Fuel Associated with Wind Delays to Coast Guard Vessel Aspen

Cost of Lost Leisure Time:	
Length of Delay (hrs.)	24
Avg. Expected Daily Labor Cost	$5,800
Value of Leisure Time Relative to Labor Rate	1/3
Cost of Lost Leisure Time per Wind Delay Incident	$1,900
Cost of Additional Fuel Usage:	
Fuel Use Rate (gal/hr.)	25
Avg. Cost of Fuel ($/gal)	$3.74
Fuel Cost per Wind Delay Incident	$2,200
Total Cost per Wind Delay Incident	$4,000
Ave. Wind Delay Incidents Per Year	2.5
Annual Cost of Wind Delay Incidents	$10,000

(Per information from *Aspen*'s commander, received via email March 2025)

In addition to the *Aspen,* the 110-foot Coast Guard cutter *Naushon* was previously stationed at Homer and was able to use transient moorage inside the harbor. The *Naushon* was scheduled to be transferred to the Columbian Navy in 2025 and as such, is not treated as part of the Homer fleet beyond the end of 2025.

C.5.1.2.7 Float System 5

Float System 5, sometimes referred to simply as System 5, is the only area in the harbor where vessels over 85 feet long are able to moor. While System 5 is not a user group, it is briefly discussed here because for users from multiple user groups, it is the only available moorage, and because vessels using this moorage area are considered together for later discussions of delays, rather than with their respective user groups. In 2023, there were a total of 55 vessels which used System 5. The user groups of these vessels are shown in Table 22. About 64% of System 5 vessels are commercial fishing vessels, with 11% being research vessels and the remaining 25% being made up of tow, freight, charter, government, and unspecified vessels.

Table 22: System 5 Vessels by User Group, 2023

User Group	System 5 Vessel Count
Commercial Tow	3
Commercial Freight	4
Charter	1
Commercial Fishing	35
Research	6
Government	2
Not Specified	4
Total	**55**

(Fleet data received from harbor, 2023)

C.5.2 Proximity to Other Harbors

A factor contributing to the overcrowding in Homer is the absence of nearby substitute harbor facilities. There are three other harbors located on the Kenai Peninsula, in Seward, Seldovia and Whitter. These are discussed below. In general, harbors in the vicinity which provide reserve moorage maintain waitlists, and these waitlists have very significant wait times associated with them, often of 10 or more years. Demand for moorage on the Kenai Peninsula consistently exceeds supply. In addition to being overcrowded themselves, these other regional harbors may not be effective substitutes for Homer because they do not have infrastructure such as the barge ramp used by freight vessels or the cranes to offload fish and gear, because they do not have the marine trades needed to maintain working vessels, or because they are on the far side of the peninsula and further from where commercial vessels work.

C.5.2.1 *Seward*

The population of Seward is about 2,700 people according to the 2020 Census. Seward is located 168 road miles from Homer, on the eastern side of the Kenai Peninsula, making it a longer trip for vessels working in Western Alaska or Bristol Bay. It is the closest harbor to Homer and is used by recreation, commercial fishing, charter, and Coast Guard vessels, as well as cruise ships. Seward also maintains a waitlist for its reserve moorage.

C.5.2.2 *Seldovia*

Seldovia is a small town of 235 people as of 2020. Seldovia is located across Kachemak Bay, about a 45–60-minute boat ride from Homer. This location means that Seldovia does not provide the advantages of a road-connected harbor available in Homer. Seldovia has a small boat harbor with 143 slips for vessels between 35 and 42 feet LOA.

C.5.2.3 *Whittier*

Whittier is a community of about 270 people as of the 2020 Census and is located 183 miles north of Homer on the Kenai Peninsula. The small boat harbor of Whittier provides 360 slips and maintains a waitlist.

C.5.3 Moorage Demand Analysis

C.5.3.1 *Reserve Moorage Demand*

Demand for reserve moorage in the Homer Harbor is composed of the existing reserve moorage users, the waitlisted users, vessels turned away from the harbor, some of the external dock users, and vessels over 85 feet long which purchased annual transient moorage. The Coast Guard vessel *Aspen* has also indicated interest in a berth inside the harbor.

Transient moorage in Homer may be purchased for different lengths of time: daily, monthly, semi-annually, and annually. Reserve moorage for vessels over 85 feet is not available, so vessels of this size cannot signal interest in reserve moorage by joining a waitlist. This analysis considered sales of annual transient moorage as a proxy for reserve moorage. In 2023, 24 vessels over 85 feet long purchased annual transient moorage in Homer. These vessels are shown by size range in Table 23.

Table 23: Vessels over 85' that Purchase Annual Transient Moorage

Size Range	86'-115'	116'-150'	151'-199'
Vessels	14	7	3

(Data received from harbor, August 2024)

Demand for reserve moorage in Homer is shown in Table 24. Grayed out cells indicate that there are no vessels of that size in that category.

Table 24: Demand for Reserve Moorage, 2023

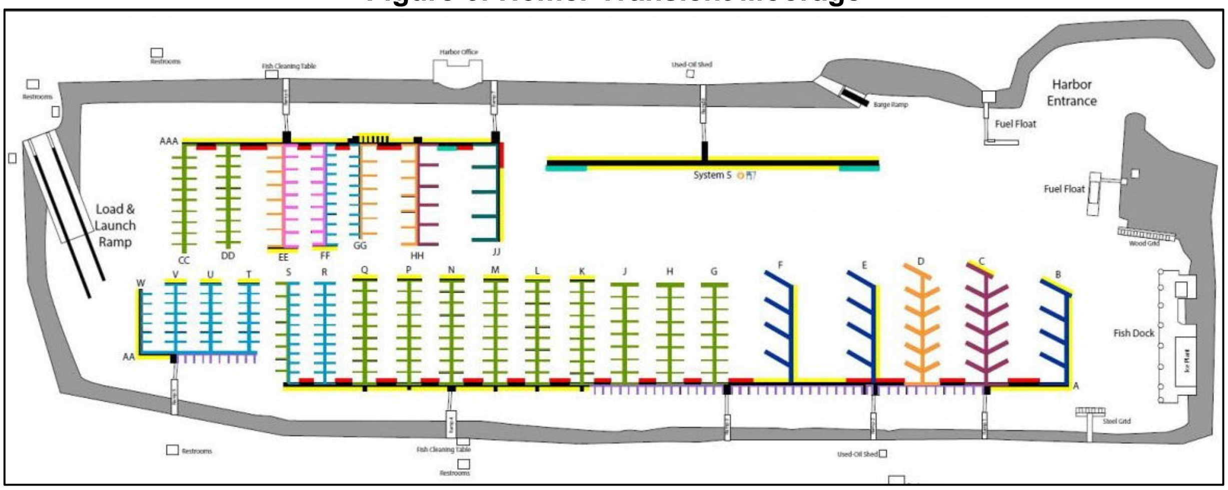
	Slip Size											
Group	**20'**	**24'**	**32'**	**40'**	**50'**	**60'**	**75'**	**100'**	**150'**	**175'**	**200'**	**Total**
Existing Reserve Users	86	283	275	102	34	13	16					**809**
Waitlisted	No list	45	194	75	39	4	22					**379**
Turned Away								8	3	1		**12**
Annual Transient (85'+)								14	7	3		**24**
External Docks										1	1	**2**

	Slip Size											
Group	**20’**	**24’**	**32’**	**40’**	**50’**	**60’**	**75’**	**100’**	**150’**	**175’**	**200’**	**Total**
Coast Guard											1	**1**
Total	**86**	**328**	**469**	**177**	**73**	**17**	**38**	**22**	**10**	**5**	**2**	**1,227**

C.5.3.2 *Transient Moorage Demand*

While there are a small number of 18-foot slips which are used as transient moorage, and transient boats may be placed in reserve slips leased by other users while they are away (“hot berthing”), almost all of Homer’s moorage available to transient boats is in designated transient side-tie spaces throughout the harbor. Figure 6 shows areas of transient moorage highlighted in yellow.

Figure 6: Homer Transient Moorage



(Retrieved from cityofhomer-ak.gov/port, Sept. 2024)

Transient spaces vary in length from 60 feet to 960 feet. Transient spaces on the side of floats close to the perimeter of the harbor are generally used by shorter boats because they are shallower than spaces elsewhere in the harbor and may be difficult for large boats to maneuver into.

C.5.3.2.1 Transient Capacity of Homer Harbor

Harbor staff track the number of vessels moored in each transient space each night, and the LOA of each vessel. Because boat counts are done at night, they do not include boats which may utilize moorage during the day, but they do provide a metric for moorage demand and overcrowding. This analysis uses nightly vessel counts provided by the Harbor office for calendar year 2023. These counts allow the sum of the lengths of all vessels in a given transient space at one time to be determined, as well as the average length of boat that moors in that space. By comparing the average length of vessel which tends to moor in a given transient space to the length of that transient space, and by repeating this for all transient moorage spaces in the harbor, the transient capacity of the harbor can be determined.

The estimated transient capacity of the harbor is show in Table 25. This reflects the total number of vessels of the size ranges shown which can moor in the harbor simultaneously without significant rafting or delays occurring. When more transient vessels attempt to utilize moorage in Homer than the harbor has capacity for, the harbor becomes overcrowded.

It should be noted that there were no transient spaces in the harbor for which the average vessel was between 60–69 feet or 80–89 feet in length. This does not indicate that vessels in these size ranges do not utilize transient moorage in Homer; it only means that there are no transient moorage areas where these were the average vessel lengths.

Table 25: Estimated Transient Capacity of Homer Harbor

Average Length of Vessel in Space (ft)	20–29	30–39	40–49	50–59	70–79	90–99	100+
Harbor Capacity in Number of Vessels	72	33	7	4	2	9	9

(Data received from port database, July 2024)

C.5.3.2.2 Transient Overcrowding

When there are more vessels than transient space, boats “raft” to other boats, i.e., tie up to the sides of boats already moored in the transient space. Figure 7 shows five vessels rafted together in Homer transient moorage.

Figure 7: Transient Vessels Rafted in Homer Harbor

(Photo received from harbor staff)

When rafting occurs, the sum of the lengths of the boats in a given space exceeds the length of the space. For example, if a 60-foot boat moored in a 70-foot space, and a 30-foot boat rafted to the first boat, the total moorage utilized for that space would be 90 feet. Comparing the moorage utilized to the length of a transient space shows by how much that space has been oversold. In the case of this example, the space has been oversold by 20 feet.

Because moorage utilized can be calculated for each transient space nightly, it is possible to identify how often a given space is oversold. Because the average length of vessel that utilizes a given transient space can be calculated, the amount of moorage by which a space is oversold can be characterized in terms of boats per space. The following discussion of float System 5 provides an example of this.

System 5 is the float where boats over 85 feet long moor. The outside of this float is referred to as System 5A, while the side closer to shore is System 5B. System 5 is shown with vessels rafting on both sides of it in Figure 8. Table 26 shows the frequency and severity of overcrowding on float System 5 for calendar year 2023.

Figure 8: Vessels rafting on Float System 5 in Homer Harbor

(Photo received from harbor staff)

It should be noted that average oversold moorage is the average of days when moorage was oversold and does not include days when moorage was not oversold. This was done to avoid underestimating the severity of crowding on days when it occurs.

Table 26: Float System 5 Transient Overcrowding, 2023

	System 5A	System 5B
Space Length (ft)	960	898
Average length of Boat in Space (ft)	104	97
Average Moorage Utilized (ft)	1,247	985
Max Moorage Utilized (ft)	2,100	1,512
Average Oversold Moorage (ft)	550	204
Max Oversold Moorage (ft)	1,140	614
Percent of 2023 that Space was Oversold	71%	58%
Avg. Oversold Moorage in Equivalent Boat Lengths (ft)	5	2
Max Oversold Moorage in Equivalent Boat Lenths (ft)	11	6

(Data received from port database, July 2024)

These calculations were also completed for the other transient spaces in the harbor. The average length of vessel mooring in a space was determined and the total moorage sold in that space daily was compared to the length of the space to determine how frequently and by how much transient spaces are being oversold.

As is discussed above, the oversold moorage of a given transient space can be thought of in terms of a number of vessels of the average size for that space. An example of this is shown in Table 26 above. The average length of a vessel which moors in the transient space System 5A is 104 feet. On average, when System 5A is oversold, which it is about 71% of the year, it is oversold by 550 feet, or approximately 5 times the length of its average vessel. Therefore, it can be said that System 5A is oversold by 5 vessels on average.

The maximum moorage a space was oversold by during calendar year 2023 can also be characterized in terms of vessels, indicating by how many vessels a given transient space was over capacity on its most oversold day of the year.

Table 27 shows by how much transient moorage was oversold on average and at peak use times in 2023.

Table 27: Transient Overcrowding in Vessel Equivalents, 2023

Average Boat Length (ft)	Average Oversold Moorage Boat Equivalent	Max Oversold Moorage Boat Equivalent
20–29	16	43
30–39	26	81
40–49	3	16
50–59	3	17
60–69	0	0
70–79	3	10
80–89	1	4
90–99	2	6
100+	5	11
Total Vessels	**52**	**171**

(Data received from port database, July 2024)

Table 27 demonstrates that, frequently, additional transient moorage space is needed for approximately 52 vessels, and at peak use times, additional transient moorage space is needed for approximately 171 vessels.

C.5.3.3 *Invisible Moorage Demand*

Invisible demand is composed of vessels owned by discouraged boaters (who might seek reserve moorage if wait times for slips were not so long) and vessels which are homeported elsewhere under existing conditions but might relocate to Homer if space were available.

Discouraged boaters were estimated using 2023 boat launch pass sales data provided by the harbor office. Section C.5.3.3 estimates the number of harbor users who launched their vessels frequently in 2023, did not purchase either transient or reserve moorage, and who were not waitlisted for moorage, but were likely to have purchased it in the past. It is considered likely that, while these users are not reflected in observable reserve moorage demand under existing conditions, they would likely demonstrate demand if waitlist times were less significant.

Possible vessel relocations, also discussed in Section C.5.3.3, utilizes data from the Commercial Fisheries Entry Commission (CFEC), which identifies both a vessel owner's city of residence and a vessel's listed homeport. This analysis assumes that Alaska residents who live closer to Homer than they do to their vessel's current homeport would prefer to keep their vessel in Homer for greater convenience.

C.5.3.3.1 Boat Launch Users

Homer Harbor maintains a boat launch from which vessels loaded onto trailers can be launched. While the Alaska Department of Transportation and Public Facilities regulations limit the length of a trailer to 53 feet, it becomes more difficult for a user to launch, retrieve, transport and store trailered vessels over approximately 40 feet long, so it is reasonable to assume that the majority of vessels using the boat launch are under this length.

Launch passes can be purchased either as "day passes" or "season passes". Season passes are priced equivalent to the cost of 10 day passes and allow any number of launches during a season. Users who initially purchase day launch passes may upgrade to season passes by paying the difference. Harbor users who purchase season passes demonstrate an expectation that they will launch their boat at least 10 times during a season, and possibly more.

356 season passes were sold in 2023, accounting for 5% of pass sales. Of these, client information is available for 291. The majority of pass sales do not record information on the purchaser, making it impossible to determine if the user is already accounted for in the transient or reserve moorage user lists, or on the waitlist, and avoid double-counting.

Of the 291 season passes sold in 2023 for which user information was available, 45 were sold to users already accounted for on the transient, reserve, or waitlisted user lists. A further 205 were identified as not having client accounts with the harbor. This indicates that the users have not utilized any services at the harbor beyond the boat launch. 41 users were identified who have client accounts, but are not accounted for on the transient, reserve, or waitlisted user lists.

The fact that these 41 users purchase season launch passes demonstrates that they anticipate using the harbor with some frequency. Because they have user accounts, but are not reflected on 2023 user lists, it is likely that they have purchased moorage in Homer in the past. As such, they are the boat launch users who are not actively seeking moorage but are most likely to have demand for it if it were available.

C.5.3.3.2 Vessel Relocations

The Commercial Fisheries Entry Commission (CFEC) is an agency of the Alaska State government which regulates the commercial fishing industry in Alaska. The CFEC maintains a database of vessels which are licensed and permitted to participate in the

Alaskan commercial fishing industry. This database includes information such as the vessel's homeport and the vessel owner's state and city of residence.

In 2023, there were 549 vessel owners registered with the CFEC who were Homer residents. Of these, 113 had vessels homeported somewhere in Alaska other than Homer, were not already using Homer transient moorage, and were not waitlisted for moorage in Homer. If it is assumed that vessels are actually physically kept where they are homeported, these Homer residents have to commute between their vessels and Homer at least twice per season. These vessel owners could eliminate this commute if they relocated their vessels to Homer.

Additionally, in 2023 there were 16 vessel owners who do not live in Homer, but live closer to Homer than to their vessel's current homeport. These vessel owners could reduce their commute if they relocated their vessels to Homer

A third group of 54 Alaska resident vessel owners keep their vessels homeported out of state, and commute to Alaska for the fishing season. Because it is unreasonable to assume that vessels are commuting to Alaska from states on the East Coast or from states without water access, this analysis only considers potential relocations from Washington, Oregon, and California. Furthermore, because travel over open sea is unfeasible in small craft, this analysis assumes that only vessels over 40 feet are actually commuting under existing conditions. If these vessel owners relocated their vessels to Homer, they could eliminate or reduce the frequency of their commutes. Vessels with the potential to relocate to Homer are shown in Table 28. All vessels with the potential to relocate to Homer were checked against the Homer waitlist to avoid double-counting. No duplicates were identified.

It should be noted that, because the 183 vessels expected to relocate to Homer were all identified using the CFEC database, they are already actively fishing in Alaska; this analysis does not assume any change in fishing behavior for these vessels, and they do not represent an increase in the number of vessels fishing in the state. These vessels are only considered in this analysis in that their owners live closer to Homer than they do to their vessel's current homeport, and therefore they are likely to relocate if moorage is available. Vessels with the potential to relocate to Homer are shown in Table 28.

Table 28: Vessels with Potential to Relocate to Homer

	Number of Vessels
Vessels Owned by Homer Residents Homeported Outside Homer	113
Vessels Owned by non-Homer Alaska Residents for whom Homer is closer than their current Homeport	16
Vessels Homeported on the West Coast	54
Total Potential Relocations	**183**

(Alaska Commercial Fisheries Entry Commission, retrieved from www.cfec.state.ak.us July 2024)

This analysis assumes that Homer residents with vessels elsewhere in Alaska are most likely to want to relocate their vessels and treats this group as the “expected” number of relocations, while 183 vessels is treated as the high estimate.

C.5.3.4 *Summary of Overall Moorage Demand*

The summary of moorage demand for Homer in shown in Table 29. This table includes the total demand for reserve moorage summarized in Table 24 above, the estimated transient capacity of the existing harbor as discussed in Table 25, the average additional transient space needed, as discussed in Table 27, and the invisible demand discussed in Section C.5.3.3.

Table 29: Homer Moorage Demand Summary

<table>
<tr><th>Type of Demand</th><th>20’</th><th>24’</th><th>32’</th><th>40’</th><th>50’</th><th>60’</th><th>75’</th><th>100’ (85’-115’)</th><th>150’ (116’-150’)</th><th>175’ (151’-119’)</th><th>200+</th><th>Total</th></tr>
<tr><td>Total Reserve Demand</td><td>86</td><td>328</td><td>469</td><td>177</td><td>73</td><td>17</td><td>38</td><td>22</td><td>10</td><td>5</td><td>2</td><td>1227</td></tr>
<tr><td>Existing Transient Capacity</td><td colspan="2">72</td><td>33</td><td>7</td><td>4</td><td></td><td>2</td><td colspan="3">18</td><td></td><td>136</td></tr>
<tr><td>Average Additional Transient Space Needed</td><td colspan="2">16</td><td>26</td><td>3</td><td>3</td><td></td><td>3</td><td colspan="3">8</td><td></td><td>59</td></tr>
<tr><td>Boat Launch Users</td><td colspan="3">41</td><td></td><td></td><td></td><td></td><td colspan="3"></td><td></td><td>41</td></tr>
<tr><td>Expected Vessel Relocations</td><td colspan="3">76</td><td colspan="4">34</td><td colspan="3">3</td><td></td><td>113</td></tr>
</table>

(Data received from Harbor office, summer 2024

C.5.4 Recreation

C.5.4.1 *Recreation Vessels*

NED benefits to recreational harbor users were evaluated using the Unit Day method described in ER 1105-2-100, Appendix E, Section VII. Unit Day Values (UDVs) assess a water resource, in this case Homer Harbor and the Kachemak Bay area, in reference to five criteria: the recreation experience available at the location, the availability of other locations which can provide comparable recreational opportunities, the capacity of facilities at the resource, its accessibility, and environmental quality.

Each of these criteria was assigned a number of points by the recreational user focus group participants. The sum of these points is associated with a dollar value as detailed in EGM 26-03. This is considered the value per person-day of recreation at the water resource. This is shown in Table 30. Criteria are referred to by their official designations in UDV guidance. This analysis averages the values for “specialized” recreation and “specialized hunting and fishing”, as Kachemak Bay provides unusually beautiful sailing and hiking opportunities, as well as salmon and halibut fishing.

Table 30: Unit Day Value Points for Existing Conditions, FY26 Dollars

Criteria	Points Assigned by Recreational Focus Group		
	Low	Average	High
Recreational Experience	16	26	30
Availability of Opportunity	15	16	18
Carrying Capacity	2	4	9
Accessibility	10	13	15
Environmental Quality	6	14	20
Total Points	*49*	*73*	*92*
Dollar Value	$38.09	$48.96	$59.29

Focus group conducted October 2024; EGM 26-03

Reasons participants gave for their ratings are shown in Table 31. Wording is paraphrased for concision and clarity. Stated rationales may combine reasons given by multiple participants.

Table 31: Rationale for UDV Ratings

	Rationale for Ratings
Recreational Experience	
Low	Trails are busier; need to go further for fishing than in the past
Average	Lots of things to do and it’s a very unique area
High	I can do 20 different activities from Homer.
Availability of Opportunity	
Low	There’s a boat launch at Anchor Point.
Average	No comment provided
High	The closest similar harbor is Seward, which is over three hours away.

Carrying Capacity	
Low	Vessel damaged within a week at harbor; parking, ramp and fish cleaning all take a long time due to crowds.
Average	I’ve been waitlisted for a 50-foot slip for 4 years.
High	Parking could be better but the launch ramp’s not a big issue.
Accessibility	
Low	The harbor entrance is too narrow, it’s a choke point.
Average	Inner transient slips can struggle to get out at extreme tides, and boat wakes cause disruptions.
High	As long as the harbor’s not iced in, I can get out, and the area’s still incredible.
Environmental Quality	
Low	Docks close to the harbor are becoming dangerous to walk on.
Average	Outside the harbor you can’t beat it.
High	Off the scale

(Focus groups, October 2024)

The Homer Port User Survey indicated average trips recreational users take annually, and the average number of people per trip. The estimated value of recreation at Homer Harbor under existing conditions is shown in Table 32.

Table 32: Annual Value of Recreation at Homer Harbor, Existing Conditions

	Low	Expected	High
UDV Point Value	$38.09	$48.96	$59.29
Passengers per Trip	3.77	3.77	3.77
Trips per Vessel per Year	43.8	43.8	43.8
Recreational Vessels	1171	1171	1171
Value of Recreation at Homer Harbor under Existing Conditions (rounded)	**$7,365,000**	**$9,467,000**	**$11,464,000**

(Homer Port User Survey April 2024; Focus group conducted October 2024; EGM 26-03)

C.5.4.2 *Charter Vessels*

The recreational value of fishing charter activities in Homer were assessed using the Unit Day method described in ER 1105-2-100, Appendix E, Section VII. Unit Day Values (UDVs) assess a water resource, in this case Homer Harbor, in reference to 5 criteria: the recreation experience available at the location, the availability of other locations which can provide comparable recreational opportunities, the capacity of facilities at the resource, its accessibility, and environmental quality.

Each of these criteria was assigned a number of points by charter vessel focus group participants. The sum of these points is associated with a dollar value as detailed in EGM 26-03. This is considered the value per person-day of recreation at the water resource. This analysis references the values for “specialized hunting and fishing”, as fishing charters in Homer focus mainly on salmon and halibut. The numbers of clients per charter and the numbers of charter trips per season were taken from focus group information and the Port User Survey conducted by the port. Most charter vessels carry 6 passengers, while approximately 1/3 of the charter fleet are larger 24-passenger vehicles.

Average point values assigned by participants and related UDVs are shown in Table 33.

Table 33: Annual Value of Fishing Charter Recreation Under Existing Conditions

	Low	Expected	High
Recreation Experience	15	20	19
Availability of Opportunity	15	16	18
Carrying Capacity	2	5	6
Accessibility	10	13	15
Environmental Quality	4	13	20
Total Points	*46*	*67*	*89*
Specialized Fishing UDV	$43.37	$51.07	$59.56
Clients per Charter	3	6.69	23
Trips per season per vessel	114	114	114
Fishing Charter Vessels	144	144	144
Annual Value of Fishing Charter Recreation under Existing Conditions (whole fleet)	**$2,136,000**	**$5,609,000**	**$22,488,000**

(Port User Survey April 2024, Focus groups October 2024)

C.5.5 Delays Experienced by Harbor Users

Large vessels such as those over 85 feet long which use float System 5 may be unable to enter the harbor except at high tide. Additionally, they may experience delays waiting for harbor staff assistance navigating the turn required to enter the harbor, and/or clearing other traffic from the harbor mouth entrance.

