5.0 DESCRIPTION OF RECOMMENDED PLAN

5.1 Components

The LSA-South Basic Plan was found to maximize the net NED benefits; however, it is not environmentally acceptable. The LSA-South Mussel Bed Avoidance Plan is a modification of the LSA-South Basic Plan to include mitigation and avoidance features. LSA-South Mussel Bed Avoidance Plan is designated the NED plan and is the recommended plan. It is referred to as the LSA-South alternative in the remainder of this document because it is the plan considered in detail at the LSA-South site. The LSA-South alternative is shown in figure 4-8. Major construction components of the recommended plan include breakwaters, dredging, intertidal fill, and inner harbor facilities. Construction would require 2 years due to the remoteness and construction timing constraints at Unalaska.

5.1.1 Breakwaters

The 181-meter-long rubblemound breakwater would protect the basin from southwest waves. The breakwater would have a crest elevation of 3.05 meters MLLW and a crest width of 2.5 meters. Maximum depths along the breakwater are -14.5 meters MLLW. Foundation materials are sand and gravel, serving as a suitable base for the rubblemound structure. A 253-meter-long concrete floating breakwater would be on the southeast side of the basin. This would protect the harbor from vessel wakes, diffracted waves from the southwest, and waves from the east. A 145-meter-long concrete floating breakwater would be on the northern limit of the basin for protection from northeast waves.

5.1.2 Channels and Basin

The project would accommodate a fleet of 75 vessels in a 5.6-hectare mooring basin. Vessel sizes range from 24 to 45 meters in length. Dredging is required only along shore in the mooring area. Dredging would be to a depth of –5.5 meters MLLW. The location of the entrance channel and the maneuvering area are shown on figure 4-8. The required depths in the maneuvering area and entrance channels would be -5.5 and -6.1 meters MLLW, respectively. However, natural depths are deeper than required for the design vessel in the maneuvering area and entrance channels. Minimal maintenance dredging would be expected during the life of the project.

5.1.3 Placement of Dredged Material and Intertidal Fill

The dredged material is expected to be primarily sand and gravel, and some rock. Dredged material would be used to construct a staging area that would be essential for launching boats, providing access to boat moorage, and facilitating safe and efficient harbor operations. The volume needed for intertidal fill is expected to exceed the volume of dredged material. The area of intertidal fill may be reduced to balance the volume of dredged material. The finished elevation of the intertidal fill would be 3.0 meters MLLW and the side slopes would be layered with rock.

5.1.4 Mitigation Plan

Mitigation plan components would be incorporated into the recommended plan. Those features would include physical modifications, requirements placed on the contractor, operational requirements assumed by the sponsor, and compensatory mitigation.

Avoidance and Minimization. The rubblemound breakwater would be shifted to the north edge of the intertidal reef to avoid and preserve the mussel bed. A gap would be left between the shore and the end of the breakwater for a fish passage breach. The additional cost for this rubblemound breakwater alignment is included in the project cost for breakwaters.

Mitigation During Construction. Each "Mitigation During Construction" alternative considered in Section 4.5.2 would be incorporated as part of the recommended plan.

Standards or Procedures for Operations. Each "Standard or Procedure for Operations" considered in Section 4.5.3 would be incorporated as part of the recommended plan.

Compensatory Mitigation. Subtidal areas in protected waters of Iliuliuk Harbor would be filled to create 0.8 hectare of intertidal habitat to replace the same intertidal habitat destroyed or substantially impacted by construction of the LSA-South alternative. Specific sites, elevations, grain size of fill material, and habitat objectives would be determined during project design and would be coordinated with State and Federal resource agencies. This mitigation measure would be monitored for 3 years after construction to evaluate the success of the mitigation. Interpretive signs explaining the role of Unalaska in World War II and events at Little South America would be placed at the harbor on Hill 400 overlooking the harbor. *View to the Past: A driving guide to World War II Buildings and Structures on Amaknak Island and Unalaska Island* would be reprinted to provide information about World War II sites and activities to the interested public. A website to be maintained by the Museum of the Aleutians would be developed so that people interested in World War II in the Aleutians, including Little South America would have access to information that is in danger of being lost.

Endangered Species. Principal terms and conditions of the 2003 USFWS draft biological opinion are integrated into the first three categories of the mitigation plan. All terms and conditions of the final biological opinion would be incorporated into the mitigation plan after acceptance by the Corps and the non-Federal sponsor (City of Unalaska).

5.1.5 Relocations and Removals

Relocation is providing a functionally equivalent facility, regardless of the depth of the navigation project, to the owner of an existing utility, cemetery, highway, railroad and bridge, or other public utility. Relocation does not include existing bridges over navigable waters. Removals consist of obstructions to the navigation project. The cost of relocations and removals is borne by the non-Federal sponsor and the utility/obstruction owner in accordance with Section 101(a)(4) of WRDA 86, as amended. No relocations or removals are anticipated.

5.2 Plan Benefits

Benefits for the NED/recommended plan (LSA-South alternative) are summarized below. See Appendix B Economics Analysis for details of project benefits.

Table 5-1. Summary of annual benefits

	Without-Project Costs ($)	With-Project Costs ($)	Savings ($)
Rafting and congestion related expenses:	715,000	429,000	286,000
Dock/Piling damages	65,000	39,000	26,000
Vessel damages	650,000	390,000	260,000
Travel-related expenses:	2,358,514	492,246	1,866,268
King Cove and Sand Point	492,246	492,246	0
Pacific Northwest travel	1,866,268	0	1,866,268
Total	**3,073,514**	**921,246**	**2,152,268**

5.3 Plan Costs

Table 5-2 presents the detailed estimated costs of the recommended plan for harbor improvements. Table 5-2 also has the benefit/cost analysis, including annual costs and benefits.

The local sponsor may request that the Corps of Engineers dredge the mooring basin as part of the Federal construction contract for general navigation features. The local sponsor would be responsible for 100 percent of the costs for dredging the mooring basin. The contract mob/demob cost would be split based on the ratio of GNF costs and LSF (mooring basin dredging) costs in the contract. The sponsor would still pay the local cost share portion of the federal GNF mob/demob costs (10 percent during construction plus 10 percent deferred) calculated in the split.

Interest during construction (IDC) was added to the initial cost to account for the opportunity cost incurred during the time after the funds have been spent, but before the benefits begin to accrue. IDC was calculated by matching the construction expenditure flow with the interest the funds would have accumulated had they been deposited in an interest-bearing account. Preconstruction, engineering, and design (PED) is assumed to take a minimum of 9 months. Construction is expected to last for 24 months. For this analysis, midpoint of construction is assumed. The cost estimate is shown in Appendix F.

Table 5-2. LSA-South alternative

	Qty	Units	Unit Price	Contingency	Amount
Mobilization & Demobilization	1	LS	1,180,000	15%	1,357,000
Breakwater and Seawall Construction					
Floating Breakwaters					
East - Floating Breakwater	253	m	13,940	20%	4,232,000
North - Floating Breakwater	145	m	13,497	20%	2,348,000
			Total Floating Breakwaters		6,580,000
Rubblemound Breakwater					
Core Rock	15,000	m^3	60.12	20%	1,082,000
B-Rock	6,400	m^3	93.07	20%	715,000
Armor Rock	6,300	m^3	135.80	20%	1,027,000
Hydrographic Survey	1	LS	26,100	20%	31,000
Navigation Foundation	1	LS	9,800	20%	12,000
Fence at Mussel Bed	1	LS	21,100	20%	25,000
			Total Rubblemound Breakwater		2,892,000
Breakwater and Breach Monitoring [a]	1	LS	50,000	N/A	50,000
Avoid Important Cultural Resource Sites [a]	1	LS	135,000	N/A	135,000
Create Intertidal Habitat [a]	1	LS	590,000	N/A	590,000
Steller's Eider Studies [b]	1	LS	100,000	N/A	100,000
Dredging					
Sand/Gravel	31,800	m^3	8.22	20%	314,000
Rock	4,800	m^3	140.38	20%	809,000
Upland Disposal (City Landfill Cover)	-	m^3	16.55	20%	-
Hydrographic Survey	1	LS	31,400	20%	38,000
Silt Barrier	1	LS	155,800	20%	187,000
Water Quality Analysis	1	LS	109,100	20%	131,000
				Total Dredging	1,479,000
Constructed Staging Area					
Intertidal Fill	36,600	m^3	22.13	20%	972,000
Slope Armor	1,600	m^3	60.12	20%	115,000
			Total Constructed Staging Area		1,087,000
Mooring Facilities	1	LS	5,615,100	20%	6,738,000
Boat Ramp	1	LS	383,300	20%	460,000
			Construction Contract Cost		21,468,000
Lands & Damages	1	LS	362,000	20%	434,000
PED	1	LS	750,000	20%	900,000
Construction Management	1	LS	875,000	20%	1,050,000
Aids to Navigation (U.S. Coast Guard)	1	LS	20,000	N/A	20,000
			Total Project Cost		23,872,000
Interest During Construction					1,336,000
NED Investment Cost					25,215,000
Annual NED Cost (50years @ 5-5/8%)					1,517,000
Annual OMRRR					82,000
Total Annual NED Cost					1,599,000
Average Annual Benefits					2,152,000
Benefits to Cost Ratio (BCR)					1.3
Net Annual Benefits					553,000

[a] Mitigation costs not include elsewhere in estimate.
[b] ESA, terms and conditions costs not include elsewhere in estimate.

5.4 Sensitivity Analysis

Sensitivity analysis tests project justification and scoping to changes in the major variables used to compute project benefits. Two methods used are risk and uncertainty and a computer model, @RISK. Appendix B, Economic Analysis, Section 7.0 Sensitivity Analysis is a detailed discussion of the benefit assumptions and variables used for project justification. The sensitivity analysis examines likely ranges of values for the major benefit categories: Pacific Northwest (PNW) travel and vessel damages. The current benefit-to-cost ratio (BCR) is 1.3 as show in table 5.2.