Transient vessels of all sizes experience delays as a result of rafting. “Rafting” is the practice of having a vessel tie up to the side of another vessel rather than to the dock. This is a common and accepted practice, especially when a harbor has insufficient transient moorage for its demand. Because the Homer Harbor is very crowded, rafting happens frequently. Harbor staff and users state that at busy times, vessels may be rafted 4 or even 5 deep, meaning that there may be as many as 4 other vessels between a vessel and the dock. This degree of rafting leads to delays for vessels when they wish to leave the harbor and must wait for vessels tied outside of them to move. This can also create delays when vessels must be rearranged within the raft so that another vessel which needs to load gear or conduct maintenance can be moved alongside the dock.

Rafting conditions in Homer cause frequent delays for transient users. Vessel owners must frequently coordinate with harbor staff to find a place to tie up or may be delayed leaving the harbor if vessels tied to them must be moved to allow them to disembark. Vessels may also be delayed in completing work while in port if they must take time out of the workday to relocate so that another vessel can moor up closer to the dock. This analysis evaluates rafting delays by user group.

Other delays identified were fueling delays, assessed in this analysis for the water taxi user group, and delays to large vessels entering the harbor. For large vessels, entering the harbor can be risky because it requires a turn which can be challenging for long vessels. For these vessels, entering the harbor can require coordinating with harbor staff, tug assists, and can even involve clearing the harbor entrance of other vessel traffic to reduce the risk of collision.

C.5.5.1 *Fishing Charters*

C.5.5.1.1 <u>Valuation of Time for Fishing Charter Vessels</u>

ER 1105-2-103, Section 3-4 b(3) states that commercial benefits should be captured as changes in net income for fishing charter vessels. Fishing charters in the Homer area are limited by regulations to one trip per day, regardless of how long the trip is. While reducing delays does save companies money, it doesn't enable them to increase their business activities, or by extension, their net income. This parallels the situation addressed in ER 1105-2-100, Appendix E-11, b (a), which states that when benefits to commercial fishing vessels can't be evaluated by increased aggregate fish catch due to a quota system, benefits can be evaluated through cost savings. As such, this analysis uses cost savings as a proxy for difference in net income for fishing charter vessels.

Variable operating cost data for charter vessels was provided by focus group participants and is shown in Table 34. Participants estimated daily operating costs including fuel, wages, and bait for multi-vessel fleets. Small charter vessels hold 6 passengers while large charters can carry 24. To estimate the daily operating cost per charter vessel, the total operating cost for the fleet was divided by the total number of possible passengers to identify an "operating cost per seat", which was multiplied by the number of seats per vessel. To estimate the operating cost per hour, the operating cost per vessels was divided by the number of hours in a charter trip, as estimated by the focus group.

Table 34: Fishing Charter Hourly Operating Costs

	Low	Expected	High
Fuel	*$1,200*	*$1,200*	*$1,200*
Wages	*$2,500*	*$2,750*	*$3,000*
Bait	*$150*	*$150*	*$150*
Variable Costs per 3 Vessels, assorted sizes	$3,850	$4,100	$4,350
Total Daily Passengers	31	34	37
Variable Daily Operating Cost per Vessel	$496.77	$1,266.18	$2,586.49
Hours per Trip	7	8.5	10
Hourly Operating Cost (rounded)	$71	$149	$259

(Focus Groups, conducted October 2024)

C.5.5.1.2 Fishing Charter Delay Costs

Hourly operating costs from Table 34 were used to estimate the cost of time fishing charter vessels spend rafting. The Homer Port User Survey (2024) found that operators of fishing charter vessels estimated their rafting delays at 18.8 hours annually.

Low, expected, and high estimates are shown in Table 35. Totals are rounded.

Table 35: Fishing Charter Rafting Delay Costs

	Low	Expected	High
Rafting Delays (hrs.)	18.8	18.8	18.8
Hourly Operating Cost (rounded)	$71	$149	$259
Transient Fishing Charter Vessels	44	44	44
Total Cost of Annual Rafting Delays for the Fishing Charter Fleet	**$59,000**	**$123,000**	**$214,000**

(Port User Survey April 2024; Focus groups, October 2024)

C.5.5.2 *Water Taxi*

C.5.5.2.1 Valuation of Time for Water Taxis

The value of an hour for water taxis was calculated as hourly operating income per ER 1105-2-103 Section 3-4b (3). Water taxis do not have limits on the number of trips they can operate in a day, meaning that time saved from avoided delays can be used to conduct more business.

Data on operating costs per day were provided by focus group participants. Moorage rates and dry dock costs were provided by the harbor. To estimate gross income, participant focus group data was combined with passenger fares for the area found online and hourly wage rates from the Alaska Department of Labor & Workforce Development for pilots of water vessels. Annual costs were subtracted from gross revenue to estimate net annual revenue, which was divided by estimated annual work hours to estimate hourly net income. The average passengers per trip were taken from the Homer Port User Survey water taxi respondents. Low, expected, and high estimates are shown in Table 36. Final values are rounded to whole dollars.

Table 36: Water Taxi Hourly Operating Income

	Low	Expected	High
Trips per year	*1392*	*1392*	*1392*
Passengers per trip	*5*	*5*	*5*
Cost per passenger	*$75*	*$100*	*$225*
Estimated Annual Revenue per Vessel	$522,000	$696,000	$1,566,000
Fuel ($/day)	*$400*	*$400*	*$400*
Wages ($/hr.)	*$18.71*	*$30.19*	*$38.30*
Length of workday (hrs.)	*8*	*9*	*10*

	Low	Expected	High
Moorage rates ($/day)	*$67*	*$96*	*$135*
Dry dock ($/ft/month)	*$1*	*$1*	*$1*
Daily Operating Cost per Vessel	$618	$769	$920
Annual Operating Costs per Vessel	$216,000	$269,000	$322,000
Annual Net Income per Vessel	$306,000	$427,000	$1,244,000
Hourly Net Income per Vessel (rounded)	$147	$205	$598

(Focus Groups October 2024, Alaska Dep. of Labor, Homer Port User Survey 2024)

C.5.5.2.2 Water Taxi Rafting Delays

Focus group participants estimated that managing rafting took 10–15 minutes each morning and required 1–2 people per vessel. Focus group participants stated that their businesses operate daily, year-round, but that they see a reduction on trips per day during the winter. This analysis estimates 350 days of operation per year, based on year-round operation with 15 days off per year for holidays and incidental maintenance.

Low, expected, and high estimates are shown in Table 37. Totals are rounded.

Table 37: Water Taxi Rafting Delay Costs

	Low	Expected	High
Delay per day (hrs.)	0.17	0.21	0.25
Days per year	350	350	350
Value of Time ($/hr.)	$147	$205	$598
Transient Water Taxis	14	14	14
Total Cost of Annual Rafting Delays for the Water Taxi Fleet	**$122,000**	**$211,000**	**$733,000**

(Focus Groups October 2024; ADL&WD 2023 Wages)

C.5.5.2.3 Water Taxi Fueling Delays

Large vessels take longer to fuel than small ones because their fuel tanks have larger capacities. The longer lengths of these vessels can also block smaller vessels from accessing the fuel dock. Because the fuel dock is located near the harbor entrance, vessels queuing around it can create obstacles to traffic going in and out of the harbor. Participants in multiple focus groups reported that delays at the fuel dock can be daily occurrences in peak season.

According to focus group participants, water taxis experience delays attempting to fuel 1–2 times per week during peak season, which lasts from May through September. The same value of time, hourly operating income, was used in the calculation of this benefit category. Costs associated with fueling delays are described in Table 38.

Table 38: Water Taxi Fueling Delay Costs

	Low	Expected	High
Delay per Fueling (hrs.)	0.17	0.34	0.5
Events per week in Peak Season	1	1.5	2
Weeks in Peak Season	16	16	16
Fueling Delays per Vessel per Season (hrs.)	*2.7*	*8*	*16*
Value of Time ($/hr.)	$147	$205	$598
Water Taxi Vessels	36	36	36
Total Cost of Annual Fueling Delays (fleet)	**$14,000**	**$59,000**	**$344,000**

(Focus Groups October 2024; ADL&WD 2023 Wages)

C.5.5.3 *System 5*

While vessels using System 5 are not all part of the same user group, their larger size and shared moorage location mean that their rafting patterns are more similar to each other than to smaller vessels of their respective user groups. Evaluations of delays for other user groups exclude System 5 vessels.

C.5.5.3.1 Valuation of Time for System 5 Vessels

System 5 is composed primarily of commercial fishing vessels and freight vessels. Where permit and quota systems for commercial fishing are in place, changes to income can be approximated through operating cost savings. Freight vessels do not have quota systems and can increase their operations if delays are alleviated. As such, this analysis estimates the value of time for vessels which use System 5 as a weighted average of the hourly variable operating costs for commercial fishing vessels and the hourly operating income for freight vessels.

Variable costs for System 5 commercial fishing vessels include labor costs for the captain and crew, the cost of wear on the engine, and the cost of fuel. Labor costs were based on those of smaller fishing vessels and were increased proportionally to account for larger crew sizes. Focus group participant information indicated that engines for vessels of this size cost approximated $65,000 and need to be replaced or significantly overhauled after 25,000 hours of use. Annual engine wear costs were estimated based on Full Time Work Equivalent (FTWE), or 2,080 hours per year. Annuel fuel costs were taken from estimates of fuel costs for similarly sized research vessels provided by the System 5 focus group.

Calculation of hourly operating income for System 5 freight vessels required the estimation of revenue as well as costs. Focus group participants reported that their average contract is 7 days long, and that their billing rates range from $14,000 to $15,000 per day. Freight operating costs included repair and maintenance, fees and insurance, miscellaneous business costs, fuel, and labor costs for the captain and crew.

Fuel and labor costs were taken from estimates for similarly sized research vessels provided by the System 5 focus group. Maintenance, insurance, fees and miscellaneous business costs were taken from the NOAA publication *An Overview of the Social Sciences Branch Commercial Fishing Business Cost Survey in the Northeast.* Moorage and maintenance costs were increased proportionally to vessel length. The difference between the revenue and the operating costs is the annual net revenue for System 5 freight vessels. This was divided by an assumed FTWE hours to estimate hourly operating income.

Commercial Fishing vessels make up 65% of the vessels on System 5. Freight vessels make up 7%. While there are other vessel types which utilize System 5, they each account for smaller percentages of its user base, and there was not available data to estimate the value of time for them. To estimate the value of time for System 5 users, the weighted average of the commercial fishing operating costs and freight operating income was calculated to identify a composite value of time. Low, expected, and high estimates of this are shown in Table 39 .

Table 39: Value of Time for System 5 Vessels

	Low	Expected	High
Crew & Captain Labor Cost	*$892,000*	*$896,000*	*$900,000*
Engine Wear	*$5,400*	*$5,400*	*$5,400*
Fuel	*$300,000*	*$300,000*	*$300,000*
Annual Variable Costs per Vessel	$1,197,000	$1,201,000	$1,205,000
Full Time Equivalent Hrs/year	2,080	2,080	2,080
Hourly Operating Cost for System 5 Commercial Fishing Vessels (rounded)	**$575**	**$577**	**$579**
Average Days/Contract	*7*	*7*	*7*
Day Rate	*$14,000*	*$14,500*	*$15,000*
Contracts per year	*30*	*36*	*42*
Annual Revenue per Vessel for System 5 Freight Vessels	$2,940,000	$3,654,000	$4,410,000
Repair/Maintenance	*$55,000*	*$63,000*	*$70,000*
Fees & Insurance	*$17,000*	*$19,000*	*$22,000*
Business Cost	*$10,000*	*$14,000*	*$17,000*
Other	*$100*	*$300*	*$600*
Fuel	*$300,000*	*$300,000*	*$300,000*
Crew/Captain Labor Cost	*$450,000*	*$475,000*	*$500,000*
Annual Operating Costs for System 5 Freight Vessels	$832,000	$871,000	$910,000
Annual Net Income for System 5 Freight Vessels	*$2,108,000*	*$2,783,000*	*$3,500,000*
Full Time Equivalent Hrs./year	*2,080*	*2,080*	*2,080*

	Low	Expected	High
Hourly Operating Income for System 5 Freight Vessels	**$1,000**	**$1,300**	**$1,700**
Percentage of System 5 vessels that are Commercial Fishing	*65%*	*65%*	*65%*
Percentage of System 5 vessels that are Freight	*7%*	*7%*	*7%*
Weighted Value of Commercial Fishing Operating Cost ($/hr.) (rounded)	*$520*	*$521*	*$523*
Weighted Value of Freight Hourly Income ($/hr.) (rounded)	*$99*	*$130*	*$164*
Composite Value of Time for System 5 Vessels ($/hr.) (rounded)	**$618**	**$651**	**$687**

C.5.5.3.2 System 5 Rafting Delays

Because System 5 vessels are larger and require more people to move, vessel owners experience additional delays coordinating with crew and other vessel owners to facilitate moves. Focus groups described time spent actively moving vessels into and out of rafts. They also described time which is consumed in coordinating with the harbor and/or other vessel owners when rafted vessels need to be moved.

Time spent rafting involves multiple crew members and precludes other vessel operations from being accomplished and is therefore evaluated using vessel operating costs as the value of time. Coordination is handled by the captain or vessel owner and is evaluated using focus group data on day rates for skippers. Because coordination can happen during what would otherwise be leisure time, the value of leisure time is also used, and is evaluated at 1/3 of the hourly wage rate, per ER 1105-2-100.

Focus group estimates of rafting and coordination delay times and costs are shown in Table 40. Totals are rounded.

Table 40: System 5 Rafting and Coordination Delay Costs

	Low	Expected	High
Time rafting per event (hrs.)	1	2	3
Delay Events per year	6	29	52
Value of an hour	$618	$651	$687
Transient System 5 Vessels	55	55	55
Annual Cost of Rafting Time for the System 5 Fleet	$204,000	$2,077,000	$5,894,000
Coordination time per year (hrs.)	24	42	60
Captain Labor Rate ($/hr.)	$81.00	$81.00	$81.00
Captain Leisure Rate ($/hr.)	$27.08	$27.08	$27.08
% of Coordination time that is leisure	75%	50%	25%

	Low	Expected	High
Transient System 5 Vessels	55	55	55
Annual Cost of Coordination Time for the Fleet	$54,000	$125,000	$223,000
Total Cost of Annual Rafting Delays for the Fleet	**$258,000**	**$2,202,000**	**$6,117,000**

(Focus Groups, October 2024)

C.5.5.3.3 System 5 Delays Entering and Exiting the Harbor

System 5 focus group participants stated that there "are delays almost every time you enter the harbor". According to these participants and harbor staff, large vessels experience delays at the harbor mouth because its shape requires them to make a turn which can be challenging in certain weather conditions or when there is other vessel traffic. Focus group participants estimated delay times at between 0.5 and 1.5 hours per event. Hourly operating income is used in the valuation of these delays because they can reduce the number of contracts users are able to complete. Delay times and associated costs are shown in Table 41. Totals are rounded.

Table 41: Existing Delays to System 5 Vessels Entering & Exiting the Harbor

	Low	Expected	High
Harbor transits per year	52	52	52
Delay per transit (hrs.)	0.5	1	1.5
Delays per year (hrs.)	26	52	78
Hourly Net Operating Income	$618	$651	$687
Annual Delay Costs (per vessel)	**$16,000**	**$34,000**	**$54,000**

(Focus group responses October 2024)

C.5.5.4 *Commercial Fishing*

The commercial fishing vessels discussed in this section exclude commercial fishing vessels which utilize System 5. This includes vessels up to 85 feet LOA. Focus group participants stated that moving vessels due to rafting generally takes 2 people 1–2 hours, and happens roughly every other day during peak season, in June and July. Vessels generally have a captain and one deckhand.

The value of an hour for commercial fishing vessels was calculated as hourly operating costs. Operating costs included repair and maintenance, fees and insurance, miscellaneous business costs, and labor costs for the captain and crew. Maintenance, insurance, fees and miscellaneous business costs were taken from the NOAA publication *An Overview of the Social Sciences Branch Commercial Fishing Business Cost Survey in the Northeast.* The value of labor for commercial fishermen is based on estimates from a study conducted by Cornell University on the value of time for commercial fishermen in Alaska. This study differentiated between the hourly value of time for captains and crewmembers, and presented hourly values in 2006 dollars. This analysis escalates these hourly values to FY24 dollars using the Bureau of Labor Statistics Employment Cost Index (ECI). FY24 dollars were used because the ECI did not include 2025. Crew and captain payment totals include two crew members, per focus group information. Annual operating costs were divided by an assumed FTWE hours to estimate hourly operating costs. Inputs considered in the value of time for commercial fishing vessels are shown in Table 42.

Table 42: Value of Time for Commercial Fishing Vessels

	Low	Mean	High
Captain rate ($/hr.)	*$121.21*	*$121.21*	*$121.21*
Crew rate ($/hr.)	*$97.30*	*$97.30*	*$97.30*
Hours/year	*2,080*	*2,080*	*2,080*
Annual Crew/Captain Payments	$654,000	$657,000	$660,000
Repair/Maintenance	$21,000	$25,000	$29,000
Total Operating Costs	$675,000	$682,000	$689,000
FTWE (hrs./yr)	2,080	2,080	2,080
Hourly Operating Costs	**$325**	**$328**	**$331**

(Focus groups 2024; NOAA; Cornell University)

Estimated rafting delay costs are shown Table 43. Totals are rounded.

Table 43: Commercial Fishing Rafting Delay Costs

	Low	Expected	High
Time per delay (hrs.)	1	1.5	2
Delays per year	30	30	30
Value of an Hour (rounded)	$325	$328	$331
Transient Commercial Fishing Vessels	587	587	587
Total Cost of Annual Rafting Delays	**$5,723,000**	**$8,664,000**	**$11,658,000**

(Focus Groups October 2024; Cornell University)

C.5.6 Rafted Fuel Consumption

When vessels raft, vessels on the “outside” of the raft (the side furthest from the dock) they often cannot reach the dock to access shore power. Many vessels, especially working vessels, have sensitive equipment onboard that takes time to prepare to go without power and cannot simply be turned off. Participants in the System 5 and Commercial Fishing groups stated that when they cannot reach shore power, they have to keep generators running onboard 24/7, consuming fuel that otherwise would be conserved.

Vessel counts, done daily by the harbor, provide an estimate of crowding severity throughout the year. Days when transient moorage sold exceeds the harbor’s capacity can be identified, and the amount of moorage oversold can be averaged to determine by how much moorage is oversold generally. It should be noted that there will be peak use periods during the year when rafting numbers are much higher, as this is an average across both peak and off-season times.

Transient moorage on System 5, the float used by large vessels, was oversold 64.5% of the time by an average of 7 vessels. At the busiest time of the year, System 5 was oversold by the equivalent of 17 vessels. Because this is the annual maximum, treating it as a high value for daily rafting was found to be inaccurate. Therefore, in order to show the potential variation in the number of vessels rafting at a given time, the midpoint between the average and the annual maximum (12) was used as a “high” daily estimate. Focus group participants provided estimates of gallons used per day by their generators, and fuel costs per gallon were taken from the Pacific States Marine Fisheries Commission monthly marine fuel prices. Inputs for rafted fuel consumption costs for System 5 vessels are discussed in Table 44.

Table 44: System 5 Rafted Fuel Consumption

	Low	Expected	High
% of year rafting occurs	64.5%	64.5%	64.5%
Days per year running generator	236	236	236
Generator fuel consumption (gal/day)	30	40	50
Average vessels rafting per day	7	7	12
Gallons per year	50,000	66,000	142,000
Fuel cost per gallon	$3.70	$3.74	$3.78
Annual Fuel Cost Due to System 5 Rafting	**$185,000**	**$247,000**	**$537,000**

(Data received from port July 2024)

For transient vessels not using System 5, this analysis limits the assessment of rafted fuel consumption to vessels over 40 feet. This is because vessels under 40 feet tend to experience more severe crowding less frequently, whereas vessels over 40 feet tend to experience more moderate levels of crowding more consistently, and including vessels under 40 feet would tend to skew the averages. Additionally, the majority of vessels under 40 feet are recreational vessels, which according to harbor staff, do not tend to run generators around the clock while rafting.

Transient moorage for vessels 40 feet and above not using System 5 was oversold 77.3% of the time by an average of 9 vessels. Focus group participants provided estimates of gallons used per day by their generators, and fuel costs per gallon were taken from the Pacific States Marine Fisheries Commission monthly marine fuel prices. Inputs for rafted fuel consumption costs for medium-sized transient vessels are discussed in Table 45.

Table 45. Rafted Fuel Consumption for Medium-Sized Vessels

	Low	Expected	High
Percent of year that rafting occurs	77.3%	77.3%	77.3%
Days per year running generator	283	283	283
Hours per day	24	24	24
Gallons per hour	2	4	6
Average vessels rafting per day	9	9	26
Gallons per year	122,000	244,000	1,059,000
Fuel cost per gallon	$3.70	$3.74	$3.78

	Low	Expected	High
Annual Fuel Cost Due to Small Vessel Rafting	**$451,000**	**$913,000**	**$4,003,000**

(Data received from port July 2024)

A similar situation exists for vessels which use the Deep Water Dock because they cannot enter the harbor. When vessels which are too large to enter the harbor moor at the Deep Water Dock, they must continuously run generators because power is not available at this dock. A participant in the Deep Water Dock focus group described having 3–4 such instances per year for 1–2 days each. Inputs for fuel consumption costs for vessels moored at the Deep Water Dock are discussed in Table 46.

Table 46: Deep Water Dock Moored Fuel Consumption

	Low	Expected	High
Vessels	2	2	2
Generators per vessel	2	2	2
Gallons/hour	8	8	8
Hours per day	24	24	24
Days per instance	1	1.5	2
Instances per year	3	3.5	4
Gallons per year	2,300	4,000	6,000
Fuel cost per gallon	$3.70	$3.74	$3.78
Annual Fuel Cost Due to Rafting	**$8,500**	**$15,000**	**$23,000**

(Data received from port July 2024)

C.5.7 Damages to Vessels Under Existing Conditions

This section estimates annual vessel damages attributable to overcrowding conditions in Homer using focus group information and data from the 2024 Homer Port User Survey. Focus group information was used to estimate the cost of damages in an average vessel incident. This average incident cost was used in combination with Port User Survey data to estimate the annual damages per vessel experienced by harbor users.

C.5.7.1 *Average Damages Per Incident*

Examples of accidents and associated damage costs were provided by focus group participants and are shown in Table 47. This focus group data was used to estimate low, expected, and high average costs per vessel accident. Values are rounded

Table 47: Vessel Damages Reported by Focus Group

Incident	Minimum Cost	Expected/Average Cost	Maximum Cost
Pipe went through hull	$30,000	$30,000	$30,000
Vessel collision	$4,000	$4,000	$4,000
Sunken skiff	$4,000	$11,500	$19,000
Dinged-up propeller	$2,000	$2,000	$2,000

Incident	Minimum Cost	Expected/Average Cost	Maximum Cost
Total Damages for Accidents Reported by Focus Group	$40,000	$48,000	$55,000
Incidents reported	4	4	4
Average Cost per Incident	$10,000	$12,000	$14,000

(compiled from focus group information, October 2024)

C.5.7.2 *Damages Per Vessel*

The Homer Port User Survey, conducted by the Homer Harbor in April 2024, was sent to 1,500 harbor users for whom the harbor had email addresses. The survey had 328 respondents and a response rate of 22%. The survey asked respondents to identify factors which contributed to the accidents. Contributing factors identified by respondents included:

- Steep ramps
- Wet ramps
- Uneven float walking surfaces
- Narrow fairways
- Icy float surfaces
- Rafting
- Icy ramps

Of these contributing factors, rafting and narrow fairways are the only ones which would be reduced by a project. A project could reduce rafting by increasing available moorage space. It could also reduce the issue of narrow fairways, as rafting vessels extend into fairways, reducing available maneuvering space.

The 328 harbor users who responded to the survey reported an average of 23 accidents per year. Of these, 8.7 accidents were contributed to by rafting, narrow fairways, or both. Because the survey had a response rate of 22%, we can extrapolate that these numbers reflect 22% of the accidents likely experienced by the surveyed sample of harbor users. This indicates that for the surveyed sample of 1,500 harbor users, we can assume a total of 105 accidents, and that 40 of them were contributed to by rafting, narrow fairways, or both.

The estimated cost of damages per incident discussed in Table 45 multiplied by the number of annual accidents gives us an estimated damages per year for the surveyed population of 1,500. Dividing the estimated damages per year by the surveyed population gives us an estimated damages per vessel.

In order to estimate damages per year related to rafting and narrow fairways, the damages per vessel were multiplied by the vessels in the existing fleet. These values are shown in Table 48.

Table 48: Annual Vessel Damages Under Existing Conditions

	Low	Expected	High
Average Cost per Incident	$10,000	$12,000	$14,000
Estimated incidents per year for the Surveyed Population	40	40	40
Estimated Damages for Surveyed Population	$400,000	$480,000	$560,000
Surveyed population	1,500	1,500	1,500
Estimated Damages per Vessel	$265	$315	$365
Estimated Annual Damages for the Homer Fleet	**$557,000**	**$662,000**	**$767,000**

(compiled from focus group information, October 2024)

C.5.8 Harbor Staff Time Costs

The Homer Harbormaster stated that harbor staff spend significant time managing rafting and coordinating vessel movements. They are also frequently called on to assist large vessels entering the harbor. These demands on staff time take them away from other work activities such as maintenance on harbor infrastructure, providing security for harbor premises, and administrative tasks. They also result in overtime costs when employees must remain at work late or come in to assist on days off.

C.5.8.1 *Coordinated Harbor Entrances*

The harbormaster estimated that approximately once a month, a large vessel requires staff assistance to enter the harbor due to vessel size and the depth and shape of the harbor entrance. Coordinating these assists takes time before vessel arrival, and a guide as the vessel enters. Assisted vessels may need an escort to clear the harbor entrance of other traffic and/or assistance from a tugboat to ensure turns are completed successfully. Time spent managing rafting is the value of lost opportunity to complete other work tasks, therefore average staff wage rates are used as the value of time. Costs associated with coordinating harbor entrances are shown in Table 49.

Table 49: Cost of Harbor Staff Time Assisting Vessels Entering the Harbor

	Low	Expected	High
Events per year	12	12	12
Coordination time per vessel (hrs.)	3	3	3
Escorts needed per year	8	10	12
Hrs. per escort	1	1	1
Tug assists needed per year	8	10	12
Staff per assist	2	2	2
Average employee wage	$38.46	$38.46	$38.46
Annual Cost of Coordinated Harbor Entrances	**$2,300**	**$2,500**	**$2,800**

(Interview with harbormaster, October 2024)

C.5.8.2 *Vessel Reorganizations*

Intermittently, vessels already rafted in the harbor must be moved to allow other vessels to join the raft, to leave, or to access the dock to load gear or cargo. Harbor staff often assist in coordinating these multi-vessel reorganizations, calling vessel owners as well as helping to move vessels. Frequency of these events vary from once a month in the off season to three times a week during peak season.

Harbor staff estimate that per event, they spend an average of 2 hours coordinating with vessel owners, and that each move takes 2 staff members and 2 hours to execute on average.

Assisting in moving large vessels requires experience, and so often falls to senior harbor staff. An average hourly wage rate for harbor staff who assist in vessel reorganizations was provided by the harbor office.

Costs associated with staff time managing these vessel reorganizations are showed in Table 50.

Table 50: Harbor Staff Time Coordinating Vessel Reorganizations

	Low	Expected	High
Events per year	96	99	102
Coordination time calling vessel owners (hrs.)	2	2	2
Staff per move	2	2.5	3
Hours per move	2	2	2
Average employee hourly wages	$38.46	$38.46	$38.46
Annual Vessel Reorganization Staff Time Costs	**$22,000**	**$27,000**	**$31,000**

(Interview with Harbormaster, October 2024)

C.5.8.3 *General Rafting Management*

The harbormaster also provided an estimate of overall employee time spent managing rafting. This estimate is treated as a per-day value because, while some times of year will have less staff time dedicated to raft management, especially busy seasons will require more time from a staff member, or may involve multiple employees. This estimate was considered to include time staff spent assisting with the vessel reorganizations discussed above. As such, costs of assisting in vessel reorganizations are subtracted from the general rafting management costs. Costs associated with harbor staff time managing rafting outside of vessel reorganizations are shown in Table 51.

Table 51: General Rafting Management Costs

	Low	Expected	High
Average total staff hours per day	3	3.5	4
Average employee hourly wage	$38.46	$38.46	$38.46
Days per year	365	365	365
Reorganization costs (subtracted)	($22,000)	($27,000)	($31,000)

	Low	Expected	High
Annual cost of general Rafting Management	**$20,000**	**$22,000**	**$25,000**

(Harbormaster interview, October 2024)

C.5.9 Infrastructure Damage

Infrastructure damage is often considered as a benefit category in studies when overcrowding of moorage is a concern. This is because, as crowding in a harbor worsens, infrastructure such as floats and docks can undergo additional wear and tear, which may be alleviated if crowding is reduced. This benefit category was explored for Homer, however the existing Homer Harbor has a significant amount of deferred maintenance, and it was not possible to show from harbor maintenance cost records that infrastructure was receiving additional wear and tear from crowding.

C.5.10 Safety Concerns Related to Rafting

Harbor staff and users state that at busy times, vessels may be rafted 4 or even 5 deep, meaning that there may be as many as 4 other vessels between a vessel and the dock. This much rafting creates safety risks in a harbor to infrastructure, to staff, and to harbor users. This section discusses types of risks caused by rafting, as well as differences in severity of risk for different types of vessels.

C.5.10.1 *Climbing to Embark or Disembark*

When a vessel is rafted, its crew cannot get onto or off of the vessel by using a gangway to the dock, as they normally would. Instead, they must step over the side from one vessel to the next. This creates a risk of falling for the crewmembers. It also creates a risk to vessel owners; the more traffic there is across one vessel to others rafted outside of it, the more opportunity for equipment to be damaged or stolen.

C.5.10.2 *Increased Fire Risk*

If a vessel catches fire while rafted, emergency responders have more difficulty accessing it to put out the fire than if it were moored to the dock. Additionally, vessels rafting on the inside may be trapped near a burning vessel, allowing the fire to spread.

C.5.10.3 *Reduced Access for Emergency Personnel*

If someone is injured or a medical emergency occurs on a vessel which is rafted out from the dock, emergency medical responders may have to cross over multiple rafted vessels to reach the injured person. Similarly, if someone is injured or experiencing a medical emergency, it will be very challenging for emergency responders to remove them from a rafted vessel. Anecdotally, a focus group participant reported an instance where an injured crewman had to be removed from a rafted vessel by helicopter.

C.5.10.4 *Additional Risks for System 5 Users*

Vessels which moor at System 5 are larger than vessels in other parts of the harbor, with an average length of approximately 100 feet. These vessels are also taller, with decks significantly above the surface of the water, and they may have high sides which require ladders to climb over. Furthermore, the deck of one vessel may be several feet above or below the deck of the vessel next to it. This means that crewmembers and passengers of vessels on System 5 have higher risks climbing from boat to boat than those of smaller vessels. Additionally, larger vessels tend to have more crew members, meaning that these higher risks are experienced by more people per vessel that rafts.

If a vessel on System 5 has a mechanical issue while it is rafted, it will exert significantly more force on the dock, potentially causing damage. If a mechanical issue occurs while vessels are rafted together, the malfunctioning vessel may do significant damage to smaller vessels if it drifts into them.

Risk factors associated with rafting are shown in Table 52. A point system is used to track the number of risks per vessel. For each risk factor, a point is given per crewmember on a given size of vessel. This also allows comparison of risks per rafted vessel by size.

Table 52: Risk Factors Associated with Rafting

Risk Factor	Small/ Medium Vessels (2 crew)	System 5 Vessels (5 crew)
Climbing	2	5
Additional Height Above Water		5
Variation in Deck Height		5
Emergency Response Access	2	5
Additional Length		5
Increased fire risk	2	5
Total Risk Factors per Rafted Vessel	**6**	**30**

(compiled from focus group participant and harbor staff descriptions, October 2024)

C.6 Future Without Project Condition

C.6.1 Introduction

The Future Without Project (FWOP) assesses what is expected to happen in the study area over a 50-year period of analysis from 2034 to 2083 if no project is constructed. For the Homer Harbor, conditions are expected to continue and in some cases worsen over the period of analysis in a FWOP. This section discusses changes in the Homer fleet and moorage demand over the period of analysis, as well as costs to harbor users of continuing and worsening crowding and delays. Cost expected to occur in the period of analysis are discounted at the FY26 discount rate of 3.25%.

C.6.2 Assumptions Made in the FWOP

The following assumptions were made in forecasting the FWOP:

- Waitlist growth will continue at the average of the recent and long-term historical trends between the year of most recent data (2023) and the beginning of the period of analysis.
- The rate of waitlist growth will slow in the FWOP over the period of analysis, and is not projected past 20 years from the year of most recent data (2023).
- Growth in the fleet based on the waitlist mirrors the 2023 reserve fleet user group distribution by vessel size.
- Under existing conditions, on average, 40% of waitlisted vessels utilize transient moorage. This percentage is assumed to continue in the FWOP.

If the rate of growth is faster than projected crowding, vessel delays, and vessel damages will worsen more quickly and or more severely than expected. Conversely, if growth is slower than projected, crowding, delays, and damages in the FWOP will be overestimated in this analysis. If growth in the fleet does not mirror the existing reserve fleet, costs will be over or underestimated for different user groups. If fewer than 40% of waitlisted users utilize transient moorage, delay costs will be overestimated in this analysis, but if more than 40% of waitlisted users utilize transient moorage, delay costs will be underestimated.

C.6.3 Fleet and Moorage Demand

C.6.3.1 *Small Vessel Reserve Moorage Demand Growth*

The consulting firm HDR analyzed 20 years of waitlist data provided by the harbor. This data showed that over time, Homer's waitlist is growing. HDR's analysis provided projected future growth in the waitlist based on both the trend over the full 20-year period, and on the trend based on the most recent 5 years of data. The 20-year trend projected a higher level of growth in the number of waitlisted users. The 5-year trend still projected positive growth in the waitlist over time, but at a slower rate. This suggests that if crowding conditions in the harbor and long wait times for reserve slips continue, the rate of waitlist growth will continue to slow.

This analysis builds on these projections and presents low, expected, and high growth scenarios where growth is estimated for the 20-year period from the year of the most recent data (2023).

In the FWOP, the "low" growth scenario assumes that waitlist growth will continue at the recent, slower rate identified by HDR until the base year. This scenario assumes that in the base year, the harbor will be at maximum capacity and that any increase in active users will be offset by an equal number of users dropping out due to crowding, resulting in no net change. These assumptions were made because it is logical that the recent trend would be likely to continue, however as the harbor is already overcrowded and wait times are years long in some cases, it is reasonable that users will become discouraged and no longer signal interest in moorage at some level of crowding. This scenario projects an increase in the waitlist of 150 vessels over the next 20 years.

The high scenario for the FWOP assumes that the waitlist will continue to grow along the "high" projection from the HDR analysis, until the base year, at which time waitlist growth will slow to the "low" projection, an increase of 400 vessels over the next 20 years. The "high" projected growth rate is the growth trend over the last 20 years, so it is demonstrably relevant for this specific harbor. At the same time, it is reasonable to expect that harbor users will become discouraged by crowding and wait times and signaled interest will decrease.

The expected scenario assumes that growth in demand will continue at the average of the low and high growth rates provided by HDR, but will slow as crowding worsens, beginning in the base year. This analysis approximates that crowding will deter growth by 50% starting in the base year, leading to an increase of 275 vessels over the next 20 years. Homer is an especially desirable boating location, both for fishing access and natural beauty as well as for relative proximity to other communities on the Kenai Peninsula. It was considered most likely that even if wait times and crowding become more pronounced over time, signaled interest in moorage would not decline entirely.

Based on the HDR report, it is estimated that 50% of the growth in demand over 20 years will be for 32-foot slips, 20% of growth in demand will be for 24-foot slips, 20% for 40-foot slips and 10% for 50-foot slips.

The low, expected, and high scenarios for the FWOP are shown in Table 53.

Table 53: Small Vessel Reserve Moorage Demand Growth in the Future Without Project

Slip Size	Low	Expected	High
24' slips	30	55	80
32' slips	75	138	200
40' slips	30	55	80
50' slips	15	27	40
Total Vessels	**150**	**275**	**400**

HDR "Homer Fleet Demand Analysis" 2024

Because these growth projections are based on waitlist data, these vessels represent an increase in demand for reserve moorage. Similar projections for transient demand are not possible, because data is unavailable before 2019. Approximately 40% of waitlisted users use transient moorage while they wait for a slip assignment. This is expected to continue in the FWOP, meaning that approximately 40% of future users who join the waitlist will use transient moorage in the interim.

C.6.3.2 *Large Vessel Moorage Demand Growth*

Reserve moorage is not available at Homer Harbor for vessels over 85 feet long. Transient moorage is available at daily, monthly, semi-annual, and annual rates. While overall purchases of moorage for large vessels have not shown a trend in recent years, there was a 60% increase in sales of annual transient moorage for large vessels between 2019 and 2023, which is the most recent data available at the time of this analysis. Because large vessels do not have access to reserve moorage, annual transient moorage is the closest available substitute. This analysis treats annual transient moorage sales for large vessels as a proxy for reserve moorage demand. If the trend in annual transient moorage sales continues, this will be an increase of 14 large vessels over 20 years.

C.6.4 Recreation

C.6.4.1 *Recreational Vessels*

The recreation fleet is projected to increase over the period of analysis. This analysis considers low, expected and high estimates of recreational fleet growth, as discussed in Section C.6.3.

Fleet increases of recreational vessels are expected for the 24-, 32-, 40-, and 50-foot slip size categories. The percentage of each of these size categories and the low, expected, and high estimates of recreational fleet growth are shown in Table 54. As discussed in B.6.3.1, it is assumed that, while waitlisted for reserve, 60% of these vessels will not use harbor moorage, and that 40% will use transient moorage. This is consistent with existing waitlisted user patterns.

Table 54: FWOP Recreational Moorage Demand Growth and Fleet Increase

Slip Size	Overall Fleet Increase (low/expected/high)	Recreation as % of Category	Low	Expected	High
24’	(30/55/80)	90%	27	50	72
32’	(75/138/200)	75%	56	104	150
40’	(30/55/80)	46%	14	25	37
50’	(15/27/40)	15%	2	4	6
Total Recreational Demand Growth			99	183	265
Total Increase in Active Fleet			40	73	106

(Data received from port July 2024, HDR Fleet Demand Analysis report)

Focus group participants were asked if and how they expected the point values assigned to the UDV criteria to change if a project is not constructed. The changes in point value estimates for UDV criteria in a FWOP are shown in Table 55. In general, participants expected that recreational experience, carrying capacity, and environmental quality would decrease as crowding increased, and that availability of opportunity and accessibility would remain the same. This resulted in slight decreases in total points and dollar estimations of the value of a person-day of recreation.

Table 55: Unit Day Value Points for the FWOP

Criteria	Low		Expected		High	
	Existing	FWOP	Existing	FWOP	Existing	FWOP
Recreational Experience	16	15	26	20	30	30
Availability of Opportunity	15	15	16	16	18	18
Carrying Capacity	2	0	4	3	9	6
Accessibility	10	10	13	13	15	15
Environmental Quality	6	4	14	13	20	20
Total Points	*49*	*44*	*73*	*65*	*92*	*89*
Dollar Value	$38.09	$35.99	$48.96	$44.93	$59.29	$57.75

(Focus group conducted October 2024; EGM 26-03)

While the value per person-day of recreation in Homer is expected to decrease slightly over the period of analysis as crowding increases, this is offset by increases in the active recreation fleet in the expected and high growth scenarios. Average annual equivalent recreation values for Homer are shown in Table 56.

Table 56: FWOP Value of Recreation at Homer Harbor

	Low	Expected	High
UDV Point Value	44	65	89
Unit Day Value	$35.99	$44.93	$57.75
Passengers per Trip	3.77	3.77	3.77
Trips per Vessel per Year	43.80	43.80	43.80
Active Recreational Vessels	1,211	1,244	1,278
AAEQ Value of Recreation at Homer Harbor (rounded)	**$7,196,000**	**$9,231,000**	**$12,183,000**

(Focus Group, October 2024)

C.6.4.2 *Fishing Charters*

In a FWOP, point values for the UDV criteria are expected to remain the same, however overall recreation value is expected to increase as the charter fleet increases. Passengers per charter and trips per vessel per season are expected to remain the same. Charter operators stated that charters are generally full and that even if there were more charter vessels in the harbor, they did not expect it would decrease their business. Points and values associated with fishing charter recreation are shown in Table 57.

Table 57: Value of FWOP Fishing Charter Recreation

	Low	Expected	High
Total Points	46	67	89
Specialized Fishing UDV	$43.17	$51.13	$59.56
Clients per charter	3	7	23
Trips per vessel per season	114	114	114
Active Charter Vessels	151	151	166
Annual Value of Fishing Charter Recreation	**$2,228,000**	**$6,160,000**	**$25,956,000**

(Port User Survey April 2024, Focus Group October 2024)

C.6.5 Delay Costs Experienced by Users

In the FWOP condition, rafting, and therefore delays associated with it, are expected to continue. As the fleet increases, more vessels will have to use transient moorage because no additional reserve moorage will be created. Increased use of transient moorage will lead to increased rafting. Because the fleet is expected to increase and because no changes to the location of the fuel dock are expected to occur, delays associated with fueling are also expected to continue and to increase. Because no changes to the size or layout of the harbor mouth are expected in the FWOP condition, and because the large vessel fleet is expected to increase, delays to large vessels entering the harbor are expected to continue and to increase. The costs associated with these delays were discussed by harbor user groups and are shown in Table 58 through Table 62.

Table 58: FWOP Cost of Rafting Delays to Fishing Charters

	Low	Expected	High
Rafting delays per vessel per year	18.8	18.8	18.8
Hourly net operating cost	$71	$149	$259
Vessels Rafting	52	60	67
Annual Fishing Charter Rafting Delay Costs	**$70,000**	**$167,000**	**$325,000**

(Focus groups October 2024)

Table 59: FWOP Costs of Rafting Delays to Water Taxis

	Low	Expected	High
Time required per raft (hrs.)	0.17	0.21	0.25
Delays per vessel per year	350	350	350
Annual delay hours per vessel	**58**	**73**	**88**
Hourly net operating income	$147	$205	$598
Vessels Rafting	16	17	18
Annual Cost of Commercial Passenger Rafting	**$132,000**	**$252,000**	**$933,000**

(Focus groups October 2024)

Table 60: FWOP Costs of Rafting Delays to Commercial Fishing Vessels

	Low	Expected	High
Time per vessel moved (hrs.)	1	1.5	2
Moves per season	30	30	30
Hours per vessel per season	**30**	**45**	**60**
Hourly net operating costs (rounded)	$325	$328	$331
Vessels Rafting	587	592	598
Annual Commercial Fishing Rafting Delay Costs	**$5,714,000**	**$8,747,000**	**$11,902,000**

(Focus groups October 2024)

Table 61: FWOP Costs of Fueling Delays to Water Taxis

	Low	Expected	High
Delay per fueling (hrs.)	0.17	0.33	0.5
Events per week at peak season	1	1.5	2
Weeks of peak season	16	16	16
Delays per vessel per year (hrs.)	**3**	**8**	**16**
Hourly net operating income	$147	$205	$598
Vessels Experiencing Delays	33	39	40
Annual Costs of Fueling Delays	**$15,000**	**$64,000**	**$381,000**

(Focus groups October 2024)

Table 62: FWOP Costs of Delays to System 5 Vessels

	Low	Expected	High
Rafting Delay Cost			
Time rafting (hrs.)	1	2	3
Events per year	6	29	52
Weighted Value of an Hour	$618	$651	$687
Delays Entering Harbor			
Entrance transits per year	52	52	52
Delay per transit (hrs.)	0.5	1	1.5
Delays per vessel per year (hrs.)	26	52	78
Weighted Value of an Hour	$615	$651	$687
Annual Delay Costs for the System 5 Fleet	**$1,287,000**	**$4,842,000**	**$11,369,000**

(Focus groups October 2024)

C.6.6 Rafted Fuel Consumption

In FWOP, rafting conditions are expected to continue, meaning that rafted vessels will continue to need to run generators while moored when they are unable to access shore power. Similarly, vessels moored at the Deep Water Dock because they are unable to enter the harbor will continue to run generators. Costs associated with FWOP rafted fuel consumption are shown in Table 63.

Table 63: FWOP Rafted Fuel Consumption Costs

User Group	Low	Expected	High
System 5	$183,000	$247,000	$535,000
Small Vessels	$452,000	$914,000	$4,004,000
Deep Water Dock	$8,500	$15,000	$23,000
Annual Rafted Fuel Costs	**$644,000**	**$1,177,000**	**$4,563,000**

(Focus Groups October 2024)

C.6.7 Vessel Damages

Data provided by the port was used to estimate annual damages per vessel associated with rafting and crowding conditions. This analysis makes the conservative assumption that damage rates per vessel will not increase in the FWOP, however overall total annual damages will increase as the fleet increases. Estimated increases in the active fleet and corresponding estimated total annual damages are shown in Table 64.

Table 64: FWOP Annual Vessel Damages

	Low	Expected	High
Damages per Vessel per Year	$265	$315	$365
Vessels	2,169	2,219	2,271
Annual Damages (rounded)	**$575,000**	**$699,000**	**$829,000**

(Data sourced from the Homer Port User Survey, April 2024)

C.6.8 Coast Guard

Coast Guard representatives state that there is no discussion of reassigning the *Aspen* and it can be expected that it will continue operating from Homer throughout the period of analysis.

C.6.8.1 *Wind-Driven Weather Delays*

In a FWOP condition, it is expected that there will continue to be 2–3 instances per year when wind conditions prevent *Aspen* from mooring up in the berth outside the harbor, resulting in delays while the vessel waits for wind conditions to change.

The annual expected cost for these delays is $10,000 as discussed in Section C.5.1.2 and is expected to continue throughout the period of analysis.

C.6.8.2 *Dredging*

In a FWOP, it is expected that dredging costs to maintain *Aspen*'s berth at the Pioneer Dock will continue at the rate of $258,000 annually.

C.6.8.3 *Fast Response Cutters (FRCs)*

Coast Guard representatives stated in an interview that, within the next two years, six Fast Response Cutters (FRCs) will be stationed in communities around Homer. While these vessels are not expected to be stationed at Homer, it is expected that approximately one FRC per month will call at the harbor for crew changes and to resupply. The FRCs are 154 feet long and would likely be unable to enter the harbor. These vessels are also too shallow to safely moor to the Pioneer or Deep Water Docks, which are fixed height docks. In a previous instance when an FRC came to Homer to resupply, it was unable to moor directly to the Pioneer Dock because the difference in height between the vessel and the dock put too much strain on the mooring lines, and the FRC had to moor to the *Aspen.* This means that under a FWOP, FRCs would have to plan stops at Homer to coincide with times when the *Aspen* is in port.

C.6.9 Harbor Staff Time

This benefit category was initially considered for inclusion in the NED benefit account. However, it was determined that while staff time spent on tasks such as managing vessels is likely to be reduced, this time would most likely be reassigned to other tasks. Because no actual reduction in employee costs to the harbor can be demonstrated, this benefit category is not included in the NED account. However, as the need to devote significant staff time to vessel management is of concern to Harbor staff, and eliminating this task is likely to be perceived as an improvement by said staff, this appendix includes it in discussion here.

In the FWOP it is expected that staff will continue to be called upon to assist with rafting. Harbor staff will also continue to be called upon to assist large vessels entering the harbor. Annual costs of harbor staff time under existing conditions are held static in the FWOP. These costs are shown in Table 65.

Table 65: Annual Harbor Staff Time Costs

	Low	Expected	High
Entrance Assists	$2,300	$2,500	$2,800
Vessel Reorganizations	$22,000	$27,000	$31,000
General Management	$20,000	$22,000	$25,000

(Harbormaster interview October 2024)

C.6.10 Safety Concerns Related to Rafting

In general, safety concerns related to rafting are expected to continue in a FWOP. Rafting conditions are expected to worsen as the fleet increases. Harbor staff have stated that they do not currently have a way of limiting the number of vessels utilizing transient moorage and as such there is effectively no hard limit on how much crowding can increase. As rafting worsens, delays and vessel damages associated with it are also expected to increase.

C.6.10.1 *Vessels under 85 feet*

As the transient fleet increases, the frequency of vessels rafting four or five abreast is expected to increase, meaning that vessel crew and passengers will have more vessels to cross in order to reach their own vessel. As vessels raft further out at especially busy times, the fairway will be reduced further, increasing risks not only to transient vessels, but also to vessels with reserve moorage that must navigate increasingly narrow traffic lanes. Similarly, the risk of fire spreading from vessel to vessel increases the more densely packed vessels are, and the more their mobility is reduced.

C.6.10.2 *Vessels over 85 feet*

Vessels over 85 feet long, all of which must utilize System 5, are also expected to increase in number in the FWOP, as discussed in Section C.6.3.2. While the harbor is not able to meet existing demand for System 5 moorage and turns away vessels each year, they do make an effort to accommodate captains who are familiar with Homer and better able to integrate into its delicate cooperative rafting system, resulting in slight increases overtime.