Risk and Uncertainty examines project justification by changing major benefit categories individually by discrete percentage changes and evaluates the BCR with the changed total benefits. Only benefit reductions are evaluated since benefit increases do not jeopardize project justification. Reductions in PNW travel of 25 percent and 50 percent result in BCR's of 1.1 and 0.8, respectively. Similar reductions in vessel damages of 25 percent and 50 percent result in BCR's of 1.3 and 1.2, respectively.

Additionally, a similar evaluation can be done holding benefits static and varying the project cost. Such a calculation shows project cost could increase by 40 percent with a BCR of 1.0.

Computer modeling with @RISK uses the technique of Monte Carlo simulation for risk analysis. With this technique uncertain benefit values are specified as probability distributions and numerous iterations of the model are run. This analysis ran the computer model with over 100,000 combinations of benefit values. The result of the computer modeling with @RISK indicates the project has a 90 percent probability of a BCR between 1.5 and 2.2 assuming no change in project costs.

More work in developing cost and benefit calculations will refine the BCR. However, refinements in values are unlikely to result in a negative project determination. The conclusion can be drawn that the project has a solid BCR of 1.3.

5.5 Plan Accomplishment

The recommended plan would meet the planning objectives for Unalaska in the following ways:

- Provide protected permanent moorage for commercial fleet operations.
- Reduce damages and operating costs related to rafting
- Reduce travel related costs for fishing fleet due to unavailability of moorage.
- Preserve environmental resources by avoiding and minimizing project impacts to the maximum extent practicable.
- Compensate for project environmental impacts to the extent that is justifiable and practicable.

5.6 Plan Implementation

5.6.1 Construction

Federal. The Corps of Engineers would be responsible for construction of the general navigation features (GNF) and mitigation measures. GNF consists of the rubblemound and floating breakwaters, entrance channel, and maneuvering area. The U.S. Coast Guard would be responsible for installing aids to navigation.

Local. The sponsor would be responsible for the construction of local service facilities (LSF). LSF include excavating the mooring basin, constructing the float system, and the boat ramp. The sponsor is responsible for providing all lands, easements, and rights-of-way necessary for the project. The sponsor is also responsible for funding its share of the Federal GNF.

5.6.2 Operation, Maintenance, Repair, Replacement, and Rehabilitation (OMRRR)

Federal. The Corps of Engineers would conduct periodic inspections of the rubblemound and floating breakwaters, hydrographic surveys of the entrance channel and maneuvering area, and maintain the breakwaters, channels, and maneuvering area as needed. The U.S. Coast Guard would maintain navigational aids.

Local. The sponsor would perform maintenance dredging of the mooring basin if necessary, maintain the floats, utilities, etc., and operate the completed project. The local sponsor may use dredged material for approved fill activities or other construction activities.

5.6.3 Real Property Interests

The sponsor is required to provide all lands, easements, and rights-of-way necessary for construction of the project. Public access is available to the project. Ounalashka Corporation (an Alaska Native Village Corporation under ANCSA) currently owns the upland surface estate required for the project indicated by a preliminary title search. The City of Unalaska and the State of Alaska currently own tidelands. There is no known mining activity occurring in the area, other than the use of subsurface mineral material for construction of roads and other similar uses. It is not anticipated that the presence of any hazardous and toxic wastes will adversely affect acquisition of project lands. Real estate requirements anticipated for the federal project are: (1) permanent easements for breakwater tie-ins and (2) temporary easements for construction and staging areas. Temporary easements would be for 2 years. No interest is required for lands below mean high water as these areas are subject to the Federal right of navigation servitude. It is not anticipated that relocation assistance benefits in accordance with Public Law 91-646 will be required for this project. See Appendix D Real Estate Plan for the areas and interests required for the project features. A schedule of 4 to 6 months is estimated to complete acquisition and certification of all real estate required for project construction.

5.6.4 Cost Apportionment

Construction costs for the project would be apportioned in accordance with the Water Resources Development Act of 2000. The fully funded cost apportionment for the project features is summarized in table 5-3.

Table 5-3. Apportionment of construction costs

	Construction cost contribution (%)	
Portion of project	Federal	Local
General navigation features (includes entrance channel, maneuvering basin, and breakwaters)	80	20°
Local features (includes floats and mooring basin)	0	100
Coast Guard navigation aids	100	0

'Non-federal interests must provide cash contributions toward the costs for construction of the general navigation features (GNF) of the project, paid during construction (PDC) as follows: For project depths of up to 20 ft-10%; for project depths over 20 ft and up to 45 ft-25%, and for project depths exceeding 45 ft-50%. For all depths, they must provide additional cash contribution equal to 10% of GNF costs (which may be financed over a period not exceeding 30 years), against which the sponsor's costs for LERR (except utilities) shall be credited. Note: Costs for general navigation features include associated costs, such as mobilization and required mitigation.

The sponsor is also responsible for 100 percent of the construction cost of the inner harbor facilities, which includes dredging the mooring area and the intertidal fill. Table 5-4 provides a breakdown of the initial Federal and non-federal costs of the project of the NED plan. The fully funded cost of the NED plan escalated to the mid-point of construction is estimated as $25,589,000.

The Federal Government will assume 100 percent of the operation and maintenance costs for the breakwaters and entrance channel. The non-federal sponsor will assume all other operation and maintenance costs. The sponsor would be responsible for providing lands, easements, and rights-of way (LERR) for construction and future maintenance of the inner harbor.

In addition to the sponsor's share of costs for GNF, the sponsor is responsible for costs associated with other NED and non-NED features. The pertinent data table in the front of this report provides a summary of all shared costs.

5.7 Views of the Local Sponsor

Since initiation of this feasibility study representatives from the City of Unalaska (local sponsor) have been members of the project delivery team working closely with the Corps of Engineers. The City of Unalaska has included representatives from the adjacent landowner (Ounalashka Corporation) and the Qawalangin Tribe (a federally recognized tribe located in the community) as part of the local sponsor's team. Cooperation between the various entities resulted in the selection of the NED and Recommended Plan. The community of Unalaska, in an advisory election held October 1, 2002, stated their support for a harbor at Little South America South, which is the location identified in the Recommended Plan.

5.8 Financial Analysis

The City of Unalaska is planning to meet its financial commitment by issuing general obligation (GO) and/or revenue bonds and general fund cash. The City of Unalaska's city council has already designated $5,000,000 in general funds to be set aside for the Unalaska Harbor project. The State of Alaska had approved a debt reimbursement program that specifically lists the Unalaska Harbor project for up to $5,000,000. A letter stating the city's financial plan and capability is enclosed in Appendix E.

Table 5-4. Federal/Non-Federal cost apportionment for recommended plan

	(Oct 2003 price level)	Implementation Costs ($000)			
Items	Total Proj Cost ($000)	Federal	%	Non-Federal	%
General Navigation Features (GNF)					
Mobilization/demobilization	1,357	1,221		136	
Breakwaters and Seawalls	9,472	8,525		947	
Mitigation [a]	775	698		78	
Steller's Eiders Studies [b]	100	90		10	
Preconstruction, Engineering, and Design	900	810		90	
Construction Management	1,050	945		105	
LERR (GNF)-Federal Administrative Costs [c]	19	17		2	
TOTAL GENERAL NAVIGATION FEATURES	13,673	12,306	90	1,367	10
Additional Funding Requirement					
10% of GNF		-1,367		1,367	
GNF LERR Credit [d]		195		-195	
Adjustment for GNF LERR Credit		-1,172		1,172	
Subtotal of GNF Related Items	13,673	11,133		2,540	
LERR (GNF) - Acquisition Credit	195	0	0	195	100
Aids to Navigation	20	20	100	0	0
Local Service Facilities (LSF)					
Mooring Basin and Disposal	2,566	0		2,566	
Mooring Facilities	6,738	0		6,738	
Boat Ramp	460	0		460	
LERR (LSF)	220	0		220	
TOTAL LOCAL SERVICE FACILITIES	9,984	0	0	9,984	100
	23,872	**11,153**		**12,719**	

[a] Environmental and cultural mitigation costs not included elsewhere in estimate

[b] ESA, terms and conditions costs not included elsewhere in estimate

[c] The local sponsor pays 10% of the Federal GNF LERR cost.

[d] GNF LERR credit includes the local sponsor's administrative and acquisition costs for the GNF LERR.

6.0 AFFECTED ENVIRONMENT

6.1 Regional Context

The City of Unalaska is on two islands in the eastern segment of the Aleutian Chain. The islands of the chain are the peaks of undersea mountains modified by glaciers and the sea. They typically are steep with predominantly rocky shorelines on the outer coasts. The islands on this great arc of approximately 1,800 km are a westward projection of the Aleutian Range and the Alaska Peninsula. The archipelago consists of 14 large islands and many small islands, islets, and other bits of land that are more or less permanently above the highest range of the tide. These islands occupy an area of about 1.77 million hectares and have a total shoreline length estimated at 10,000 km.

Human activity and development in the region has always been primarily along the island shorelines. Past and present human activity is evident in pre-contact Unangan (Aleut) coastal sites, contemporary communities, and both active and former military bases and battlefields. The Aleutians are surrounded by rich fishing grounds that produce catches of king and Tanner crab, pollock, Pacific cod, rock sole, black cod, halibut, and other fishes in abundance. The modern fishing port at Unalaska annually delivers a significant portion of America's seafood catch.

The lives of the people inhabiting the Aleutian Islands traditionally have been directly tied to the fish and wildlife resources of the region, through direct personal use, and more recently through commercial harvest. Many of the islands in the Aleutian Chain are now uninhabited, some of them because the U.S. Government moved the Unangan people from their communities during World War II. Many of the people of the region still are closely connected economically and/or in more traditional ways to the natural resources of the region.

6.1.1 Communities of the Region

The western 1,600 km of the Aleutian Island chain is not in an organized borough or other broader unit of local government. For purposes of population statistics, funding distribution, and other regional government statistics and functions, this huge unincorporated area is generally referred to as the Aleutians West Census Area. The 480-km eastern group of the Aleutian Islands and the western end of the Alaska Peninsula are joined in a single local government, the Aleutians East Borough. Most inhabitants of the region are settled in six communities in the Aleutian East Borough and five communities in the Aleutian West Census Area (figure 6-1). The populations of these communities are listed in table 6-1.