As the large vessel fleet increases, all of the safety concerns which increase for smaller vessels also increase for the vessels using System 5, with the partial exception of narrow fairways. System 5 vessels do not raft directly adjacent to the fairways between floats, however they do raft between the areas of the harbor used by smaller vessels and the harbor entrance. This means that as rafting on System 5 worsens, traffic in and out of the harbor may be impacted.

C.6.11 Summary of Future Without-Project

In general, in a FWOP condition, demand for reserve moorage is expected to grow, but more slowly over time as the waitlist becomes longer and prospective users become more discouraged by long wait times. While waiting for reserve moorage to become available, a portion of waitlisted users will use transient moorage. This will increase crowding. As more vessels utilize transient moorage, rafting will worsen, as will delays and vessel damages. Recreational values for recreation and fishing charter users will increase as more of these vessels join the fleet. The Coast Guard vessel *Aspen* will continue to experience wind delays, and *Aspen's* berth on the Pioneer Dock will continue to be dredged annually.

C.7 Future With Project

C.7.1 Introduction

The Future With Project (FWP) assesses what is expected to happen over a 50-year period of analysis if a project is constructed. Alternative project plans are designed and evaluated, and the outcomes of each plan are compared with the FWOP condition. The difference between the FWOP and the FWP for a given alternative is the benefit of that alternative. As with the FWOP, costs and benefits are discounted using the FY26 discount rate of 3.25%.

Per ER1105-2-103, the benefits of each alternative are evaluated according to four accounts: the National Economic Development (NED) account, the Regional Economic Development (RED) account, the Environmental Quality (EQ) account, and the Other Social Effects (OSE) account.

C.7.2 Assumptions Made in the FWP

The following assumptions were made in forecasting the FWP:

- Waitlist growth will continue at the average of the recent and long-term historical rates between now and the beginning of the period of analysis.

- For this analysis, waitlist growth is not projected past 20 years from the year of most recent data (2023).
- Growth in the fleet based on the waitlist mirrors the existing reserve fleet user group distribution by vessel size.
- Under existing conditions, on average, 40% of waitlisted vessels utilize transient moorage. This percentage is assumed to continue in the FWP.

If the rate of growth is faster than projected crowding, vessel delays, and vessel damages will worsen more quickly and/or more severely than expected. Conversely, if growth is slower than projected, crowding, delays, and damages in the FWP will be overestimated in this analysis. If growth in the fleet does not mirror the existing reserve fleet, costs will be over or underestimated for different user groups. If fewer than 40% of waitlisted users utilize transient moorage, delay costs will be overestimated in this analysis, but if more than 40% of waitlisted users utilize transient moorage, delay costs will be underestimated.

C.7.3 Design Vessel

The design vessel for this study is an oil rig tender which, while it treats Homer as a home port, cannot actually enter the harbor due to length and depth concerns. This vessel was used because it is the largest vessel identified in the fleet which would use the harbor in a FWP. This vessel has an LOA of 207 feet, a 40-ft beam and a draft of 19 feet.

C.7.4 Alternatives

For Homer, four alternatives to the FWOP were developed for analysis. All alternatives create a second harbor basin located in the same place, on the northeast side of the Homer Spit adjacent to the existing harbor. Each alternative addresses a different part, or combination of parts, of the fleet, with each successive alternative addressing those parts of the fleet served by the prior alternative, as well as an additional fleet segment.

All alternatives assume that the large vessel fleet (vessels over 85 feet long) will be removed from the existing harbor and will moor in the new harbor. Alternatives which provide moorage for small and medium (under 85 feet) vessels assume that only vessels for which there is insufficient room in the existing harbor will moor in the new harbor.

It should be noted that the float system which is currently used by large vessels is expected to need replacement within approximately 10 years. The NFS has stated the intention, in a FWP, of replacing this float system with reserve moorage sufficient for users on the 24-foot and 32-foot waitlists. As all alternatives include the removal of the large vessels which use this float from the existing harbor, all alternatives also include the addition of reserve moorage for the 24-foot and 32-foot waitlists in the existing harbor. Cost engineering estimates indicate that there was no difference between the cost to replace the existing System 5 float with reserve moorage for smaller vessels in the FWP and the FWOP cost to replace it in kind. As such, there are neither additional costs nor cost savings between the FWOP and the FWP regarding this moorage.

The parts of the Homer fleet served by the various alternatives are shown in Table 66.

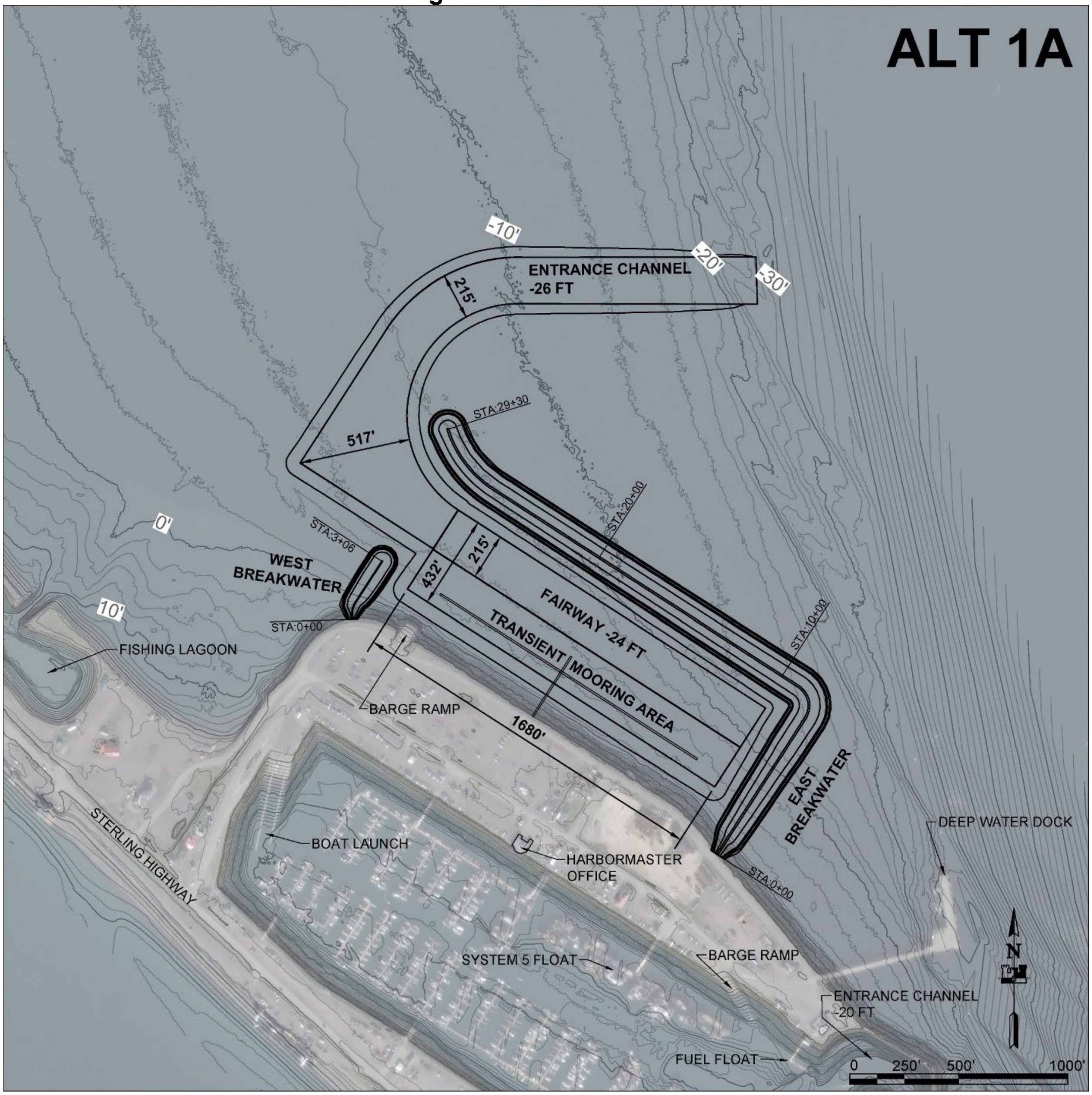
Table 66: Parts of the Homer Fleet Addressed by Each Alternative

Alternative	Users Addressed
Alternative 1a	Provides sufficient transient moorage for large (85'+) vessels, including existing harbor users and vessels that have been turned away due to crowding. Provides moorage for 240 vessels from the 24' and 32' 2023 waitlists in existing harbor.
Alternative 1b	Provides sufficient moorage for vessels served by Alternative 1a as well as sufficient transient moorage for small (under 85') vessels.
Alternative 2	Provides transient moorage for vessels served by Alternative 2 as well as reserve moorage for vessels on the 40', 50', 60', and 75' waitlists.
Alternative 3	Provides moorage for vessels served by Alternative 2 as well as for fleet growth expected over the period of analysis.

C.7.4.1 *Alternative 1a*

Alternative 1a addresses the large vessel fleet which uses float System 5. This alternative creates an 8-acre mooring basin on the northeast side of the existing harbor. 340,00 cubic yards of rubble-mound breakwater provide protection for the basin. Alternative 1a provides moorage sufficient for 64 vessels of the size which utilize the existing System 5. This alternative includes dredging of an entrance channel to a depth of -26 feet Mean Lower Low Water (MLLW) and dredging of the mooring basin to -24 feet MLLW. This alternative assumes that float System 5 in the existing harbor will be removed and replaced with reserve moorage sufficient for the 24-foot and 32-foot waitlists. Alternative 1a is shown in Figure 9.

Figure 9. Alternative 1a

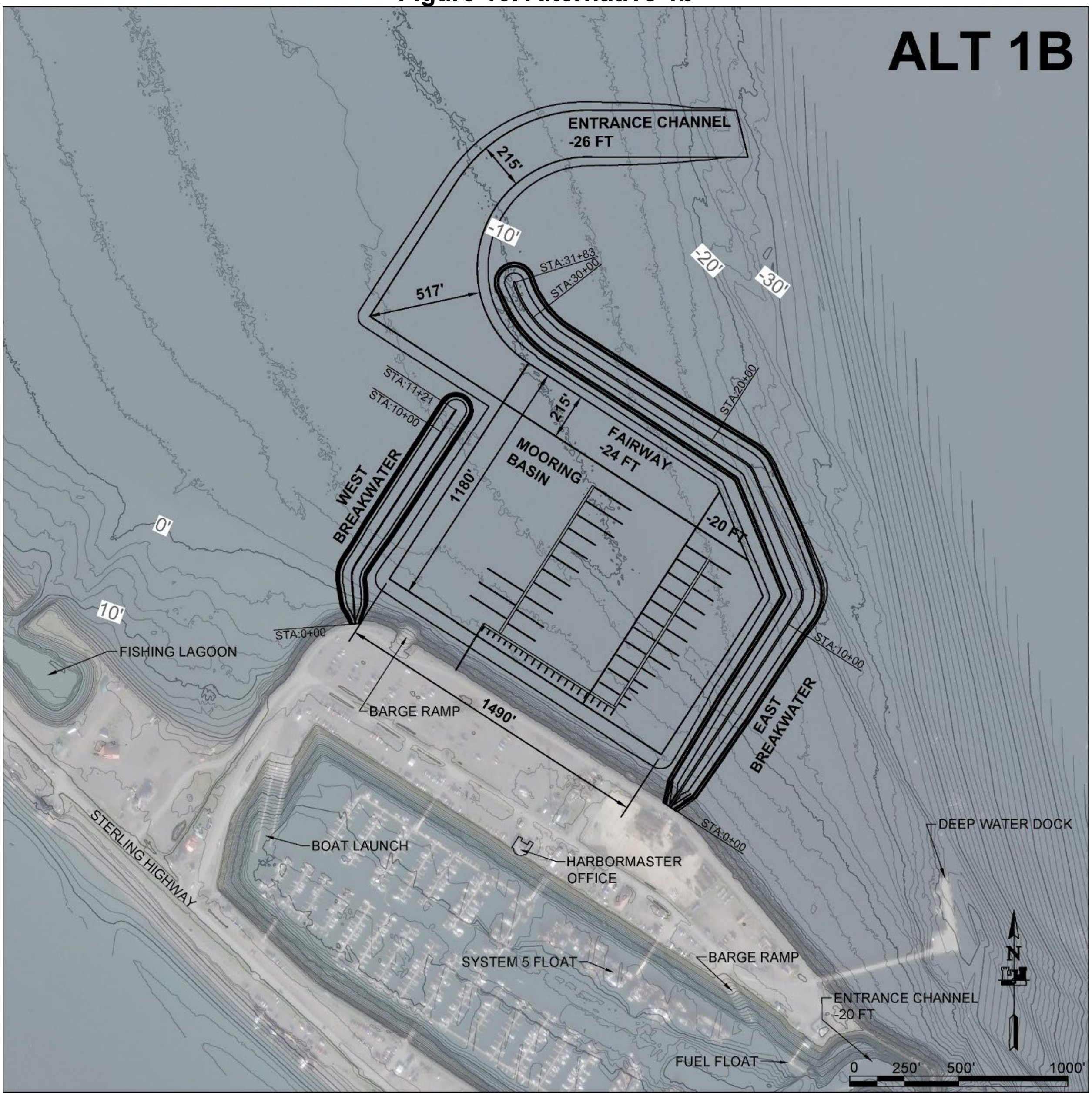


(Image from H&H)

C.7.4.2 *Alternative 1b*

Alternative 1b addresses the transient fleet, including both the large vessels addressed in Alternative 1a and the transient vessels under 85 feet which utilize the existing harbor. This alternative creates a 33-acre mooring basin on the northeast side of the existing harbor. 481,000 cubic yards of rubble-mound breakwater provide protection for the basin. Alternative 1b provides moorage sufficient for 116 vessels, in a combination of slips and side-tie. This alternative includes dredging of an entrance channel to a depth of -26 feet MLLW and dredging of the fairway to -24 feet MLLW. Parts of the moorage basin are dredged to -24 feet MLLW, with areas used by smaller craft dredged to -20 feet MLLW. This alternative assumes that float System 5 in the existing harbor will be removed and replaced with reserve moorage sufficient for the 24-foot and 32-foot waitlists. Alternative 1b is shown in Figure 10.

Figure 10. Alternative 1b

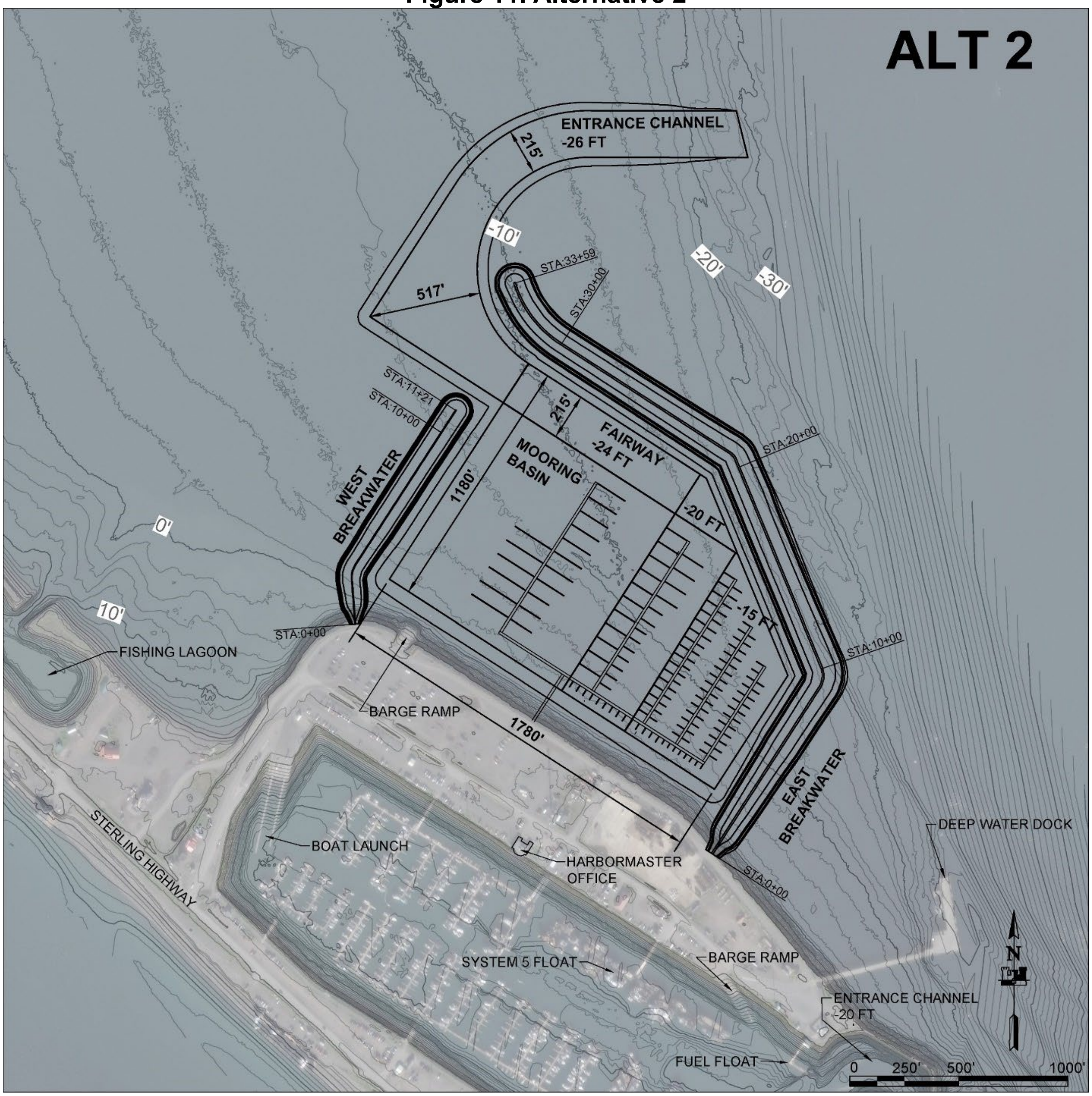


(Image from H&H)

C.7.4.3 *Alternative 2*

Alternative 2 addresses the existing moorage demand, including both the transient vessels addressed in Alternative 1b and the vessels on the existing 40-, 50-, 60-, and 75-foot waitlists. This alternative creates a 37-acre mooring basin on the northeast side of the existing harbor. 500,000 cubic yards of rubble-mound breakwater provide protection for the basin. Alternative 2 provides moorage sufficient for 304 vessels in a combination of slips and side tie. This alternative includes dredging of an entrance channel to a depth of -26 feet MLLW and dredging of the fairway to -24 feet MLLW. Parts of the moorage basin are dredged to -24 feet MLLW, with areas used by smaller craft dredged to -20 feet MLLW and -15 feet MLLW. This alternative assumes that float System 5 in the existing harbor will be removed and replaced with reserve moorage sufficient for the 24-foot and 32-foot waitlists. Alternative 2 is shown in Figure 11.

Figure 11. Alternative 2

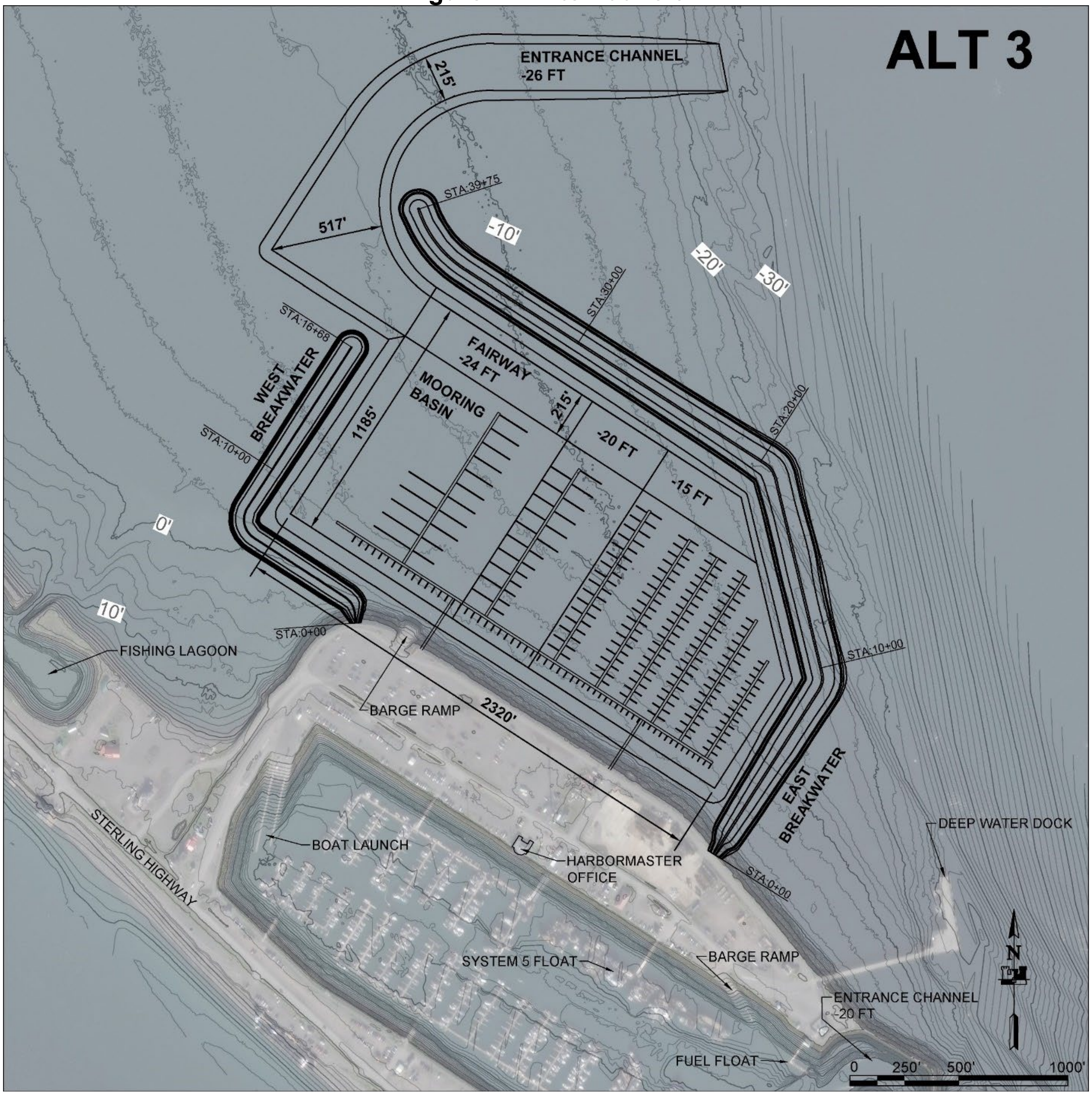


(Image from H&H)

C.7.4.4 *Alternative 3*

Alternative 3 addresses the existing moorage demand, including both the transient and reserve moorage demand addressed in Alternative 2, as well as expected future growth in demand. This alternative creates a 50-acre mooring basin on the northeast side of the existing harbor. 615,000 cubic yards of rubble-mound breakwater provide protection for the basin. Alternative 3 provides moorage sufficient for 779 vessels in a combination of slips and side tie. This alternative includes dredging of an entrance channel to a depth of -26 feet MLLW and dredging of the fairway to -24 feet MLLW. Parts of the moorage basin are dredged to -24 feet MLLW, with areas used by smaller craft dredged to -20 feet MLLW and -15 feet MLLW. This alternative assumes that float System 5 in the existing harbor will be removed and replaced with reserve moorage sufficient for the 24-foot and 32-foot waitlists. Alternative 3 is shown in Figure 12.

Figure 12. Alternative 3



(Image from H&H)

C.7.4.5 *Alternative Costs*

The USACE Alaska district cost engineers developed Rough Order of Magnitude (ROM) cost estimates for the alternatives, including construction and maintenance costs. The Cost Engineering Appendix D details the procedures and assumptions used to calculate these estimates. Cost risk contingencies were included to account for uncertainty. Project costs are in FY2026 dollars.

Preconstruction Engineering and Design (PED) is expected to occur over a 36-month period. Construction is expected to occur over 3 years consisting of 3 constructions seasons of 4 months each, with construction complete by the end of calendar year 2033. These assumptions inform the interest during construction calculations.

ER 1105-2-100 defines interest during construction (IDC) as “the opportunity cost of capital incurred during the construction period.” It is not considered a financial cost but is an NED cost.

Operations, Maintenance, Repair, Rehabilitation and Replacement (OMRR&R) costs were developed by Cost Engineering according to maintenance intervals determined by Hydraulics and Hydrology. OMRR&R for all alternatives is composed of rock replacement and maintenance dredging costs. Maintenance dredging consists of three components: mobilization and demobilization, a dredge survey, and dredging. This addresses the buildup of sediment over time and ensures that deep draft vessels are still able to access the harbor. Breakwater armor rock wears down over time, requiring periodic replacement.

Costs are discounted to a base year and annualized to allow comparison with average annual benefits. Costs used in the benefit-cost analysis, also called NED costs or economic costs, differ slightly from those detailed in the Cost Engineering Appendix as NED costs include initial construction costs, interest during construction, and OMRR&R costs. The economic costs of each alternative are shown in Table 67.