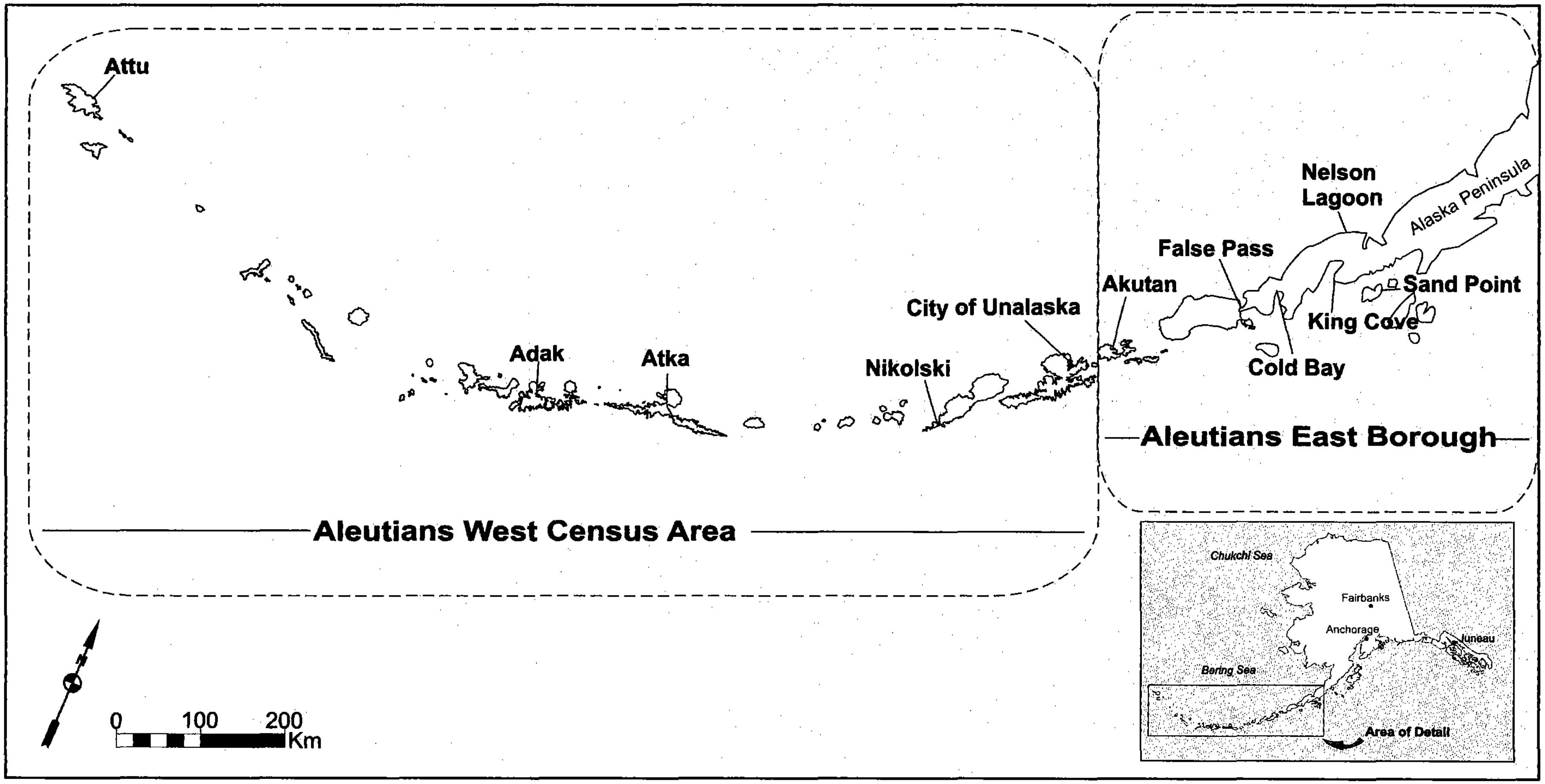

Figure 6-1. Communities in the Aleutian Islands and Western Peninsula

Table 6-1. Populations of communities in the Aleutian Islands and western Alaska Peninsula (2000 U.S. Census).

Community	Population
Aleutians East Borough	
Sand Point*	952
King Cove*	792
Akutan	713
Cold Bay*	88
Nelson Lagoon*	83
False Pass	64
Aleutians West Census Area	
Unalaska	4,283
Adak	316
Atka	92
Nikolski	39
Attu	20
Total	**7,442**

*Alaska Peninsula community

As is evident in the table, the City of Unalaska is the largest community in the Aleutian Chain. Its population in 2000 accounted for 58 percent of the combined population of the Aleutians West Census Area and Aleutians East Borough, and was more than four times as large as Sand Point, the second largest community (table 6-1). Unalaska has for some time served as an international hub for the multi-million dollar fishing industry in the Bering Sea and is the economic and transportation center for all the Aleutians and coastal Southwestern Alaska (AWCRSA 2003).

The City of Unalaska is on two adjacent islands–Unalaska Island and Amaknak Island. Part of the city is on the northeast side of Unalaska Island at the head of Iliuliuk Bay, an arm of Unalaska Bay, and is referred to as Unalaska. This side of the city has the original town site, city offices, and most of the retail shops, businesses, and restaurants. The remainder of the city is on Amaknak Island and is referred to as the Port of Dutch Harbor, and is mostly near and around a sheltered cove on the northwest side of Iliuliuk Bay. This side of the city has the airport, a principal marine port, and most of the industry. The two islands are connected by a low two-lane highway/bridge across South Channel (figure 2-1). The bridge is locally known as "The Bridge to the Other Side."

Steep rugged mountains rise from the shore of Unalaska Island and confine development to narrow strips of trees and ragged topography. Amaknak Island has more relatively level land and more potential for expansion and development.

6.1.2 Transportation

Information on transportation and industry in Unalaska was compiled from the City of Unalaska 1993 Comprehensive Plan and the Aleutian West Coastal Resource Service Area Plan, unless otherwise noted. Most passengers and mail to and among the islands of the region are transported by air. Unalaska is the busiest airport in the region and is a key mail and passenger transportation hub for the Aleutians. Most other freight and petroleum products are transported by ship or barge to the region's communities, and almost all the fisheries products are shipped out by sea. Unalaska also has ship repair facilities, storage capacity, capability to re-supply and refuel vessels, and other infrastructure necessary to support regional fisheries and transportation functions. Marine facilities and support services at Unalaska are a crucial component of the fishing industry that drives the economy of Unalaska. Table 6-2 and figure 2-2 show the characteristics and locations of the Unalaska marine transportation facilities, which are the most extensive in the region.

Appendix B (Economics) and Section 2 identified damage, risk, and inefficiencies that result from the lack of harbor space for boats 24 to 45 meters long. The docks and other moorage sites used most commonly by boats in the 24 to 45-meter range are identified in figure 2-2.

The City of Unalaska controls and operates four major dock facilities in Dutch Harbor: the Spit Dock, the Unalaska Marine Center, the Small Boat Harbor and the Light Cargo Dock. The city expanded the Unalaska Marine Center in Dutch Harbor to 625 linear meters in January 2003 to accommodate U.S. Coast Guard berthing and port facilities. The Spit Dock is available for transient and long-term moorage of large commercial and fishing vessels. Longliners, draggers, gillnetters, and recreational vessels primarily use the city-operated small boat harbor floating docks in Expedition Inlet.

Unalaska has seven other major docks and a number of smaller docks. The APL (American President Line) and City of Unalaska docks are generally used to offload products. Thirty vessels 60 meters longand less can moor at the Spit Dock and the Unalaska Marine Center. Fishing vessels less than 30 meters long typically dock at the small boat harbor, the Unalaska Marine Center, or the Spit Dock. In total, the public and private mooring facilities in Unalaska can accommodate approximately 200 vessels up to 60 meters long, if vessels are rafted five deep.

The Alaska Marine Highway System (state ferry system) runs the *MV Tustumena* to Unalaska and other communities in the western Alaska Peninsula and the Aleutians from April through September. Freight carriers provide containerized, break-bulk, or barge shipping from Seattle and Anchorage.

Road systems play only a minor role in the Aleutians in terms of regional transportation, as they rarely extend beyond the boundaries of individual communities. Unalaska has the most extensive local road system, with 61 km of road maintained by the city. Amaknak and Unalaska islands are the only islands in the Aleutian Chain connected by road.

Table 6-2. Marine infrastructure in Unalaska

Location	Owner	Dock Length	Berth Depth	Services*
Captain's Bay				
	Westward Seafoods	347m (1,140ft)	12m (40ft)	W, F1, S
	North Pacific Fuel	125m (410ft)	11m (35ft)	F1, W
	Offshore Systems Inc.,	352m (1,155ft)	8m (25ft)	W, F1, S, Wr, C, Fr, St, H, G
	Port Levashef	61m (200ft)	5m (15ft)	G
Iliuliuk Harbor				
	Unisea G-1 Dock	244m (800ft)	8m (25ft)	W, S
	Unisea G-2 Dock	247m (810ft)	8m (25ft)	W, S
	Royal Aleutian Dock	27m (90ft)	6m (20ft)	W
	Barge Royal Aleutian	91m (300ft)	9m (30ft)	W, S
	Coastal Marine Dock	128m (420ft)	?	?
	Alyeska Seafoods	277m (910ft)	11m (35ft)	W, S
	Galaxy Dock	18m (60ft)	6m (20ft)	None
	Walashek Shipyard	18m (60ft)	6m (20ft)	Shipyard work, chandlery
Dutch Harbor				
	Alaska Ship Supply Dock	117m (380ft)	9m (30ft)	Freight, moorage
	Trident Seafoods Dock	87m (280ft)	8m (25ft)	W, Wr, F1, G
	North Pacific Fuel	82m (270ft)	6m (20ft)	F1, W, S, Wr, G
	Icicle Dock	24m (80ft)	6m (20ft)	W, G, moorage
	Delta Western Fuel	152m (500ft)	11m (35ft)	W, Fl
Iliuliuk Bay				
	American President Lines	165m (540ft)	12m (40ft)	W, F1, H, longshoring
Unalaska Marine Center	City of Unalaska	402m (1,320ft)	11-14m (35-45ft)	E for USCG & ADFG W, Fl, Wr, Wt, H, Sewer
Spit Dock				
	City of Unalaska	600m (1,970ft)	6-12m (20-40ft)	E, W, Wt
Small Boat Harbor				
	City of Unalaska	1,585m (5,200ft) moorage 1,230m (4,035ft) floating	2m-9m (6-30ft)	E, W, Wt portable toilet
Light Cargo Dock				
	City of Unalaska	104 m (340 ft) moorage	7-8m (22-25ft)	