Table 67: Economic Cost Summary by Alternative

Cost Component	Alt 1a	Alt 1b	Alt 2	Alt 3
Project First Costs	$303,204,000	$389,404,000	$402,124,000	$478,014,000
LSF	$23,844,000	$72,181,000	$89,952,000	$125,218,000
IDC	$16,931,000	$23,591,000	$25,101,000	$30,604,000
OMRR&R	$86,251,000	$87,009,000	$86,246,000	$86,546,000
Total Economic Cost	**$430,230,000**	**$572,185,000**	**$603,423,000**	**$720,382,000**
AAEQ Economic Cost	**$17,523,000**	**$23,305,000**	**$24,578,000**	**$29,341,000**

(Cost Engineering Cost Estimate, May 2026)

C.7.5 National Economic Development

The National Economic Development (NED) account assesses changes in the economic value of the national output of goods and services. To account for uncertainty, low, expected and high scenarios were evaluated for each benefit category for each alternative.

C.7.5.1 *Fleet Growth and Moorage Demand*

C.7.5.1.1 Growth in Reserve Moorage Demand

Projected growth in reserve moorage demand in the FWP is also based on HDR's waitlist analysis discussed in Section C.6.3, however, where the FWOP makes the assumption that growth in demand will slow over time, the FWP assumes that it will continue at a steady rate. Like the FWOP, demand growth is not projected beyond 20 years from the year of most recent data (2023).

In the FWP, the "low" growth scenario assumes that the trend seen in growth of Homer's waitlist over the last 5 years will continue, for an increase in reserve moorage demand of 300 vessels over 20 years. The high scenario for the FWP assumes that the waitlist will continue to grow along the high projection provided in the HDR analysis, an increase of 500 vessels over the next 20 years. The expected scenario used in this analysis assumes growth in reserve moorage demand of 400 vessels over the next 20 years, the midpoint of these two projections. Because these projections are based on growth in the waitlist, this demand is met or partially met by some alternatives and is unmet by others.

Based on the HDR report, it is estimated that 50% of the growth in demand over 20 years will be for 32-foot slips, 20% of growth in demand will be for 24-foot slips, 20% for 40-foot slips and 10% for 50-foot slips. Low, expected, and high projections of reserve moorage demand growth are shown in Table 68.

C.7.5.1.2 Boat Launch Users

As discussed in Section C.5.3.3, 41 users of the Homer boat launch can be identified who did not purchase reserve or transient moorage in 2023, but who purchased season passes for the boat launch, and who have client accounts with the harbor. As client accounts are necessary for purchasing moorage but are not necessary for purchasing boat launch passes, this suggests that these users have purchased moorage previously. It is reasonable to assume that, if moorage became more available, users who had purchased moorage previously would be interested in purchasing it again.

In the FWP condition, the low fleet growth scenario assumes these users continue to use the boat launch and do not contribute to moorage demand. In the expected and high fleet growth scenarios these users are expected to contribute demand for moorage.

C.7.5.1.3 Relocations

As discussed in Section C.5.3.3, there are 113 vessel owners registered with the CFEC who are Homer residents whose vessels are homeported outside Homer and who did not purchase moorage in 2023. It is reasonable to assume vessel owners would prefer to keep their vessels where they can more easily be accessed and used. As such it, it follows that these users would transfer their vessels to Homer if there were moorage available. Similarly, the CFEC identifies 16 Alaska residents who live closer to Homer than they do to their vessels current homeport. These people could save time accessing their vessels if they were homeported in Homer. These vessel counts were checked against the waitlist to avoid double-counting.

This analysis assumes that in a low fleet growth scenario, these users will not choose to relocate their vessels from their current homeports. The expected scenario assumes that the Homer residents will want to relocate their vessels to Homer in a FWP, and the high growth scenario assumes that both the Homer residents and the Alaska residents from outside Homer will want to relocate their vessels to Homer in a FWP.

C.7.5.1.4 <u>Increase in Large Vessel Moorage Demand</u>

Reserve moorage is not available at Homer Harbor for vessels over 85' long. Transient moorage is available at daily, monthly, semi-annual, and annual rates. While overall purchases of moorage for large vessels have not shown a trend in recent years, there has been an increase in sales of annual transient moorage of 60% between 2019 and 2023. Because large vessels do not have access to reserve moorage, annual transient moorage is the closest available substitute. This analysis treats annual transient moorage sales for large vessels as a proxy for reserve moorage demand. If the trend in annual transient moorage sales continues, this will be an increase of 14 vessels over 20 years.

Low, expected, and high estimates of fleet growth in the FWP are shown in Table 68.

Table 68: Fleet Growth in the Future With Project

Vessel/Slip Size	Low	Expected	High
Waitlist			
24'	60	80	100
32'	150	200	250
40'	60	80	100
50'	30	40	50
Total Waitlist Growth	*300*	*400*	*500*
Discouraged Users	N/A	41	41
Relocations	N/A	113	183
Large Vessels	14	14	14
Total Fleet Growth	**314**	**568**	**738**

(Data received from port July 2024, HDR Fleet Demand Analysis report)

C.7.5.2 *Recreation*

C.7.5.2.1 <u>Recreational Vessels</u>

Low, expected and high estimates of growth in reserve moorage demand for recreational vessels are shown in Table 69.

Table 69: FWP Recreational Waitlist Growth

Slip Size	Waitlist Growth (low/expected/high)	Recreation as % of Slip Category	Low	Expected	High
24’	(60/80/100)	90%	54	72	90
32’	(150/200/250)	75%	113	150	188
40’	(60/80/100)	46%	28	37	46
50’	(30/40/50)	15%	5	6	8
Total Recreational Demand Growth			200	265	332
Total Increase in Active Fleet			67	88	111

(Data received from port July 2024, HDR Fleet Demand Analysis report)

Focus group participants were asked if and how they expected the point values assigned to the UDV criteria to change if a project is constructed. The changes in point value estimates for UDV criteria in a FWP are shown in Table 70. In general, carrying capacity and accessibility were expected to improve if a new project were constructed, while availability of opportunity and environmental quality were expected to remain the same. Recreational experience was expected to worsen slightly as users increased, however to a lesser extent than expected in a FWOP. This resulted in slight increases in total points and dollar estimations of the value of a person-day of recreation. UDVs and recreation benefit inputs are shown in Table 71. Benefits to the recreational fleet are shown in Table 72. Expected AAEQ benefits are shown by alternative in Table 73.

Table 70: Unit Day Value Points for the FWP Recreation

	Min.	Ave.	Max.
Recreational Experience	12	25	30
Availability of Opportunity	15	16	18
Carrying Capacity	5	7	10
Accessibility	11	14	16
Environmental Quality	10	14	20
Total Points	**53**	**76**	**94**

(Focus group conducted October 2024; EGM 26-03)

Table 71: UDV Dollar Values and Recreation Benefit Inputs

	Min.	Ave.	Max.
Points	53	76	94
Ave. Specialized Recreation UDV	$39.57	$50.68	$60.29
Trips per Vessel per Year	43.8	43.8	43.8
Passengers per Vessel per Trip	3.77	3.77	3.77

(Focus group conducted October 2024; EGM 26-03)

Table 72: Range of Recreation Benefits by Alternative

	Low	Expected	High
Alternative 1a	$1,633,000	$2,303,000	$1,821,000
Alternative 1b	$1,637,000	$2,312,000	$1,832,000
Alternative 2	$1,794,000	$2,513,000	$2,071,000
Alternative 3	$2,513,000	$4,084,000	$3,940,000

(Single-use SBH Model)

Table 73: FWP Expected Value of Recreation at Homer Harbor

	Alt 1a	Alt 1b	Alt 2	Alt 3
AAEQ Recreation Vessel Benefits	$2,303,000	$2,312,000	$2,513,000	$4,084,000

(Focus group conducted October 2024; EGM 26-03)

C.7.5.2.2 Fishing Charter Recreation

When focus groups were conducted in October of 2024, alternative designs were not yet sufficiently developed to show to participants for individual scoring. In order to estimate UDV change in the FWP condition, participants were asked how a given change, such as reduction in vessel crowding, would alter the point values they assigned to the UDV criteria. As such, the same UDVs are used across alternatives, and difference in charter recreation benefits come from the number of charter vessels impacted by the alternative and from increased charter traffic.

In a FWP, point values for the UDV criteria recreational experience, carrying capacity, accessibility, and environmental quality were expected to increase, while availability of opportunity was expected to remain the same. Passengers per charter and trips per vessel per season are expected to remain the same, however the number of charters operating is expected to increase with reserve moorage demand growth. Charter operators stated that charters are generally full and that even if there were more charter vessels in the harbor, they did not expect it would decrease their business. Low, expected, and high point estimates, specialized fishing UDVs and other benefit input values are shown in Table 74. Low, expected and high estimates of recreation benefits for fishing charters are shown in Table 75. AAEQ expected fishing charter recreation benefits are summarized in Table 76.

Table 74: FWP Fishing Charter Recreation Benefit Inputs

	Low	Expected	High
Total Points	53	76	94
Specialized Fishing UDV	$46.17	$54.42	$61.29
Clients per charter	3	6.7	23
Trips per vessel per season	114	114	114
Fishing Charter Recreation Value per Vessel per Season	$16,000	$42,000	$161,000

(Focus group conducted October 2024; EGM 26-03, Port User Survey, April 2024)

Table 75: Range of Fishing Charter Recreation Benefits

	Low	Expected	High
Alternative 1a	$537,000	$1,335,000	$4,007,000
Alternative 1b	$543,000	$1,366,000	$4,126,000
Alternative 2	$846,000	$2,178,000	$7,388,000
Alternative 3	$1,242,000	$3,559,000	$12,735,000

(Single-use SBH Model)

Table 76:Expected Value of FWP Fishing Charter Recreation

	Alt 1a	Alt 1b	Alt 2	Alt 3
AAEQ Fishing Charter Recreation Benefits	$1,335,000	$1,366,000	$2,178,000	$3,559,000

(Port User Survey April 2024, Focus Group October 2024)

C.7.5.3 *Delays Experienced by Users*

In the FWP condition, rafting conditions, and therefore delays associated with them, are expected to be reduced to varying degrees by each alternative. Because alternatives each address different components of the Homer fleet, and because demand for moorage in Homer is expected to increase in the FWP, net delay costs are expected to increase for some user groups under some alternatives.

Because vessels utilizing a new harbor will be able to access fuel there, delays associated with fueling are expected to continue and to decrease. Because the large vessel fleet is expected to utilize the new harbor, which will have an entrance large enough to accommodate them without assistance from harbor staff, delays to large vessels entering the harbor are expected be reduced. The following sections offer additional detail by harbor user group.

C.7.5.3.1 Avoided Rafting Delays for Fishing Charter Users

The fishing charter fleet is expected to increase over the period of analysis more quickly than in the FWOP. Based on current fleet behavior, approximately 40% of waitlisted charter vessels are expected to use transient moorage while waiting for a slip. This analysis assumes that delays experienced per vessel will remain constant. Alternative 1b alleviates rafting delays to existing transient fishing charter vessels. Alternative 2 creates space for additional charter operations for currently waitlisted vessels, and Alternative 3 creates sufficient space that as the fleet grows, crowding and associated delays do not return. Low, expected, and high estimates of benefits associated with avoided rafting costs are shown in Table 77. AAEQ expected avoided rafting costs to fishing charters are summarized by alternative in Table 78

Table 77: Range of Avoided Delay Costs to Fishing Charters

	Low	Expected	High
Alternative 1a	$7,000	$18,000	$37,000
Alternative 1b	$11,000	$24,000	$42,000
Alternative 2	$45,000	$93,000	$160,000
Alternative 3	$70,000	$164,000	$278,000

(Single-use SBH Model)

Table 78. FWP Expected Avoided Cost of Rafting Delays to Fishing Charters

	Alt 1a	Alt 1b	Alt 2	Alt 3
AAEQ Avoided Rafting Delay Costs to the Fishing Charter Fleet	$18,000	$24,000	$93,000	$164,000

(Focus groups October 2024)

C.7.5.3.2 Avoided Rafting Delays for Water Taxi Users

The water taxi fleet is expected to increase over the period of analysis more quickly than in the FWOP. Based on current fleet behavior, approximately 40% of waitlisted charter vessels are expected to use transient moorage while waiting for a slip. This analysis assumes that delays experienced per vessel will remain constant. Alternative 1b alleviates rafting delays to existing transient water taxi vessels. Alternative 2 creates space for additional taxi operations for currently waitlisted vessels, and Alternative 3 creates sufficient space that as the fleet grows, crowding and associated delays do not return. Low, expected and high estimates of benefits associated with avoided rafting costs are shown in Table 79. AAEQ expected benefits are summarized by alternative in Table 80.

Table 79. Range of Avoided Rafting Delay Costs for Water Taxis

	Low	Expected	High
Alternative 1a	$11,000	$21,000	$81,000
Alternative 1b	$80,000	$141,000	$499,000
Alternative 2	$109,000	$191,000	$671,000
Alternative 3	$132,000	$249,000	$871,000

(Single-use SBH Model)

Table 80. FWP Avoided Costs of Rafting Delays to Water Taxis

	Alt 1a	Alt 1b	Alt 2	Alt 3
AAEQ Avoided Rafting Delay Costs to the Water Taxi Fleet	$21,000	$141,000	$191,000	$249,000

(Focus groups October 2024)

C.7.5.3.3 Avoided Fueling Delays for Water Taxi Users

Because Alternative 1a does not create additional transient moorage for vessels under 85 feet, small vessels will continue to use the existing harbor in this alternative and crowding conditions experienced by small vessels, including the water taxi fleet, will worsen. Because the fleet is projected to grow faster in the FWP than in the FWOP, crowding of small vessel transient moorage is expected to be more severe than in the FWOP. This analysis assumes that fuel delays experienced per vessel will remain constant. Alternative 1b creates additional room in the new harbor for small transient vessels, reducing the vessel crowding in the existing harbor. Alternative 2 creates space for additional taxi operations for currently waitlisted vessels, and Alternative 3 creates sufficient space that as the fleet grows, crowding and associated delays do not return. Low, expected and high estimates of benefits associated with avoided fueling costs are shown in Table 81. AAEQ expected benefits are summarized by alternative in Table 82.

Table 81: Range of Avoided Fueling Costs for Water Taxis

	Low	Expected	High
Alternative 1a	($2,000)	($9,000)	($49,000)
Alternative 1b	$13,000	$52,000	$315,000
Alternative 2	$14,000	$57,000	$342,000
Alternative 3	$15,000	$64,000	$372,000

(Single-use SBH Model)

Table 82: FWP Avoided Cost of Fueling Delays to Water Taxis

	Alt 1a	Alt 1b	Alt 2	Alt 3
AAEQ Avoided Fueling Delay Costs to the Water Taxi Fleet	($9,000)	$52,000	$57,000	$64,000

(Focus groups October 2024)

C.7.5.3.4 Avoided Delays for Large Vessels

All alternatives create harbors sufficient to alleviate rafting delays experienced by large vessels. Additionally, harbor entrances in all alternatives create sufficient space to alleviate delays entering the harbor. These delays include time spent by vessel captains organizing vessel moves. Low, expected and high estimates of avoided costs are shown in Table 83. AAEQ expected benefits are summarized by alternative in Table 84.

Table 83: Range of Avoided Delays for Large Vessels

	Low	Expected	High
Alternative 1a	$1,020,000	$3,842,000	$9,036,000
Alternative 1b	$1,020,000	$3,842,000	$9,036,000
Alternative 2	$1,020,000	$3,842,000	$9,036,000
Alternative 3	$1,287,000	$4,800,000	$11,180,000

(Single-use SBH Model)

Table 84: FWP Avoided Costs of Delays for Large Vessels

	Alt 1a	Alt 1b	Alt 2	Alt 3
AAEQ Avoided Rafting Delay Costs to Large Vessel Fleet	$3,842,000	$3,842,000	$3,842,000	$4,800,000

(Focus groups October 2024)

C.7.5.3.5 Avoided Rafting Delays for Commercial Fishing Vessels

This benefit category assesses avoided delays to commercial fishing vessels too small to use large vessel moorage. Costs of delays for large commercial vessels are considered together with those of other large vessels.

The commercial fishing fleet is expected to increase over the period of analysis. Alternative 1a does not create additional moorage for vessels under 85 feet, meaning that delays will be experienced by additional vessels. This analysis assumes that delays experienced per vessel will remain constant. Alternative 1b alleviates rafting delays to existing transient commercial fishing vessels. Alternative 2 creates space for currently waitlisted commercial fishing vessels, and Alternative 3 creates sufficient space that as the fleet grows, crowding and associated delays do not return. Low, expected and high estimates of benefits associated with avoided rafting costs are shown in Table 85. AAEQ expected benefits are summarized by alternative in Table 86.

Table 85: Range of Avoided Delays to Commercial Fishing Vessels

	Low	Expected	High
Alternative 1a	($3,000)	($5,000)	($4,000)
Alternative 1b	$5,131,000	$7,791,000	$10,516,000
Alternative 2	$5,549,000	$8,460,000	$11,326,000
Alternative 3	$5,714,000	$8,738,000	$11,771,000

(Single-use SBH Model)

Table 86. FWP Avoided Cost of Rafting Delays for Commercial Fishing Vessels

	Alt 1a	Alt 1b	Alt 2	Alt 3
AAEQ Avoided Rafting Delay Costs to the Commercial Fishing Fleet	($5,000)	$7,791,000	$8,460,000	$8,738,000

(Focus groups October 2024)

C.7.5.4 *Rafted Fuel Consumption*

In the FWP, rafting conditions are expected to be reduced, meaning that fewer vessels will need to run generators while moored when they are unable to access shore power.

All alternatives create harbors with entrance channels which can be navigated by vessels of the size that have to use the Deep Water Dock as moorage under existing conditions. In the FWP, these vessels will be able to moor in the harbor and so will not have to continuously run generators. Low, expected and high estimates of avoided fuel costs for rafting vessels are shown in Table 87. AAEQ expected benefits are summarized by alternative in Table 88.

Table 87. Range of Avoided Fuel Cost Benefits

	Low	Expected	High
Alternative 1a	$192,000	$262,000	$558,000
Alternative 1b	$644,000	$933,000	$3,843,000
Alternative 2	$644,000	$933,000	$3,843,000
Alternative 3	$644,000	$933,000	$3,843,000

(Single-use SBH Model)

Table 88. FWP Avoided Costs of Rafted Fuel Consumption

	Alt 1a	Alt 1b	Alt 2	Alt 3
AAEQ Avoided Fuel Cost Benefits	$262,000	$933,000	$933,000	$933,000

(Focus Groups October 2024)

C.7.5.5 *Vessel Damages*

Data provided by the port and by focus group participants was used to estimate annual damages per vessel associated with rafting and crowding conditions. This analysis makes the conservative assumption that damage rates per vessel will not increase in the FWP, however overall total annual damages will vary by FWP alternative.

Alternative 1a reduces damages to large transient vessels by alleviating rafting conditions for those vessels, however as the number of small vessels utilizing the existing harbor continues to grow, these additional vessels are exposed to the crowding conditions that Alternative 1a does not address. In the case of Alternative 1a, fleet expansion outpaces damages alleviated for large vessels, resulting in negative benefits.

Alternative 1b provides sufficient transient moorage to alleviate rafting conditions for both large and small transient vessels, alleviating vessel damages associated with these conditions.

Alternatives 1b and 2 are both formulated to existing demand—either transient or transient and existing unmet demand for reserve moorage. As such, some crowding is expected to return over time as moorage demand grows. Alternative 3 reports the highest benefits for this category because it alleviates crowding and the vessel damages connected with it for future projected fleet growth as well as existing demand. Low, expected and high estimates of vessel damages avoided are shown in Table 89. AAEQ expected benefits are summarized by alternative in Table 90.

Table 89. Range of Avoided Vessel Damages

	Low	Expected	High
Alternative 1a	($43,000)	($47,000)	($50,000)
Alternative 1b	$538,000	$639,000	$742,000
Alternative 2	$536,000	$637,000	$739,000
Alternative 3	$575,000	$697,000	$804,000

(Single-use SBH Model)

Table 90. FWP Avoided Vessel Damages

	Alt 1a	Alt 1b	Alt 2	Alt 3
AAEQ Vessel Damages	($47,000)	$639,000	$637,000	$697,000

(Focus Groups October 2024, Port User Survey April 2024)

C.7.5.6 *Coast Guard*

The Commander of the Coast Guard tender *Aspen* and other Coast Guard representatives were consulted regarding the impacts of a project on *Aspen* and the FRCs which will be stationed in the region during the period of analysis. All alternatives presented in this analysis propose harbors which *Aspen* and the FRCs would be able to enter.

In order for *Aspen* to utilize a new harbor on a regular basis, a dedicated berth would need to be constructed for it, as the vessel has specific technical and security needs that a standard berth would not meet. If *Aspen* were to have a dedicated berth in the FWP condition, maintenance dredging for its current berth on the Pioneer Dock would no longer be needed. However, as Coast Guard representatives have stated that the Coast Guard will be unwilling to contribute to funding this, the assumption has been made that *Aspen* will remain at its current external berth in the FWP.

The FRCs which will be stationed in communities around Homer by 2027 are expected to call at Homer for crew changes and resupply stops at a rate of approximately one vessel per month. These vessels do not require a dedicated berth to use the harbor on this basis and would be able to utilize transient moorage within any of the new harbors proposed in the alternatives.

In a FWP, when wind conditions prevent *Aspen* from mooring up in its external berth on the Pioneer Dock, *Aspen* would be able to moor in the new harbor temporarily until the weather changed, allowing the ship to offload crew for leave and removing the need to continue running a generator, saving fuel. Low, expected and high estimates of these benefits are shown in Table 91. AAEQ expected benefits are summarized by alternative in Table 92.

Table 91. Range of Coast Guard Benefits

	Low	Expected	High
Alternative 1a	$8,000	$10,000	$14,000
Alternative 1b	$8,000	$10,000	$14,000
Alternative 2	$8,000	$10,000	$14,000
Alternative 3	$8,000	$10,000	$14,000

(Single-use SBH Model)

Table 92. Future With Project Coast Guard Benefits

	Alt 1a	Alt 1b	Alt 2	Alt 3
AAEQ Avoided Wind Delay Costs	$10,000	$10,000	$10,000	$10,000

(Interview with Coast Guard, Fall 2024)

C.7.5.7 *Harbor Staff Time*

This benefit category was initially considered for inclusion in the NED benefit account. However, it was determined that while staff time spent on tasks such as managing vessels is likely to be reduced, this time would most likely be reassigned to other tasks. Because no actual reduction in employee costs to the harbor can be demonstrated, this benefit category is not included in the NED account. However, as the need to devote significant staff time to vessel management is of concern to harbor staff, and eliminating this task is likely to be perceived as an improvement by said staff, this appendix includes it in discussion here.

In a FWP it is expected that staff time spent managing rafting and assisting with vessel moves will be reduced. All alternatives provide wider harbor entrances that will reduce or eliminate the need for harbor staff to assist vessels entering the harbor. Because small rafted vessels are generally able to facilitate their own moves, harbor staff time is dominated by assisting large vessels. As such, because all alternatives provide sufficient moorage to alleviate rafting for the large vessel fleet and provide improved harbor access to alleviate the need for assistance entering the harbor, all alternatives reflect the same benefits to harbor staff time saved.

Harbor management has stated that the alleviation of these tasks would allow them to allocate their staff to other tasks, such as patrolling the harbor and parking areas to provide security, performing routine maintenance tasks on harbor infrastructure, and grant-writing activities. As such, it should not be assumed that a reduction in staff time managing rafting would result in a reduction in harbor staff, but in a reallocation of existing staff to other productive activities.

Table 93 shows low, expected, and high estimates of the value of time which harbor staff would be able to reallocate in each alternative. Table 94 shows the expected AAEQ value of harbor staff time which could be reallocated to other tasks in each alternative.

Table 93. Range of Avoided Harbor Staff Costs

	Low	Expected	High
Alternative 1a	$44,000	$52,000	$59,000
Alternative 1b	$44,000	$52,000	$59,000
Alternative 2	$44,000	$52,000	$59,000
Alternative 3	$44,000	$52,000	$59,000

(Single-use SBH Model)

Table 94. Future With Project Harbor Staff Costs Avoided

	Alt 1a	Alt 1b	Alt 2	Alt 3
AAEQ Avoided Harbor Staff Costs	$52,000	$52,000	$52,000	$52,000

(Interview with Harbor Master, October 2024)

C.7.5.8 *NED Summary*

The AAEQ expected NED benefits discussed in the sections above are summarized in Table 95. Low, expected, and high total AAEQ benefits are summarized by alternative in Table 96. The present value of NED benefits is shown by alternative in Table 97.

Table 95. AAEQ NED Benefit Summary by Alternative

	Alt 1a	Alt 1b	Alt 2	Alt 3
Rec User UDV Benefits	$2,303,000	$2,312,000	$2,513,000	$4,084,000
Fishing Charter UDV Benefits	$1,335,000	$1,366,000	$2,178,000	$3,559,000
Fishing Charter Avoided Rafting Delay Benefits	$18,000	$24,000	$93,000	$164,000
Water Taxi Avoided Rafting Delay Benefits	$21,000	$141,000	$191,000	$249,000
Water Taxi Avoided Fueling Delay Benefits	($9,000)	$52,000	$57,000	$64,000

	Alt 1a	Alt 1b	Alt 2	Alt 3
Large Vessel Avoided Rafting Delay Benefits	$3,842,000	$3,842,000	$3,842,000	$4,800,000
Commercial Fishing Avoided Rafting Delay Benefits	($5,000)	$7,7791,000	$8,460,000	$8,738,000
Avoided Fuel Cost Benefits	$262,000	$933,000	$933,000	$933,000
Avoided Vessel Damages	($47,000)	$639,000	$637,000	$697,000
Avoided Coast Guard Wind Delay Costs	$10,000	$10,000	$10,000	$10,000
Total AAEQ NED Benefits	**$7,730,000**	**$17,110,000**	**$18,914,000**	**$23,298,000**

Table 96: Range of AAEQ NED Benefits by Alternative

	Low	Expected	High
Alternative 1a	$3,360,000	$7,730,000	$15,451,000
Alternative 1b	$9,624,000	$17,110,000	$30,953,000
Alternative 2	$10,565,000	$18,914,000	$35,582,000
Alternative 3	$12,200,000	$23,298,000	$45,807,000

(Single-use SBH Model)

Table 97: Present Value Benefits by Alternative

	Alt 1a	Alt 1b	Alt 2	Alt 3
Rec User UDV Benefits	$56,536,000	$56,536,000	$61,694,000	$100,260,000
Fishing Charter UDV Benefits	$32,780,000	$33,533,000	$53,464,000	$87,368,000
Fishing Charter Avoided Rafting Delay Benefits	$453,000	$578,000	$2,294,000	$4,025,000
Water Taxi Avoided Rafting Delay Benefits	$522,000	$3,459,000	$4,680,000	$6,114,000
Water Taxi Avoided Fueling Delay Benefits	$(214,000)	$1,269,000	$1,403,000	$1,560,000
Large Vessel Avoided Rafting Delay Benefits	$94,340,000	$94,340,000	$94,340,000	$117,852,000
Commercial Fishing Avoided Rafting Delay Benefits	$(122,000)	$191,274,000	$207,709,000	$214,540,000
Avoided Fuel Cost Benefits	$6,438,000	$22,909,000	$22,909,000	$22,909,000
Avoided Coast Guard Wind Delay Costs	$256,000	$256,000	$256,000	$256,000

	Alt 1a	Alt 1b	Alt 2	Alt 3
Avoided Vessel Damages	$(1,153,000)	$15,696,000	$15,651,000	$17,123,000
Total Present Value NED Benefits	**$189,836,000**	**$419,850,000**	**$464,400,000**	**$572,007,000**

The average annual equivalent (AAEQ) benefits and costs, and the benefit to cost ratios (BCRs) are shown in Table 98.

Table 98. Average Annual Benefits and Costs Summary

	Alt 1a	Alt 1b	Alt 2	Alt 3
AAEQ Benefits	$7,730,000	$17,110,000	$18,914,000	$23,298,000
AAEQ Costs	$17,523,000	$23,305,000	$24,578,000	$29,341,000
AAEQ Net Benefits	($9,793,000)	($6,195,000)	($5,664,000)	($6,043,000)
BCR	0.44	0.73	0.77	0.79

C.7.5.8.1 Non-Recreation Benefits

ER 1105-2-103, Chapter 8 Section 4(d)states that "Current policy allows for a project that is formulated for other primary purposes and average annual recreation benefits are less than 50 percent of the average annual benefits required for justification (that is, the recreation benefits that are required for justification are less than an amount equal to 50 percent of total project costs)." This guidance indicates that as recreation benefits may be included in the BCR for a navigation project as long as non-recreation benefits reach at least a 0.5 BCR.

While this project is not NED justified, the AAEQ non-recreation net benefits and the non-recreation BCR are included here in Table 99 for comparison and completeness.

Table 99: AAEQ Non-Recreation Benefits

	Alt 1a	Alt 1b	Alt 2	Alt 3
AAEQ Non-Recreation Benefits	$4,092,000	$13,432,000	$14,525,000	$15,655,000
AAEQ Net Non-Recreation Benefits	($13,431,000)	($9,873,000)	($10,053,000)	($13,686,000)
Non-Recreation BCR	0.23	0.58	0.58	0.53

C.7.6 Regional Economic Development

The Reginal Economic Development (RED) account assesses changes in the distribution of regional economic activity. These benefits do not represent an increase in overall productivity or benefits to the nation as NED benefits do, but rather assess the transfer of benefits from one region to another. For this reason, RED benefits do not inform plan selection. However, as they do represent benefits felt by the local community, they are included here for completeness.

This analysis assessed RED benefits with the use of the certified planning model Regional Economic Systems, or RECONS, which was developed by the Institute for Water Research (IWR) to provide estimates of regional impacts associated with Federal expenditures.

Other regional benefits, such as improved reliability of freight shipments from Homer to regional communities, and opportunities for local Homer businesses to expand are considered as part of the Other Social Effects (OSE) benefit account and are discussed in Section C.7.8.4.

C.7.6.1 *RED-Alternative 1a*

C.7.6.1.1 <u>Construction</u>

The expenditures associated with All Work Activities, with Ability to Customize Impact Area and Work Activity at Kenai Peninsula Borough (AK) are estimated to be $327,048,000. Of this total expenditure, $216,589,605 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 expenditure of $327,048,000 support a total of 2,753.6 full-time equivalent jobs, $184,688,892 in labor income, $204,199,568 in the gross regional product, and $343,132,102 in economic output in the local impact area. More broadly, these expenditures support 5,094.7 full-time equivalent jobs, $405,621,790 in labor income, $505,782,592 in the gross regional product, and $873,304,386 in economic output in the nation. RED benefits resulting from construction of Alternative 1a are shown in Table 100.

Table 100: RED Benefits Resulting from Alt 1a Construction

Area	Local Capture	Output	Jobs*	Labor Income	Value Added
Local					
Direct Impact		$216,589,605	2,085.7	$146,070,983	$133,860,408
Secondary Impact		$126,542,497	667.9	$38,617,908	$70,339,161
Total Impact	$216,589,605	$343,132,102	2,753.6	$184,688,892	$204,199,568
State					
Direct Impact		$234,135,895	2,256.9	$189,169,215	$155,944,863
Secondary Impact		$198,068,943	899.5	$63,400,127	$116,630,535
Total Impact	$234,135,895	$432,204,837	3,156.4	$252,569,343	$272,575,399
US					
Direct Impact		$309,979,291	2,849.5	$229,838,437	$201,193,345
Secondary Impact		$563,325,095	2,245.3	$175,783,353	$304,589,247
Total Impact	$309,979,291	$873,304,386	5,094.7	$405,612,790	$505,782,592

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

C.7.6.1.2 Operations & Maintenance

The expenditures associated with All Work Activities, with Ability to Customize Impact Area and Work Activity at the Homer Harbor are estimated to be $3,512,751. Of this total expenditure, $2,271,024 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 of $3,512,751 support a total of 23.3 full-time equivalent jobs, $1,626,418 in labor income, $2,036,219 in the gross regional product, and $3,366,488 in economic output in the local impact area. More broadly, these expenditures support 47.1 full-time equivalent jobs, $3,913,961 in labor income, $5,292,835 in the gross regional product, and $8,973,652 in economic output in the nation. The RED benefits discussed in this section are based on AAEQ OMRR&R costs and as such are AAEQ benefits. The AAEQ RED benefits resulting from Alternative 1a OMRR&R are shown in Table 101.

Table 101: RED Benefits Resulting from Alt 1a Operations & Maintenance

Area	Local Capture	Output	Jobs*	Labor Income	Value Added
Local					
Direct Impact		$2,271,024	17.4	$1,292,246	$1,436,319
Secondary Impact		$1,095,464	6.0	$334,172	$599,900
Total Impact	$2,271,024	$3,366,488	23.3	$1,626,418	$2,036,219
State					
Direct Impact		$2,575,786	19.5	$1,710,012	$1,804,193
Secondary Impact		$1,783,091	8.1	$570,545	$1,060,366
Total Impact	$2,575,786	$4,358,878	27.6	$2,280,557	$2,864,559
US					
Direct Impact		$3,357,944	24.8	$2,146,816	$2,243,198
Secondary Impact		$5,615,708	22.3	$1,767,146	$3,049,636
Total Impact	$3,357,944	$8,973,652	47.1	$3,913,961	$5,292,835

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

C.7.6.2 *RED-Alternative 1b*

C.7.6.2.1 Construction

The expenditures associated with All Work Activities, with Ability to Customize Impact Area and Work Activity at the Homer Harbor are estimated to be $461,547,708. Of this total expenditure, $298,394,621 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 of $461,547,708 support a total of 3,065.9 full-time equivalent jobs, $213,698,520 in labor income, $267,543,134 in the gross regional product, and $442,329,910 in economic output in the local impact area. More broadly, these expenditures support 6,193.5 full-time equivalent jobs, $514,263,581 in labor income, $695,436,619 in the gross regional product, and $1,179,066,907 in economic output in the nation. RED benefits resulting from construction of Alternative 1b are shown in Table 102.

Table 102: RED Benefits Resulting from Alt 1b Construction

Area	Local Capture	Output	Jobs*	Labor Income	Value Added
Local					
Direct Impact		$298,394,621	2,281.5	$169,790,928	$188,721,027
Secondary Impact		$143,935,290	784.3	$43,907,592	$78,822,108
Total Impact	$298,394,621	$442,329,910	3,065.9	$213,698,520	$267,543,134
State					
Direct Impact		$338,437,964	2,563.5	$224,682,076	$237,056,693
Secondary Impact		$234,284,109	1,059.1	$74,965,077	$139,323,660
Total Impact	$338,437,964	$572,722,074	3,622.6	$299,647,153	$376,380,352
US					
Direct Impact		$441,207,304	3,260.7	$282,074,597	$294,738,546
Secondary Impact		$737,859,603	2,932.7	$232,188,984	$400,698,073
Total Impact	$441,207,304	$1,179,066,907	6,193.5	$514,263,581	$695,436,619

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

C.7.6.2.2 Operations & Maintenance

The expenditures associated with All Work Activities, with Ability to Customize Impact Area and Work Activity at the Homer Harbor are estimated to be $3,543,629. Of this total expenditure, $2,290,987 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 of $3,543,629 support a total of 23.5 full-time equivalent jobs, $1,640,715 in labor income, $2,054,118 in the gross regional product, and $3,396,080 in economic output in the local impact area. More broadly, these expenditures support 47.6 full-time equivalent jobs, $3,948,366 in labor income, $5,339,359 in the gross regional product, and $9,052,531 in economic output in the nation. The RED benefits discussed in this section are based on AAEQ OMRR&R costs and as such are AAEQ benefits. The AAEQ RED benefits resulting from Alternative 1b OMRR&R are shown in Table 103.

Table 103: RED Benefits Resulting from Alt 1b Operations & Maintenance

Area	Local Capture	Output	Jobs*	Labor Income	Value Added
Local					
Direct Impact		$2,290,987	17.5	$1,303,605	$1,448,945
Secondary Impact		$1,105,093	6.0	$337,110	$605,173
Total Impact	$2,290,987	$3,396,080	23.5	$1,640,715	$2,054,118
State					
Direct Impact		$2,598,428	19.7	$1,725,043	$1,820,052
Secondary Impact		$1,798,765	8.1	$575,560	$1,069,686
Total Impact	$2,598,428	$4,397,193	27.8	$2,300,603	$2,889,738
US					
Direct Impact		$3,387,461	25.0	$2,165,686	$2,262,916
Secondary Impact		$5,665,071	22.5	$1,782,679	$3,076,443
Total Impact	$3,387,461	$9,052,531	47.6	$3,948,366	$5,339,359

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

C.7.6.3 *RED-Alternative 2*

C.7.6.3.1 <u>Construction</u>

The expenditures associated with All Work Activities, with Ability to Customize Impact Area and Work Activity at the Homer Harbor are estimated to be $492,076,000. Of this total expenditure, $325,880,441 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 $492,076,000 support a total of 4,181.8 full-time equivalent jobs, $277,882,669 in labor income, $307,238,408 in the gross regional product, and $516,276,119 in economic output in the local impact area. More broadly, these expenditures support 7,740.6 full-time equivalent jobs, $610,298,023 in labor income, $760,999,837 in the gross regional product, and $1,313,972,655 in economic output in the nation. RED benefits resulting from construction of Alternative 2 are shown in Table 104.

Table 104: RED Benefits Resulting from Alt 2 Construction

Area	Local Capture	Output	Jobs*	Labor Income	Value Added
Local					
Direct Impact		$325,880,441	3,167.1	$219,778,214	$201,406,197
Secondary Impact		$190,395,679	1,014.7	$58,104,455	$105,832,211
Total Impact	$325,880,441	$516,276,119	4,181.8	$277,882,669	$307,238,408
State					
Direct Impact		$352,280,566	3,427.9	$284,623,758	$234,634,441
Secondary Impact		$298,014,276	1,366.7	$95,391,750	$175,482,153
Total Impact	$352,280,566	$650,294,842	4,794.6	$380,015,508	$410,116,594
US					
Direct Impact		$466,394,442	4,327.7	$345,814,616	$302,715,249
Secondary Impact		$847,578,213	3,412.9	$264,483,407	$458,284,588
Total Impact	$466,394,442	$1,313,972,655	7,740.6	$610,298,023	$760,999,837

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

C.7.6.3.2 Operations & Maintenance

The expenditures associated with All Work Activities, with Ability to Customize Impact Area and Work Activity at the Homer Harbor are estimated to be $3,512,527. Of this total expenditure, $2,270,879 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 $3,512,527 support a total of 23.3 full-time equivalent jobs, $1,626,315 in labor income, $2,036,090 in the gross regional product, and $3,366,273 in economic output in the local impact area. More broadly, these expenditures support 47.1 full-time equivalent jobs, $3,913,712 in labor income, $5,292,497 in the gross regional product, and $8,973,080 in economic output in the nation. The RED benefits discussed in this section are based on AAEQ OMRR&R costs and as such are AAEQ benefits. The AAEQ RED benefits resulting from Alternative 2 OMRR&R are shown in Table 105.

Table 105: RED Benefits Resulting from Alt 2 Operations & Maintenance

Area	Local Capture	Output	Jobs*	Labor Income	Value Added
Local					
Direct Impact		$2,270,879	17.4	$1,292,164	$1,436,228
Secondary Impact		$1,095,394	6.0	$334,151	$599,862
Total Impact	$2,270,879	$3,366,273	23.3	$1,626,315	$2,036,090
State					
Direct Impact		$2,575,622	19.5	$1,709,903	$1,804,078
Secondary Impact		$1,782,978	8.1	$570,508	$1,060,298
Total Impact	$2,575,622	$4,358,600	27.6	$2,280,412	$2,864,376
US					
Direct Impact		$3,357,730	24.8	$2,146,679	$2,243,055
Secondary Impact		$5,615,350	22.3	$1,767,033	$3,049,442
Total Impact	$3,357,730	$8,973,080	47.1	$3,913,712	$5,292,497

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

C.7.6.4 *RED-Alternative 3*

C.7.6.4.1 Construction

The expenditures associated with All Work Activities, with Ability to Customize Impact Area and Work Activity at the Homer Harbor are estimated to be $603,231,840. Of this total expenditure, $399,494,098 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 $603,231,840 support a total of 5,126.4 full-time equivalent jobs, $340,654,032 in labor income, $376,640,987 in the gross regional product, and $632,898,563 in economic output in the local impact area. More broadly, these expenditures support 9,489.2 full-time equivalent jobs, $748,159,226 in labor income, $932,903,316 in the gross regional product, and $1,610,788,054 in economic output in the nation. RED benefits resulting from construction of Alternative 3 are shown in Table 106.

Table 106: RED Benefits Resulting from Alt 3 Construction

Area	Local Capture	Output	Jobs*	Labor Income	Value Added
Local					
Direct Impact		$399,494,098	3,882.5	$269,424,268	$246,902,167

Area	Local Capture	Output	Jobs*	Labor Income	Value Added
Secondary Impact		$233,404,465	1,243.9	$71,229,764	$129,738,819
Total Impact	$399,494,098	$632,898,563	5,126.4	$340,654,032	$376,640,987
State					
Direct Impact		$431,857,790	4,202.2	$348,917,877	$287,636,393
Secondary Impact		$365,333,201	1,675.4	$116,939,946	$215,122,099
Total Impact	$431,857,790	$797,190,991	5,877.6	$465,857,823	$502,758,492
US					
Direct Impact		$571,749,033	5,305.3	$423,931,237	$371,096,084
Secondary Impact		$1,039,039,020	4,183.8	$324,227,990	$561,807,232
Total Impact	$571,749,033	$1,610,788,054	9,489.2	$748,159,226	$932,903,316

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

C.7.6.4.2 Operations & Maintenance

The expenditures associated with All Work Activities, with Ability to Customize Impact Area and Work Activity at the Homer Harbor are estimated to be $3,524,770. Of this total expenditure, $2,278,795 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 $3,524,770 support a total of 23.4 full-time equivalent jobs, $1,631,983 in labor income, $2,043,186 in the gross regional product, and $3,378,007 in economic output in the local impact area. More broadly, these expenditures support 47.3 full-time equivalent jobs, $3,927,353 in labor income, $5,310,944 in the gross regional product, and $9,004,356 in economic output in the nation. The RED benefits discussed in this section are based on AAEQ OMRR&R costs and as such are AAEQ benefits. The AAEQ RED benefits resulting from Alternative 3 OMRR&R are shown in Table 107.

Table 107: RED Benefits Resulting from Alt 3 Operations & Maintenance

Area	Local Capture	Output	Jobs*	Labor Income	Value Added
Local					
Direct Impact		$2,278,795	17.4	$1,296,668	$1,441,234
Secondary Impact		$1,099,212	6.0	$335,316	$601,953
Total Impact	$2,278,795	$3,378,007	23.4	$1,631,983	$2,043,186
State					
Direct Impact		$2,584,600	19.6	$1,715,863	$1,810,366
Secondary Impact		$1,789,192	8.1	$572,497	$1,063,994
Total Impact	$2,584,600	$4,373,792	27.7	$2,288,360	$2,874,360
US					
Direct Impact		$3,369,433	24.9	$2,154,161	$2,250,874
Secondary Impact		$5,634,922	22.4	$1,773,192	$3,060,071
Total Impact	$3,369,433	$9,004,356	47.3	$3,927,353	$5,310,944

C.7.6.5 *RED Summary*

The summary of RED benefits is shown in Table 108.

Table 108: RED Benefits Summary

RED benefits	Local Capture	Output	Jobs (FTE)	Labor Income	Value Added
Alt 1a					
First Costs	$309,979,291	$873,304,386	5,094.7	$405,621,790	$505,782,592
AAEQ OMRR&R	$3,357,944	$8,973,652	47.1	$3,913,961	$5,292,835
Alt 1b					
First Costs	$441,207,304	$1,179,066,907	6,193.5	$514,263,581	$695,436,619
AAEQ OMRR&R	$3,387,461	$9,052,531	47.6	$3,948,366	$5,339,359
Alt 2					
First Costs	$466,394,442	$1,313,972,655	7,740.6	$610,298,023	$760,999,837
AAEQ OMRR&R	$3,357,730	$8,973,080	47.1	$3,913,712	$5,292,497
Alt 3					
First Costs	$571,749,033	$1,610,788,054	9,489.2	$748,159,226	$932,903,316
AAEQ OMRR&R	$3,369,433	$9,004,356	47.3	$3,927,353	$5,310,944

(RECONS model, run April 2026)

C.7.7 Environmental Quality

The EQ account assesses both positive and negative non-monetary effects on ecological, cultural, and aesthetic resources in the study area. This analysis must distinguish between national and regional benefits, and must ensure benefits are not counted more than once.

Because all FWP alternatives are located in the same location, to the east of the existing harbor, all FWP alternatives have similar environmental effects. The environmental specialist for the PDT utilized a habitat model for Kachemak Bay, which used water velocity, fetch, bathymetry, and substrate data to assess the quality of habitat for three species of submerged aquatic vegetation: canopy kelp, understory kelp, and seagrass. These three plant species were used as a proxy for other species in the bay because they are relied upon by many other species for food, shelter, etc.

To determine the amount and quality of habitat in the project area under existing conditions, the footprints of all alternatives were overlayed, and a 200-foot-wide buffer zone was added around the perimeter of this combined footprint to determine a zone of potential impact. This area was divided into subsections of 50 square meters. Each 50 sq. m section was assigned a value between 0 and 1, where 0 corresponded to no submerged aquatic vegetation habitat in the area and 1 corresponded to ideal habitat in the area. This value is referred to as a Habitat Suitability Index (HSI) score. These HSI scores were then summed to determine a cumulative habitat value for the project area under existing conditions. The cumulative HSI score for the project area under existing conditions is 152.3. In a FWOP, this value is expected to remain constant.

The cumulative HSI score was then determined for each alternative footprint. In a FWP, the habitat within the project footprint is assumed to have an HSI score of zero, meaning that any habitat within a given project footprint is destroyed if that alternative is constructed. To assess the impacts of a given alternative, the cumulative HSI score of the alternative's footprint was subtracted from the score of the zone of potential impact. The remaining value is the Retained Cumulative HSI score, which represents habitat not impacted by a given alternative. These scores are shown in Table 109.

A score of 60.9 for Alternative 1a indicates that in this alternative, the habitat which remains in the area of potential impact has a cumulative HSI score of 60.9. As alternatives become larger and affect more of the area of potential impact, less habitat is retained.

Table 109: Retained Cumulative HSI Score by Alternative

	FWOP	Alt 1a	Alt 1b	Alt 2	Alt 3
Retained Cumulative HSI Score	152.3	60.9	47.7	44.2	9.0

(From the Environmental Benefits model, June 2025)

C.7.8 Other Social Effects

The OSE account assesses the effects of an alternative on social aspects such as community resilience, public health, and life safety. This analysis considers OSE benefits in the context of the benefit categories associated with the Remote and Subsistence Harbor Authority and discussed in Section C.4.1.

C.7.8.1 *Remote and Subsistence Harbor Benefits Evaluation Method*

As previously discussed, none of the alternatives are NED justified, meaning that the monetary cost for each alternative exceeds the NED benefits. Because this study is being justified under the Section 2006 Remote and Subsistence Harbor Authority discussed in Section C.1.3, "the Secretary may recommend a project without the need to demonstrate that the project is justified solely by national economic development benefits". Due to the absence of an NED plan, it was determined that a cost effectiveness/incremental cost analysis would be used to inform plan selection.

C.7.8.2 *Cost Effectiveness/Incremental Cost Analysis (CE/ICA) Definition*

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. Incremental cost analysis identifies the additional cost per additional unit of benefit as plan size increases. This allows the PDT to consider whether larger plans are "worth it", meaning whether the additional benefits provided by a larger alternative justify taking on the additional cost.

In a CE/ICA, a non-monetary benefit unit is developed to quantify beneficial effects of a project in terms other than dollars. This analytical tool is well-suited to the evaluation of benefits such as those permitted for consideration in the Section 2006 Authority. These benefit categories are introduced in Section C.4.1, but are repeated here for convenience:

"In considering whether to recommend a project under subsection (a), the Secretary shall consider the benefits of the project to any of–

1. public health and safety of the local community and communities that are located in the region to be served by the project and that will rely on the project, including access to facilities designed to protect public health and safety;
2. access to natural resources for subsistence purposes;
3. local and regional economic opportunities;
4. welfare of the regional population to be served by the project; or
5. social and cultural value to the local community and communities that are located in the region to be served by the project and that will rely on the project."

C.7.8.3 *First CE/ICA Conducted*

Initially, the CE/ICA metric was formulated to be considered in combination with NED benefits. This approach focused on the Section 2006 benefit category "welfare of the region" and identified regional benefits not monetized in the NED. These "welfare of the region" benefits were derived from the risks regional populations experience as a result of delays to cargo vessels in Homer. As rafting and crowding in Homer are alleviated, vessel delays will be reduced, and communities which rely on deliveries of freight and fuel will receive shipments more reliably. Both the NED and CE/ICA results would then be used to inform plan selection.

Direction was later received that a CE/ICA should **not** be considered in combination with the NED, but rather that all project benefits should be incorporated into the CE/ICA metric so that they could be considered together in one analysis. Direction was also received that the CE/ICA should incorporate a broader range of Section 2006 benefit categories.

The original CE/ICA metric and approach has been briefly described here for transparency. The updated CE/ICA, which has been expanded to account for a broader range of project benefits, is described in the following sections.