* **Services Include:** C = cold storage; E = electricity; F1 = fuel; Fr = freezer; ft=feet; m=meters; W = water; Wr = warehouse; Wt = waste disposal; S = supplies; St = stevedoring; H = heavy equipment; G = outside pot and gear storage.

One airport, operated by the city, serves Unalaska. It is on Amaknak Island at Dutch Harbor and has a 1,190-meter paved runway oriented southeast/northwest. The runway is marginal for jet airliner service. If weather permits, the city is daily served by scheduled flights. Other carriers operate on a charter basis for freight and passengers.

6.1.3 Utilities and Basic Services

The City of Unalaska operates a municipal drinking water system. A new water reservoir was completed at Icy Creek in the late 1990's. Metered water consumption averages over 68 million gallons per month with peak use exceeding 6 million gallons per day.

The sanitary sewer system was constructed in the 1980's and is operated by the city. The sewer system is being upgraded to meet new National Permit Discharge Elimination System permit requirements. Further expansion of the collection system is planned.

The city operates a 4-hectare landfill, equipped with a refuse baler. All baled materials are buried in the landfill. The landfill has three lined cells and one unlined cell with a total life expectancy of about 33 years, based on about 13,637 cubic meters per year. All wood products are burned. Metal and nets are shipped off the island.

The city generates electric power from two diesel-powered generating plants that have a combined installed capacity of 7.5 megawatts. Some fish processors purchase their power from the city, but several have their own electrical generation capability.

Three companies store and sell bulk fuel in the community. They have a combined storage capacity of approximately 18 million gallons of marine, automobile, and aviation fuel. A majority of households (68.3 percent) use fuel oil or kerosene to heat their homes.

6.1.4 Cultural and Recreational Opportunities

Unalaska's resource-rich environment offers a variety of recreation opportunities including wildlife viewing, bird watching, photography, hiking, sport fishing, hunting, kayaking, biking, flightseeing, beachcombing, and historical and cultural tours. Good hiking trails are on Pyramid Peak, south of town, and up Mount Ballyhoo, which tops out at 484 meters above sea level. Many recreational visitors to Unalaska are considered "adventure travelers," seeking recreational experiences in unusual and remote destinations. A great deal of this recreation takes place on land owned by Ounalashka Corporation. Public recreation on the corporation's 45,540 hectares on Unalaska, Amaknak, and Sedanka islands is allowed through a permitting process.

Unalaska is a community of diverse cultures, primarily focused on fishing and fish processing activities. It attracts a wide variety of people from Alaska, the "Lower 48," and foreign countries, particularly Pacific Rim countries, to the fishing and fish processing industries.

Unalaska has a strong arts and cultural community. There is an active community of artists, some of whom are nationally recognized. There are a number of local art and cultural festivals and camps, with opportunities for the entire community to participate. The Museum of the Aleutians is an 873-square-meter facility, providing the only archaeological research and museum storage facility in the Aleutian region. The Qawalangin Tribe holds a culture camp during the summer. Short marathons are held several times a year, as are organized outings for marine mammal and bird watching. One event gaining national recognition is the "Annual World Record Halibut Derby." The world record halibut (226 kg) was caught during the derby in 1996.

Many Unalaska residents maintain their ties to the land and community, not only by participating in the resource-based economy and local art and cultural activities, but also by participating in the gathering and sharing of local wild plants, animals, and other natural resources. Hunting, fishing, and berry picking for personal use are important social, recreational, and cultural links for many people of Unalaska as both traditional and non-traditional activities. Much of this activity takes place on land owned by Ounalashka Corporation.

In 1996 Congress designated the Aleutian World War II National Historic Area, to interpret, educate, and inspire present and future generations about the history of the Unangax^, and the role of the Unangan people and the Aleutian Islands in the defense of the United States in World War II. This affiliated area park is a partnership between the general public and the National Park Service because the federal government does not own or manage the parkland, as it does in more traditional national parks. The land is owned by the Ounalashka Corporation.

6.1.5 Unalaska Demographics

In 2000 the population of Unalaska was 4,283, and it ranked as the 11th largest city in Alaska, behind Anchorage, Fairbanks, Juneau, Sitka, Ketchikan, Kenai, Kodiak, Bethel, Wasilla, and Barrow, in that order. Unalaska has grown for over 50 years, with major population increases every decade since 1970 (figure 6-2). As of the census of 2000, there were 834 households and 476 families residing in the city.