C.7.8.4 *Expanded CE/ICA*

This analysis uses "Community Benefit Units" (CBUs) as a non-monetary CE/ICA metric to assess benefits and support the evaluation of alternatives for navigation improvements at Homer Harbor. The CBU framework quantifies the extent to which each alternative creates local and regional opportunities for Homer, reduces safety risks, improves the reliability of cargo deliveries to regional communities served by the Homer fleet, increases access to personal use fisheries in the area, and decreases delays to vessels. The CBU framework aligns with the study purpose, problem statements, and policy (Section 2006 of WRDA 2007, as amended.)

C.7.8.4.1 Background and Metric Need

Section 2006 identifies five types of benefits which may be considered when determining if a project is justified under this authority. CBU builds on the “welfare of the region” benefits introduced in the first CE/ICA, and also includes benefits under the Section 2006 benefit categories “safety”, “local and regional opportunities” and “access to natural resources for subsistence purposes.” In addition, benefits of alleviated vessel delays are also considered.

The CBU metric uses a consistent formula that incorporates vessels affected by a given alternative, the population benefitting from impacts to a given vessel category, and a weighting variable reflecting the significance of impacts. This structure provides a more comprehensive, equitable, and OSE-aligned assessment of navigation inefficiencies.

C.7.8.4.2 CBU Methodology

CBUs incorporate benefits from multiple Sections 2006 benefits categories, allowing multiple impacts to be considered and compared simultaneously. CBUs are calculated for each alternative and are the sum of the Safety benefits, Local and Regional Opportunity benefits (LROs), Welfare of the Region benefits (WRs), Personal Use Fishery benefits (PUFs), and Avoided Vessel Delay benefits (AVDs) for the given alternative.

Formula:

$$CBU_{alt} = Safety_{alt} + LRO_{alt} + PUF_{alt} + WR_{alt} + AVD_{alt}$$

Where:

- $Safety_{alt}$= Reduction in safety risks resulting from the alternative
- LRO_{alt} = MTI_{alt}+BEI_{alt}
  - MTI_{alt} = Marine Trades Impacts resulting from the alternative
  - BEI_{alt}= Business Expansion Impacts resulting from the alternative
- PUF_{alt} = $CPBI_{alt}$+$KBSGI_{alt}$
  - $CPBI_{alt}$= Impacts to the China Poot Bay personal use fishery
  - $KBSGI_{alt}$= Impacts to the Kachemak Bay Set Gillnet personal use fishery
- WR_{alt}= Increase in cargo reliability resulting from the alternative
- AVD_{alt}= Reduction in vessel delay hours resulting from the alternative

Benefits of these categories (Safety, LROs, WRs, PUFs, and AVDs), are determined by consideration of three variables:

- W_i = Assigned qualitative **weight** for the benefit type on a scale of 0–3, where 0 indicates no impact, 1, 2 and 3 indicate low, moderate, and high impact respectively
- V_i = The number of **vessels** for which access is either improved or created by an alternative
- P_i = The **population** experiencing a given category of benefit

These variables are used to calculate the scores for each benefit category according to the following formula:

$$Score_i = W_i \times V_i \times P_i$$

As with the NED account, benefits in the FWP are determined by scoring both the FWOP and the FWP using the method described above, where the difference between the FWOP and the FWP are the FWP benefits. Where benefits are presented in this section, they are this difference between the FWOP and FWP. FWOP “benefits” are presented for comparison but are shown as zeros because the FWOP does not differ from itself.

C.7.8.4.3 Components of CBU

Impacts on Vessel Access

Alternatives considered in this study do not have unform impacts on vessel types; access is improved for some vessels, while it is created for others.

Access is *improved* for the following categories:

- Existing transient vessels that will continue to use transient moorage in the future, for whom rafting is reduced as additional space is created
- Existing transient vessels for whom permanent moorage is created, as would be the case for approximately 40% of the waitlist

Access is *created* for the following groups:

- Currently waitlisted vessels not utilizing transient moorage
- Projected future growth of the fleet -greater than the FWOP growth

Access-created or access-improved influences which component(s) of CBU are affected by a given alternative; access-created drives LRO and PUF benefits, while access-improved drives Safety, WR and AVD benefits. This is discussed in detail in the subsections below.

Safety

Safety concerns in Homer are closely related to vessel rafting, as discussed in Section C.5.10. As discussed in that section, there are safety concerns associated with climbing between vessels, increased chance of fire, and reduced access for emergency response. The crew and passengers of rafting vessels must climb over the side of the dockside vessel to access their own, leading to risk of falling. When vessels are rafted together, if a fire starts, vessels can’t move to safety until they can be unrafted, increasing the chance of fire spreading. Additionally, if multiple vessels are between the dock and the affected vessel, fire fighters may have reduced ability to address the threat. Similarly, if a medical emergency occurs on a vessel which is not dockside, it may be more difficult for emergency responders to safely reach the affected person or transport them to an ambulance.

In addition to the three general types of hazards discussed above, the large vessels which raft on System 5 experience additional hazards. These vessels are both longer and taller than other vessels in the harbor, with more variation from one vessel to the next. Because the decks of these vessels are higher above the water, the chance of injury from falling is greater. Additionally, the deck of one vessel may be at a different height than the vessel next to it, meaning that crew may be climbing up or down between vessels. Lastly, these vessels are longer than other vessels in the harbor. All are over 85 feet long and some are as much as 180 feet long. The additional length of these vessels can make it more difficult to keep them moored steadily, and can further complicate climbing between vessels.

Application of Framework

Vessels: This variable is the number of vessels for which access is improved in an alternative.

Weight: As discussed above, small and medium vessels experience 3 types of safety risk factors. Large vessels experience these, as well as three additional types of risk factors. Because large vessels have twice as many risk factors as small and medium vessels, they are assigned a weight of 3, while small and medium vessels are assigned a weight of 1.5.

Population: The affected population for each vessel is the combination of its crew and passengers.

Th affected population and impact weights for the safety benefit category are shown by vessel type in Table 110.

Table 110: Safety Affected Population and Impact Weight by Vessel Type

Vessel User Group	Ave. Crew	Passengers	Total Population Affected	Weight
Recreation	N/A	3.77	3.77	1.5
Water Taxi	1	5	6	1.5
Freight	3.67	N/A	3.67	1.5
Commercial Fishing	3.67	N/A	3.67	1.5
System 5	5	N/A	5	3
Fishing Charters (medium)	3	22	25	1.5
Fishing Charters (small)	1.3	6	7.3	1.5

(Homer Port User Survey and Focus Groups, 2024)

AAEQ Safety benefits are shown by alternative in Table 111.

Table 111: AAEQ Safety Benefits by Alternative

Alternative	AAEQ Safety Benefits
Alt 1a	842
Alt 1b	7,829
Alt 2	8,183
Alt 3	9,462

(CE/ICA Model)

Local and Regional Opportunity Benefits (LROs)

Local and regional opportunities are increased as access is created for additional vessels. It should be noted that access-improved does not significantly influence local and regional opportunities because vessels which are presently operating in Homer are already assumed to be interacting with the local economy.

Marine Trades Impacts (MTIs)

Homer has a significant marine trades sector, which makes it an attractive location for vessel owners (particularly owners of working vessels), because a wide variety of work can be done on a vessel in one place. Increasing the number of vessels operating in Homer increases demand for the services provided by the marine trades industry and makes this economic sector more robust. Benefits to this sector of the economy carry through to other local service industries, and so benefit the whole community.

Strengthening the marine trades industry also helps Homer to maintain a diversified economy, as it balances their tourism industry and contributes to economic stability. Working vessels are assumed to interact more with the marine trades industry than recreation vessels, as they are operated more frequently and consequently require more maintenance. Similarly, small- and medium-sized working vessels are assumed to interact the most with the marine trades industry, as large vessels receive more of their maintenance out of state where there are facilities capable of hauling them out.

Application of Framework:

Vessels: This variable is the number of vessels for which access is created in an alternative.

Weight: The impact of an additional vessel on the local economy is weighted.

Small- and medium-sized commercial vessels have the highest impact rating (3) because these vessels are more likely to receive all or most of their maintenance in Homer. System 5 vessels have an impact rating of 2, or “medium”, because while these vessels do interact regularly with the Homer marine trades industry, they must receive a more significant amount of maintenance out of state, as vessels this size cannot be hauled out in Homer. Recreation vessels have the impact rating of 1, or “low”, because while additional access for these vessels will contribute to MTIs, the impact per recreation vessels is lower than for working vessels. This is because recreation vessels are not operated as frequently or under as wide a variety of conditions as working vessels and therefore do not require as much maintenance.

Population: The benefiting population for local and regional opportunities is the population of Homer, which is approximately 5,500 people. As stated above, a more robust marine trades industry will help to keep the local economy diversified and benefits will carry through to other local economic sectors. Table 112 discusses these variables in the context of Marine Trades Impacts.

Table 112: MTI Variables

Vesel Category	Access Created (V)	Marine Trades Impact of Additional Vessels (W)	Benefitting Population (P)
System 5	Vessels Turned Away, future growth	2	Homer
Commercial Fishing, Freight, Charters, & Water Taxis	Net waitlisted vessels; waitlist growth	3	Homer
Recreation	Net waitlisted vessels; waitlist growth	1	Homer

Table 113 shows the number of vessels in each user group for whom access is created in Alternative 1a, as well as the weight for each user group's impact on the marine trades sector, and the Homer population which benefits from their impacts. These numbers are multiplied to produce the MTI benefits shown in the rightmost column of the table. This demonstrates the process, using the number of vessels for which access is improved or created, the impact weight, and the benefiting population, by which the number of benefit units are determined for each benefit category.

Table 113: Marine Trades Impacts for Alt 1a

	Marine Trades Impact Variables			MTI Benefits
Vessel User Group	Vessels*	Impact Weight	Benefiting Population	
System 5	15	2	5500	165,000
Comm. Fish	14	3	5500	231,000
Charter	23	3	5500	380,000
Water Taxi	5	3	5500	83,000
Freight	1	3	5500	17,000
Recreation	137	1	5500	754,000
AAEQ MTI Benefits for Alt 1a				**1,634,000**

*Does not account for variation in fleet over period of analysis, approximate counts

AAEQ MTI benefits are shown by alternative in Table 114. Numbers are rounded.

Table 114: AAEQ MTI Benefits by Alternative

Alternative	AAEQ MBTI Benefits
Alt 1a	1,634,000
Alt 1b	1,625,000
Alt 2	2,600,000

Alt 3	6,754,000

(CE/ICA Model)

Business Expansion Impacts (BEIs)

Local and regional opportunities can also be expected to increase as existing marine businesses are able to expand their operations, or new ones are able to start operating.

Under existing conditions, approximately 60% of waitlisted vessels do not operate out of Homer Harbor and cannot be assumed to operate out of other harbors, due to a lack of substitute locations in the vicinity. While a portion of these inactive waitlisted vessels are projected to be recreational, others can be assumed to be commercial.

If a marine business owner in Homer wishes to expand his business by adding an additional vessel, but is unable to due to the lack of moorage, access created allows this business to expand. Similarly, if a Homer resident wishes to start a business, but is delayed in doing so due to wait times for Homer moorage, access created alleviates this barrier and allows additional businesses to form.

Application of Framework:

Vessels: As above, this variable is the number of vessels for which access is created in an alternative. For BEIs, this does not include access created for recreational vessels, as these are not being used in new or expanding businesses. It also excludes System 5 vessels, as these vessels are not waitlisted for moorage.

Weight: System 5 vessels are weighted zero for this category, as they do not impact it. Small- and medium-sized commercial vessels for which access is created have an impact weight of 2, or “moderate”. This is to account for the variation in the impact of expansions and new enterprises between companies. For example, an expansion for one company may only require minimal staffing increases, whereas a new enterprise may require multiple support staff. Alternatively, an additional operator in a sector which already has significant competition may have relatively small local impacts, while an operator starting a new type of business may be more impactful.

Population: As above, the benefiting population for local and regional opportunities is the population of Homer. If Homer residents are able to start and expand businesses more efficiently, it benefits not only the business owners and their families, but their employees, their families, and the wider local community with more jobs available and increasing employment. Table 115 discusses these variables in the context of Business Expansion Impacts.

Table 115: BEI Variables

Vessels Category	Access Created	Business Impact	Benefitting Population
System 5	N/A	0	N/A
Commercial Fishing, Freight,	Waitlisted vessels not currently	2	Homer

Vessels Category	Access Created	Business Impact	Benefitting Population
Charters, & Water Taxis	operating; waitlist growth		
Recreation	N/A	0	N/A

AAEQ BEI benefits are shown by alternative in Table 116. Numbers are rounded.

Table 116: AAEQ BEI Benefits by Alternative

Alternative	AAEQ BEI Benefits
Alt 1a	459,000
Alt 1b	451,000
Alt 2	1,013,000
Alt 3	3,000,000

(CE/ICA Model)

Personal Use Fishing Benefits (PUFs)

Subsistence fishing is a benefit category allowed under Section 2006. Personal use fishing is considered technically distinct from subsistence fishing by the State of Alaska because it does not occur in places historically and culturally linked to traditional subsistence practices. However, it can be considered otherwise comparable in that its primary purpose is the harvesting of fish for consumption, rather than sport fishing for recreation.

The harbor's data system does not identify whether a vessel is used for personal use fishing, so it cannot be clearly linked to any user group or groups. As such, an increase or improvement in moorage for a given vessel user group cannot be clearly associated with improved access to personal use fisheries. It is most likely that recreational vessels are used to access personal use fisheries, however it is also possible that commercial vessels may be used as well. It is unlikely that large working vessels such as those on System 5 would be used for this purpose.

Communication with the Alaska Department of Fish & Game (ADF&G) indicates that there are two personal use fisheries accessed from the Homer Harbor. These are the Kachemak Bay personal use set gillnet fishery, which requires a permit, and the China Poot Bay personal use fishery, which does not.

China Poot Bay Impacts (CPBIs)

The China Poot Bay personal use fishery is discussed in Section C.3.6. There are an average of 2,713 annual participants, with an average of 1.6 fishing days per person. If harbor conditions were delaying access to the fishery, we would expect to see participants require more time to reach bag limits, so this low average suggests that existing users are able to access the fishery effectively within given openings. As such, improved access is not anticipated to result in improvements to personal use fishing for these users. Access created, however is expected to allow use of this fishery for additional small- and medium-sized vessels. However, as it is currently assumed that not all existing harbor users use this fishery, it is also assumed that not all vessels for whom access is created will use the fishery.

Application of Framework:

Vessels: It is not assumed that every vessel for which access is created will participate in the China Poot Bay fishery. Given that dipnets are utilized in this fishery, that it is common for multiple households to dipnet together, and that it is unlikely that all individuals participating in the fishery own vessels with which to access the fishery, the assumption is made that fishermen share vessels. Recreation users reported an average of 3.77 passengers per trip. This average is used to estimate the number of vessels accessing this fishery at 720.

It is assumed that most, but not all, participants in this fishery access it through Homer. China Poot Bay is located on the southeastern side of Kachemak Bay, opposite the Homer Harbor. This location indicates that anyone accessing it from the majority of the Kenai Peninsula is likely doing so through Homer, while people in other communities on Kachemak Bay, such as Seldovia, likely are not. Given the smaller populations in communities on the southeastern side of Kachemak Bay, it is likely that the majority of fishery participants are accessing this fishery through Homer. This analysis considers a range from 50–90% of participants accessing through Homer, with an expected value of 75%.

If 75% of an estimated 720 vessels are accessing the fishery through Homer, this is equivalent to approximately 540 vessels, or 26% of the small- and medium-sized vessels in the Homer fleet.

It is assumed that this proportion will remain constant, and that 26% of small- and medium-sized vessels for whom access is created will utilize the China Poot Bay fishery.

Weight: The bag limit for the China Poot Bay fishery is six fish per household, regardless of household size. Because the bag limit for this fishery is low, the impact of access is correspondingly weighted 1 or “low”, meaning that while access is beneficial, households are not relying on this fishery for high percentages of their diet.

Population: Since the benefiting population for this category cannot be linked to a single vessel user group, we can assume that, at a minimum, access created for small and medium vessels will increase access to personal use fisheries. In this case, the benefitting population are the households accessing the personal use fisheries. Data on household sizes for those who participated in this fishery is not available, so the average household size for Homer (3 people) as reported by the census is used. The benefitting population is estimated at 3.77 households of 3 people each, per vessel for 26% of the small and medium vessels for which access is created.

While it is not possible to identify whether these users are residents of Homer, only Alaska residents are eligible to participate in personal use fisheries, so it can be assumed that the benefiting population is composed of regional residents.

The variables discussed above are summarized by alternative in Table 117.

Table 117: CPBI Variables

Alternative	Vessels	Impact weight	Benefitting Population per Vessel	AAEQ CPBIs
1a	48	1	11.3	538
1b	48	1	11.3	538
2	67	1	11.3	761
3	168	1	11.3	1897

*Does not account for variation in fleet over period of analysis, approximate counts

Kachemak Bay Set Gillnet Impacts (KBSGIs)

The Kachemak Bay set gillnet personal use fishery is a coho salmon fishery which requires a permit and allows a bag limit of 25 fish for the first person in a household, plus 10 fish for each additional household member.

According to ADF&G, from 2019 to 2024 there was an annual average of 141 permits which reported using the fishery, and an average of 0.9 fishing days per permit.

Application of Framework:

Vessels: Set gillnets can be set up near the shore, or a vessel can be used to anchor one end of a net further out in the water. Because set gillnet fishing is less common than dip netting and can require more use of a vessel, the assumption is made that groups of fishermen sharing vessels are smaller, at two per boat. Based on this, and the average annual permits issued, it is estimated that 71 vessels per year access this fishery.

Of the permits which reported participating in this fishery, 93% were issued to residents living in Homer or in communities north of Homer on the Kenai Peninsula. As such, it is assumed that 93% of participants access the fishery through Homer.

If 93% of an estimated 71 vessels access this fishery through Homer, this is equivalent to 66 vessels, or 3% of the small and medium sized Homer fleet.

It is assumed that this proportion will remain constant, and that 3% of small and medium sized vessels for whom access is created will utilize the Kachemak Bay set gillnet fishery.

Weight: The bag limit for the Kachemak Bay set gillnet fishery is 25 fish for the first person in a household, plus 10 fish for each additional household member. Because the bag limit for this fishery is higher, the impact of access is weighted 2, or “moderate”.

This implies that access is beneficial and may contribute significantly to a household's food supply. However, impact is not rated 3 because the majority of households engaging in personal use fishing generally have alternative food sources available to them.

Population: As with the China Poot Bay fishery, the benefitting population is the households of those fishing. Because permit data is available for this fishery, it was possible to identify the average household size for households reporting participation in the fishery. This average corresponded with the Homer average household size of three people. The benefitting population is estimated at two households of three per vessel for which access is created and which are expected to participate in the fishery. Two households per vessel are assumed, because, while it is the case that multiple families tend to fish together, set net fishing requires more active use of a vessel in anchoring the net and it was assumed that a single vessel would not manage 3 or 4 nets.

The variables discussed above are summarized by alternative in Table 118.

Table 118: KBSGI Variables

Alternative	Vessels	Impact weight	Benefitting Population per Vessel	AAEQ KBSGIs
1a	6	2	6	**69**
1b	6	2	6	**69**
2	8	2	6	**98**
3	20	2	6	**243**

*Does not account for variation in fleet over period of analysis, approximate counts

Welfare of the Region Benefits (WRs)

As discussed in Section C.2.6.2, Homer serves as a regional hub. Its connection to the road system and ability to receive large shipments of cargo and fuel enables it to function as a distribution point for communities in the region and around Alaska which are not connected to other communities via road.

Homer Harbor staff report, based on their experience and familiarity with their users' work patterns, that over 100 non-road connected communities around Alaska receive coastal freight shipments from Homer. However, the NFS provided USACE with a list of 50 communities served by the Homer coastal freight fleet.

Because communities in different parts of the state do not all receive shipments of the same type, size or frequency, and because different sizes of vessels may make shipments to some areas and not others, these 50 communities were organized by geographic region. These regions, the number of communities in each region that receive shipments from Homer, and the estimated total population of these communities, are indicated in Table 121.

There is very little access created for this user group for vessels not currently active. As such, the bulk of these benefits come from access improved. Additionally, access created, which adds more vessels to the fleet, does not increase the probability for a community relying on freight from Homer that a given shipment will arrive on time. In contrast, access improved for vessels currently operating does increase the reliability of shipments.

The benefitting population is the residents of the communities considered in each region. Regions are assigned impact weights individually according to their freight shipment patterns.

Application* of Framework*:

Vessels: For the WR benefit category, vessels are considered for which access is improved, rather than created. As delays are reduced for freight vessels, cargo shipments become more reliable for regional populations. However, different regions have significantly different shipping patterns, and some regions receive shipments more frequently than others. As such, both the frequency of shipments and the access improved are considered in this variable.

Table 119 shows the number of transient vessels in the Homer fleet which make freight deliveries to each of the geographic regions served by the harbor. It should be noted that these vessel counts are not additive; for example, the 10 vessels which serve communities on Kodiak are the same 10 vessels which serve the Alaska Peninsula. The table also identifies the number of vessels serving each region for which rafting delays are alleviated by each alternative. Because Alternative 1a only alleviated crowding for vessels over 85 feet long, it impacts fewer vessels than the other alternatives.

Table 119: Vessels Making Freight Deliveries by Region

Region	Transient Vessels Serving Region	Vessels Impacted by:			
		Alt 1a	Alt 1b	Alt 2	Alt 3
Kachemak Bay	32	4	32	32	32
Cook Inlet	18	4	18	18	18
Williamsport	18	4	18	18	18
Kodiak	10	4	10	10	10
Alaska Peninsula	10	4	10	10	10
Aleutians	10	4	10	10	10
Western Alaska	7	4	7	7	7

(Vessel counts are not additive between regions.)

Weight: Deliveries are weighted separately for each region based on a variety of factors which contribute generally either to the likelihood of a delay happening, or to the severity of impact for the community if a delay occurs.

Key factors that influence weighting include:

- Trip frequency: Rare trips (e.g., once per season) may have worse consequences of delay than frequent ones.
- Community redundancy: If a community has alternate ports through which they can receive cargo (e.g., Anchorage, Kodiak), the weight is lower.
- Criticality of goods and services: Deliveries of food, fuel, or medical supplies are more sensitive than bulk cargo or parts
- Seasonality: Late-season trips may have more severe consequences of delay due to fewer resupply options and narrow weather windows.
- Cascading delays: If a single vessel services multiple communities on one route, delay at one stop affects others and raises this weight.

Weights assigned to deliveries for each region are shown in Table 120. Impact severity is weighted on a 1-3 scale, with 1 indicating low impact and 3 indicating high impact.

Table 120: Impact Severity Weights by Region

Region	Impact Severity Weight	Impact Weight Rational
Kachemak Bay	1	Trips are short and communities are close to Homer.
Cook Inlet	2	Deliveries include perishables to isolated lodges without access to stores, fish camps with limited delivery windows.
Williamsport	3	Narrow window of delivery each month
Kodiak	2	Kodiak is further from Homer than Cook Inlet, but is significantly closer than communities on the Alaska Peninsula or in Western Alaska, and has less limited delivery windows than Williamsport.
Alaska Peninsula	3	Multiple days are required to reach communities, which are more isolated and receive fewer deliveries each season.
Aleutians	3	Multiple days are required to reach communities, which are more isolated and receive fewer deliveries each season.
Western Alaska	3	Vessels stay in the region and make deliveries along river systems; one delay can lead to many others.

Population: Different sizes and types of vessels serve communities in different regions, although some sizes of vessel may serve multiple regions. The regions served by the Homer fleet, the number of communities identified in each region, and their cumulative populations are shown in Table 121. The total population impacted for a given alternative is the sum of the populations of regions served by the vessels impacted by the alternative. If some, but not all, of the vessels serving a given region are impacted by an alternative, the benefiting population for that region is proportional to the percentage of vessels serving that region which are impacted by the alternative.

Table 121: Regional Communities and Population Severed by the Homer Fleet

Region	Communities Identified	Regional Population Impacted
Kachemak Bay	6	494
Cook Inlet	6	561
Williamsport	9	864
Kodiak	4	386
Alaska Peninsula	13	2,183
Aleutians	7	4,517
Western Alaska	5	13,570

AAEQ WR benefits are shown by alternative in Table 122. Numbers are rounded.

Table 122: AAEQ WR Benefits by Alternative

Alternative	AAEQ WR Benefits
1a	157,000
1b	444,000
2	444,000
3	444,000

(CE/ICA Model)

Avoided Vessel Delay Benefits (AVDs)

The NED account quantifies the value of delays which harbor users experience in monetary terms. However, as the NED analysis and CE/ICA are considered separately, and as these benefits are directly related to the problems identified in this study, they must also be considered in nonmonetary terms here. It should be noted that these benefits are not being double counted. because the CE/ICA is considered separately from the NED account, these benefits must be incorporated into the CE/ICA in order for them to be considered in plan selection.

Application of Framework:

The NED model estimates hours of delay experienced by different user groups. To calculate Avoided Vessel Delay impacts (AVDs), the annual hours of delay experienced by a given user group were multiplied by the benefitting population per vessel, and an impact weight variable on the same 0–3 scale used in the other benefit categories. This impact variable is meant to consider the severity of the impact of a delay to a given user group.

For each user group, the benefitting population per vessel was the crew and or passengers of that vessel type. Recreation vessels received an impact weight of 1, or “low”, as time impacted by delays is recreational in nature. Families or individual boaters have more control over their schedules and may extend a day to account for a delay, may decide to go somewhere closer, or may recreate o a different day. Commercial vessels, including commercial fishing, fishing charters, water taxis, freight, and System 5 vessels were weighted 3, or "high", as delays impact business operations and by extension, livelihoods. Charter passengers are included in the impact weight of 3 or "high" because charters must go to specific location to fish and are more sensitive to schedule changes than individual recreation. Additionally, most charter passengers are tourist and do not have the option of returning on a different day for a better experience. The benefiting population for charter vessels includes a weighted average of passenger numbers for large and small charters, which range from 6 to 22 passengers. Vessel user groups, their respective benefiting populations and impact weights are shown in Table 123.

Table 123: AVD Benefitting Populations and Impact Weights by User Group

Vessel User Group	Benefitting population per vessel	Impact Weight
Recreation	3.77	1
Water Taxi	6	3
Freight	3.67	3
Commercial Fishing	3.67	3
System 5	5	3
Fishing Charters	13	3

AAEQ AVD benefits are shown by alternative in Table 124. Numbers are rounded.

Table 124: AAEQ AVD Benefits by Alternative

Alternative	AAEQ AVD Benefits
1a	94,000
1b	398,000
2	443,000
3	501,000

(CE/ICA Model)

C.7.8.4.4 Application of CBU in Alternatives Analysis

Table 125 shows AAEQ OSE benefits for each alternative. Numbers shown for each benefit category are the product of the number of affected vessels, the population affected per vessel, and the impact factor as discussed above.

Table 125: AAEQ OSE Benefits by Benefit Category

	Safety	LROs		PUFs		WRs	AVDs
Alternative	Safety	MTIs	BEIs	CPBI	KBSGI	WRs	AVDs
No Action	0	0	0	0	0	0	0
Alt 1a	842	1,634,000	459,000	538	69	157,000	94,000
Alt 1b	7,829	1,625,000	451,000	538	69	444,000	398,000

	Safety	LROs		PUFs		WRs	AVDs
Alternative	**Safety**	**MTIs**	**BEIs**	**CPBI**	**KBSGI**	**WRs**	**AVDs**
Alt 2	8,183	2,600,000	1,013,000	761	98	444,000	443,000
Alt 3	9,462	6,754,000	3,000,000	1,879	243	444,000	501,000

When AVD and PUF impacts are compared to benefits in other categories, it can be seen that there is an order of magnitude difference between them across alternatives. This is because the benefitting populations in the LRO and WR categories are community populations and are much larger than the vessel crews benefitting from alleviated vessel delays and the households benefitting from PUFs. Because of this, the metric suggests that LRO benefits as far more significant than AVDs. However, this misrepresents the significance of vessels delays in this analysis.

The stated objective of the study is to “provide safe and efficient navigation for commercial, private, and government users over the 50-year period of analysis.” Similarly, the problems which the study identifies reference overcrowding in the harbor, navigation inefficiencies, and economic impacts stemming from these inefficiencies, as well as negative impacts to communities around the state which rely on freight shipments from Homer. Of the benefit categories discussed in this document, AVDs most directly relate to the objective of the study and the problems it was undertaken to address.

Additionally, LRO benefits, while felt broadly by the Homer population, are less direct and therefore less impactful per person than AVDs, which are direct benefits to harbor users. For these reasons, it was identified that the benefit categories contributing to CBUs (Safety, LROs, WRs, PUFs, and AVDs) could not be directly compared to each other as presented.

C.7.8.4.5 Normalization

Normalization is a statistical analysis technique which allows for multiple criteria which have values on different scales to be effectively compared to each other. There are multiple normalization techniques, however the most common is to recalculate the value for each alternative in a given criterion as a percentage of the maximum value for that criterion. For example, to normalize AAEQ AVD impacts, the benefit units for each alternative would be divided by 501,000, the value for Alternative 3, as it is the maximum value for this benefit category. This can then be carried through to other benefit categories. The non-normalized and normalized benefit units for each alternative are shown by benefit category in Table 126.

Table 126: Non-Normalized and Normalized CBUs by Alternative

	No Action	Non-Normalized				Normalized Values			
		Alt 1a	**Alt 1b**	**Alt 2**	**Alt 3**	**Alt 1a**	**Alt 1b**	**Alt 2**	**Alt 3**
Safety	0	842	7,829	8,183	9,462	9	83	86	100
LROs	0	2,094,000	2,077,000	3,613,000	9,754,000	21	21	37	100

	No Action	Non-Normalized				Normalized Values			
		Alt 1a	Alt 1b	Alt 2	Alt 3	Alt 1a	Alt 1b	Alt 2	Alt 3
Safety	0	842	7,829	8,183	9,462	9	83	86	100
PUFs	0	607	607	860	2,121	29	29	41	100
WRs	0	157,000	444,000	444,000	444,000	35	100	100	100
AVDs	0	94,000	398,000	443,000	501,000	19	79	88	100
Total CBUs	**0**	**2,346,000**	**2,926,000**	**4,508,000**	**10,710,000**	**113**	**312**	**352**	**500**

C.7.8.4.6 <u>Secondary Weights</u>

While the impacts of different vessel categories relative to each other are weighted in the calculation for each category, effectively the categories are also weighted relative to each other when they are added together. Normalizing the benefit units across benefit categories allows for them to be effectively compared to each other and for this implicit weighting to be more easily seen. This is most obvious in Alternative 3, in which all benefit categories appear equally impactful. However, when we consider that the study is intended to address navigation problems of overcrowding and delays, and impacts to reliant regional communities, it does not follow that secondary economic impacts of harbor expansion are as significant to the study objectives as are those categories which directly address them (i.e., AVDs).

To account for this, a multi-disciplinary team composed of PDT members familiar with the project and representatives from the NFS weighted the categories according to impact and significance to the project. A weighting scale from 1 to 7, with 7 being the highest value, was used to allow for sufficient nuance. Normalized benefit totals for each category were multiplied by their respective weights and then summed to arrive at the final CBU value for each alternative.

Safety and ADVs were weighted 7 because they most directly relate to the study purpose, problem statements and objective. Additionally, more data quantifying vessel delays and characterizing their impacts on harbor users is available than are data for other categories. WRs were weighted 5 because they also directly relate to the study purpose, problem statements and objective, but safety and AVDs are more directly felt by the community of Homer and are the highest priority for the NFS.

LROs are weighted 4 to reflect that, while they are more incidental, they are still considered significant by the NFS as they represent overall economic improvements to the local community. PUFs are weighted 1 because the number of people engaging in these fisheries is relatively low, and the fish harvested do not represent a majority of nutrition for most participating households.

Weighted and unweighted CBUs, and the weights for each benefit category, are shown in Table 127.

Table 127: Weighted and Unweighted Normalized CBUs

Benefit Category	No Action	Unweighted Normalized CBUs				Weight	Weighted Normalized CBUs			
		Alt 1a	Alt 1b	Alt 2	Alt 3		Alt 1a	Alt 1b	Alt 2	Alt 3
Safety	0	9	83	86	100	7	62	579	605	700
LROs	0	21	21	37	100	4	86	85	148	400
PUFs	0	29	29	41	100	1	29	29	41	100
WRs	0	35	100	100	100	5	177	500	500	500
AVDs	0	19	79	88	100	7	131	555	618	700
Totals	**0**	**113**	**312**	**352**	**500**		**485**	**1,748**	**1,912**	**2400**

C.7.8.4.7 Expanded Cost Effectiveness/Incremental Cost Analysis Results

The weighted normalized CBUs were analyzed in IWR Planning Suite II using a CE/ICA. Cost effectiveness analysis allows the PDT to screen out plans which are not cost effective, meaning that their level of output or higher can be achieved less expensively by a different plan. For Homer, because each alternative has a unique level of benefits, all alternatives were identified as Cost Effective. This means that for each alternative, no other alternative provided the same or greater benefits at a lower cost. In other words, each plan produces its level of output at the least cost.

Additionally, Alternative 3 was identified as a Best Buy plan, meaning that it provides the greatest increase in benefits for the least increase in cost. It should be noted that, because the No Action Alternative is always the lowest cost, it is also always considered a Best Buy plan. The Incremental Cost Analysis (ICA) calculates the marginal increase in cost per marginal increase in benefit between Best Buy plans. Because Alternatives 1a, 1b, and 2 are not considered in the ICA, the incremental cost per incremental benefit unit for Alternative 3 represents the incremental increases from the No Action Alternative.

ER1105-2-100 states that, “All possible plan combinations are listed and sorted in terms of increasing output. Costs and outputs of combined solutions may be additive or synergistic. It is important to document the rationale for determining which of these cases applies”. This analysis does not consider combinations of alternatives because they are mutually exclusive.

CE/ICA results are shown in Table 128. The scatter plot shown in Figure 13 shows cost per benefit unit for each alternative, and the box graph shown in Figure 14 visually illustrates the marginal cost per marginal CBU between Best Buy plans.

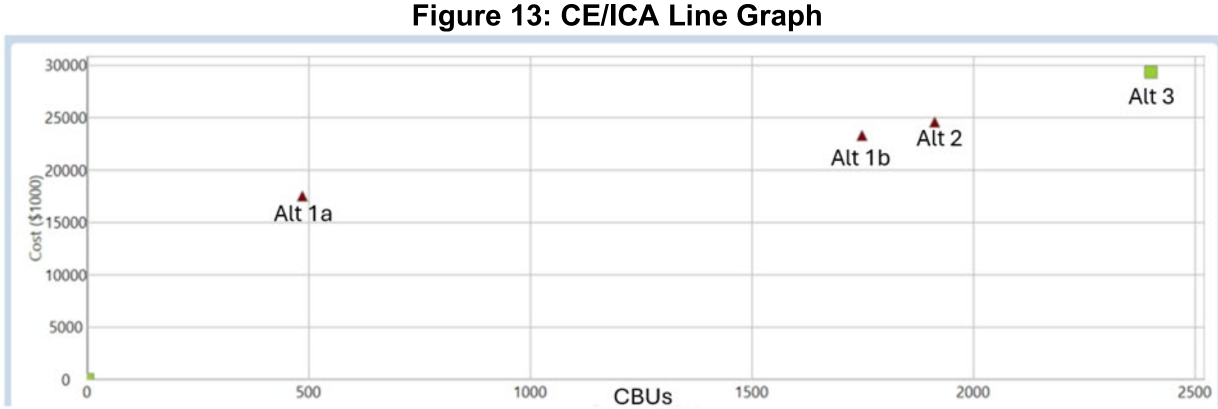
Table 128 shows that the number of CBUs increases from Alternative 1a to Alternative 1b, from 1b to 2, and from 2 to 3. The greatest increase in CBUs is from Alternative 1a to Alternative 1b, with the second-largest increase being from Alternative 2 to Alternative 3. It can be seen that Alternative 3 has the lowest cost per benefit unit, making it the Best Buy plan, however Alternatives 1b and 2 have costs per benefit unit significantly closer to Alternative 3. In contrast, Alternative 1a has a significantly higher cost per benefit unit.

Table 128: CE/ICA IWR Planning Suite II Results

	No Action	Alt 1a	Alt 1b	Alt 2	Alt 3
AAEQ Costs	$0	$17,523,000	$23,305,000	$24,578,000	$29,341,000
CBUs	0	485	1,748	1,912	2400
Cost/CBU	$0	$36,100	$13,300	$12,900	$12,200
Incremental Cost/ Incremental CBU	$0	N/A			$12,200

Figure 13 shows a scatter plot of the per unit costs for each alternative. Alts 1a, 1b, and 2 are shown as triangles, indicating that these are cost effective. The No Action Alternative and Alternative 3 are shown as squares, indicating that they are Best Buy alternatives. It can be seen in the line graph that Alternative 1a is much closer to the cost of the next-largest plan, Alternative 1b, while having significantly fewer benefits. In contrast, Alternatives 1b, 2, and 3 are clustered more closely together.

Figure 13: CE/ICA Line Graph



(IWR Planning Suite, 2026)

Figure 14 shows the increase in cost per increase in benefit between the two Best Buy plans. Because this analysis identifies only the No Action Alternative and Alternative 3 as Best Buy plans, the graph only considers the increase in cost per increase in benefit from the No Action Alternative to Alternative 3. In the graph, the green box represents the increase in benefit and the cost per additional benefit unit from the No Action Alternative to Alternative 3. This is the “buy up” from the No Action Alternative to Alternative 3.

Figure 14. Incremental Cost per Incremental Benefit Box Graph

(IWR Planning Suite, 2026)

C.7.8.4.8 Sensitivity Analysis

As stated in the section above on the secondary weighting of benefit categories, categories are implicitly “weighted” when they are added together, in that category values can be considered relative to each other. In this analysis, we have adjusted these weights to better reflect each category’s comparative significance to the project and to the community. However, here the categories are presented with equal weights as a sensitivity analysis.

A sensitivity analysis is meant to show how “sensitive” an analysis is to changes to its inputs, or how much the output of an analysis can change if an input is changed. This sensitivity analysis shows what the outputs of the CE/ICA would be if the benefit categories were waited equally, i.e., how sensitive the analysis is to the secondary weights.

Table 129 shows that the number of CBUs increases in the same order between alternatives as they do when benefit categories are not equally weighted. Similarly to the primary CE/ICA, there is a significant increase in CBUs between Alternative 1a and Alternative 1b, a smaller increase between Alternative 1b and Alternative 2, and another significant increase from Alternative 2 and Alternative 3. As in the primary CE/ICA, the sensitivity analysis shows that the greatest increase in benefits units is between Alternative 1a and Alternative 1b.

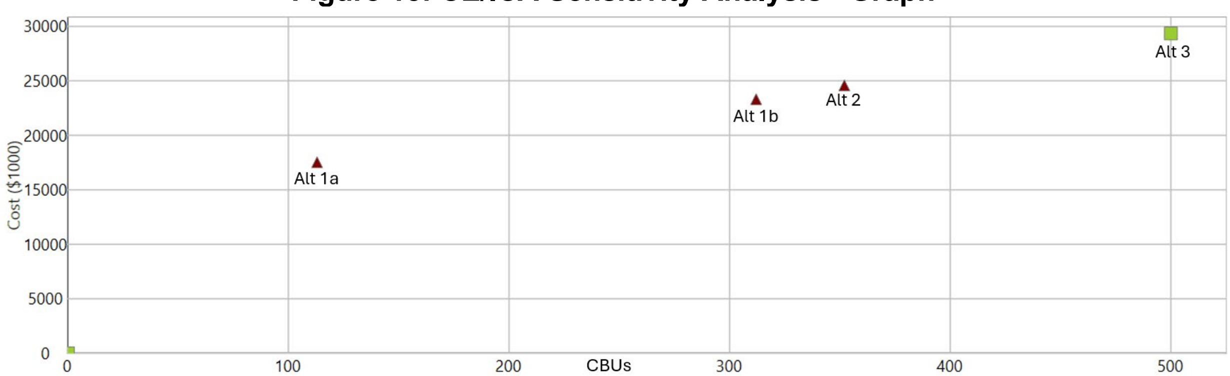
Table 129: CE/ICA Sensitivity Analysis - Equally Weighted Normalized Values

	Alt 1a	Alt 1b	Alt 2	Alt 3
Safety	9	83	86	100
LROs	21	21	37	100
PUFs	29	29	41	100
WRs	35	100	100	100
AVDs	19	79	88	100
Total CBUs	**113**	**312**	**352**	**500**

(CE/ICA one-time use model, 2026)

Figure 15 shows a graph of the per unit costs for each Alternative. Alternatives 1a, 1b, and 2 are shown as triangles, indicating that these are cost effective. Alternative 3 and the FWOP are shown as squares, indicating that they are Best Buy alternatives. This is consistent with the primary CE/ICA results. The only notable difference between the primary CE/ICA and the sensitivity analysis is that the sensitivity analysis shows less differentiation between Alternative 1a and the other alternatives.

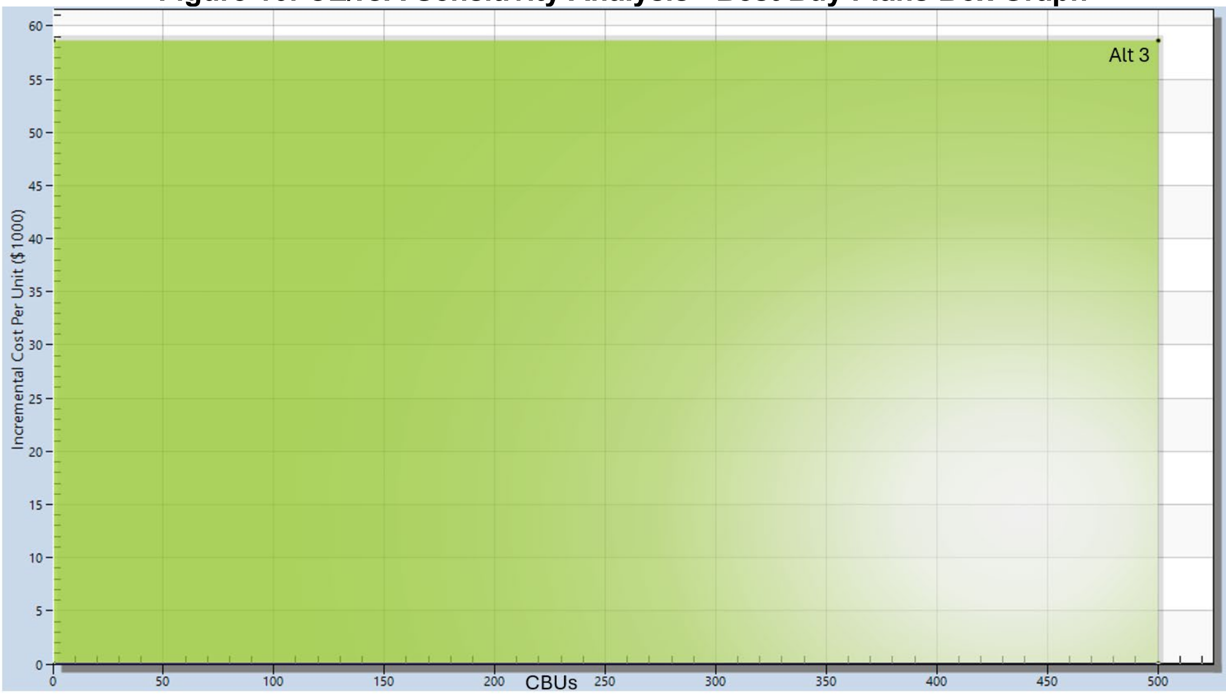
Figure 15: CE/ICA Sensitivity Analysis - Graph



(IWR Planning Suite, 2026)

Figure 16 shows the increase in cost per increase in benefit between the two Best Buy plans. Because the only Best Buy plans in the sensitivity analysis are the No Action Alternative and Alternative 3, the graph only shows one box, which represents the “buy up” from the No Action Alternative to Alternative 3.

Figure 16: CE/ICA Sensitivity Analysis - Best Buy Plans Box Graph



(IWR Planning Suite, 2026)

C.7.9 Total Net Benefits Summary

The total net benefits are summarized by alternative in Table 130.

Table 130: Total Net Benefits Summary

Benefit Account	No Action	Alt 1a	Alt 1b	Alt 2	Alt 3
NED (AAEQ Net Benefits)	$0	($9,793,000)	($6,195,000)	($5,664,000)	($6,043,000)
EQ (Retained Cumulative HSI Score)	152.3	60.9	47.7	44.2	9.0
OSE (CE/ICA)	Best Buy	Cost Effective	Cost Effective	Cost Effective	Best Buy

C.7.9.1 *Plan Selection*

According to ER 1105-2-100, Appendix E, “ordinarily, the plan that reasonably maximizes net benefits, known as the NED plan, is recommended.” Because all alternatives have negative net NED benefits, it was determined that there was no NED plan. However, because this study is also being conducted under the Remote and Subsistence Harbor Authority (see Section C.4.1), a plan may be recommended on the basis of non-NED benefits.

Under the March 2026 implementation guidance for Section 2006, “the selection of a plan shall be supported by a …CE/ICA”, and studies are required to “identify the least cost alternative that minimally meets the requirements of long-term community viability". The guidance states further that, "if this alternative is not the recommended plan, then explicit incremental justification shall be provided."

As discussed in Section C.7.8.4, Alternative 3 was identified as the "Best Buy" plan, meaning that it has the lowest cost per benefit unit among the four alternatives. However, this does not automatically imply that Alternative 3 is "the least cost plan which minimally meets the requirements of…viability". Indeed, Alternative 3 is the most expensive alternative, at an estimated total economic cost of over $720 million. In discussions with the NFS, they indicated concerns that the cost of Alternative 3 was likely outside the realm of what would be manageable for or acceptable to the community. According to ER 1105-2-103, 3-3c, "if the non-federal partner identifies a financial constraint…, the constrained plan may be recommended." For these reasons, Alternative 3 was not identified as the Tentatively Selected Plan (TSP) and was removed from consideration.

Because the other three alternatives were all found to be cost effective, they could all be considered for recommendation under the CE/ICA. While Alternative 1a is the least cost plan, the PDT determined that it did not "minimally meet the requirements of long-term community viability". This can be seen in Figure 13 and in Table 128, which show that Alternative 1a only provides 28% of the benefits provided by the next largest alternative (1b), but at 75% of the cost. In other words, Alternative 1a provides significantly fewer benefits than the next largest alternative, but costs almost as much. Given these reasons, and considering that Alternative 1a only alleviates crowding for the large vessel fleet (those over 85 ft long), and allows crowding conditions for small and midsize vessels to continue, it was determined that Alternative 1a does not sufficiently resolve the problems experienced by Homer harbor users.

Alternatives 1b and 2 were then considered for recommendation. Of the two Alternative 1b is the lower cost plan, however Alternative 2 has the lower cost per benefit unit. To determine which plan "minimally meets the requirements of long-term community viability," the PDT considered the historical context of the Homer Harbor. This is discussed in greater detail in the Hydraulics & Hydrology appendix, however, since its original construction in the early 1960s, the harbor has already been expanded four times: once by the local community and three times by USACE. Additionally, since its last expansion, USACE has conducted a feasibility study and a planning assistance to states (PAS) study to consider further expansion. This historical context demonstrates a pattern of expansions which the harbor goes on to outgrow, requiring the repetition of analysis and the continued commitment of local and Federal resources.

The primary difference between Alternative 1b and 2 is that Alternative 2 is intended to accommodate waitlisted vessels not included in Alternative 1b. These vessels are not theoretical future growth; they are a current reality. Additionally, while Alternative 2 has a total project cost of just over $31 million more than Alternative 1b, the majority of the cost difference comes from additional LSF features and are born by the NFS. The Federal cost difference is limited to approximately $10 million. In consideration of the limited increase in Federal cost, and in light of the historical pattern of Federal studies and expansions in Homer Harbor, Alternative 2 was determined to “minimally meet …requirements” and was identified as the TSP.

C.8 References

City of Homer. n.d. “Facts &Figures: Historic and Today.” Accessed June 2024. https://www.cityofhomer-ak.gov/communitydevelopment/facts-figures-historic-today.

City of Homer. n.d. “Fishing Lagoon.” City of Homer Official Website. Accessed August 11, 2025. https://www.cityofhomer-ak.gov/parks-trails/fishing-lagoon.

Time and Date. January 15th, 2025. “Climate & Weather Averages in Homer, Alaska USA.” https://www.cityofhomer-ak.gov/communitydevelopment/facts-figures-historic-today.

U.S. Census Bureau. 2020. “Census of Population, General Population Characteristics, Alaska.” Accessed December 2024. census.gov.

U.S. Census Bureau. 2022. *2021 American Community Survey 5-Year Estimates, Homer city, Alaska*. Accessed December 2024. https://data.census.gov/.

U.S. Census Bureau. 2024. Decennial Census Data, 1990–2020, Homer city, Alaska. Accessed December 2024. https://data.census.gov/.

Labor Stats Alaska. Retrieved December 2024. “Age and Sex, Cities and CDPs.” laborstats.alaska.gov.

Alaska Department of Labor and Workforce Development. 2024a. *Age and Sex, Cities and CDPs*. Accessed December 2024. https://live.laborstats.alaska.gov/.

Alaska Department of Labor and Workforce Development. 2024b. “Alaska Population Projections, 2023-2050”. laborstats.alaska.gov.

The American Community Survey. 2022. Data.census.gov.

Tides Pro. Accessed January 2025. “Tides and Fishing Times Homer”. https://www.tidespro.com/us/alaska/homer-coal-point-kachemak-bay-cook-inlet

ASCE Foundation.2025. “2025 Alaska Infrastructure Report Card”. https://infrastructurereportcard.org/state-item/alaska/.