The population of Unalaska has a strong seasonal employment component. During peak seasons, the normal population can triple or even quadruple as people come from all over the world to work in the fishing and processing industry.

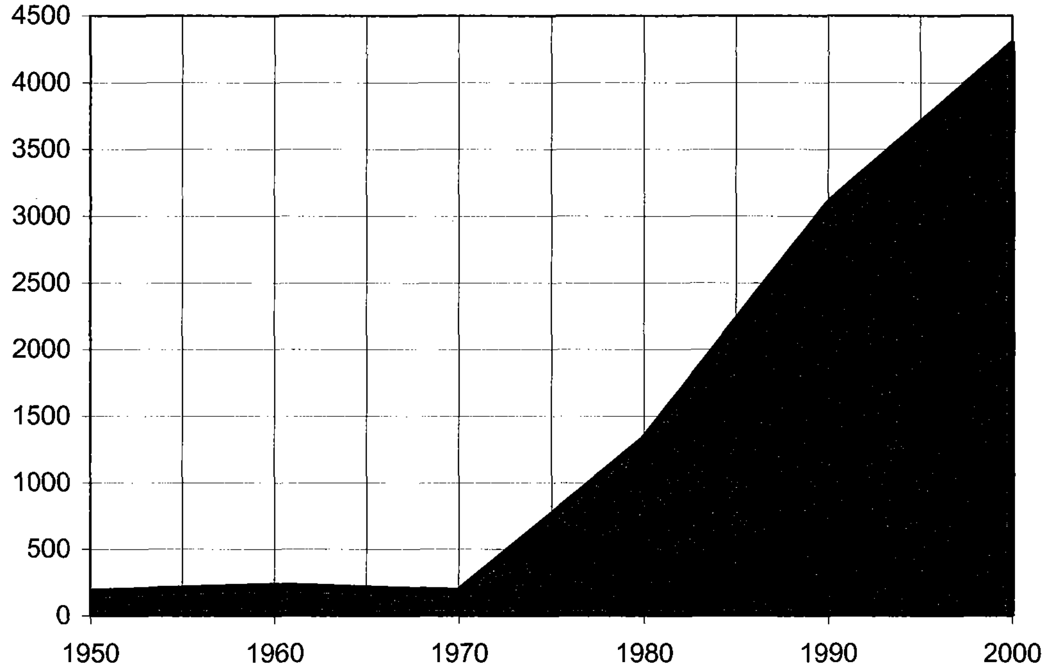

Figure 6-2. Unalaska population 1950 to 2000 (U.S. Census Bureau).

6.1.6 Community Services

The City of Unalaska Department of Public Safety, Police Division, along with the Alaska State Troopers, provide law enforcement services for Unalaska. The Unalaska Fire Department (of the Unalaska Department of Public Safety) is responsible for providing all fire and emergency medical services (EMS) for Unalaska. The department has a full time staff of four personnel and approximately 40 volunteers. They operate out of two stations with two engine companies, one truck company, two rescue vehicles (Advanced Life Support Ambulances), and five miscellaneous staff and support vehicles. On average the department responds to about 40 fire and 350 EMS calls per year. Due to the dangerous nature of fishing, a high percentage of the EMS calls are traumatic in nature and require definitive treatment at larger facilities. They routinely receive patients from smaller outlying communities and vessels via the Coast Guard medevac helicopter.

Health care is available from Iliuliuk Family and Health Services, Inc. The clinic provides a range of services and has X-ray and lab facilities, mental health counseling, and outpatient substance abuse services. The Aleutian/Pribilof Island Association operates the Oonalaska Wellness Center that includes a variety of medical and health programs.

Unalaska is served by the Unalaska School District. There are several schools – Unalaska Preschool for preschool and pre-kindergarten students, Eagle View for kindergarten through fourth grade, Unalaska City School, with grades 5 through 12, and Walkabout, an alternative school. The total enrollment for these schools in 2003 was 392 students with 30 teachers.

Unalaska has a Community Center that offers a wide variety of programs and activities. The 2,787-square-meter facility includes a walking/running track, gymnasium, exercise and weight rooms, two racquetball courts, a multi-purpose room, kitchen, kid and teen rooms, and an art and pottery studio.

The Unalaska Public Library contains about 10,000 volumes. There is public Internet access, a meeting room, a reference collection, and a fairly extensive Aleutian collection, with a complete collection of Aleutian region newspapers.

The Father Ishmail Gromoff Senior Center opened in December 1996. It is the only low income housing in the city designed specifically for seniors. The senior center holds a variety of activities for its residents throughout the year and serves as a gathering place for the senior community.

6.1.7 Employment and Income

Figure 6-3 shows employment in Unalaska by the larger segments. The largest employment sector is manufacturing (36 percent), which for Unalaska is primarily seafood processing and marine servicing. During the 2000 U.S. Census, 2,681 residents of Unalaska were employed. The unemployment rate was 13.4 percent. The median income for a household in the city was $69,539 and the median income for a family was $80,829. The per capita income for the city was $24,676.

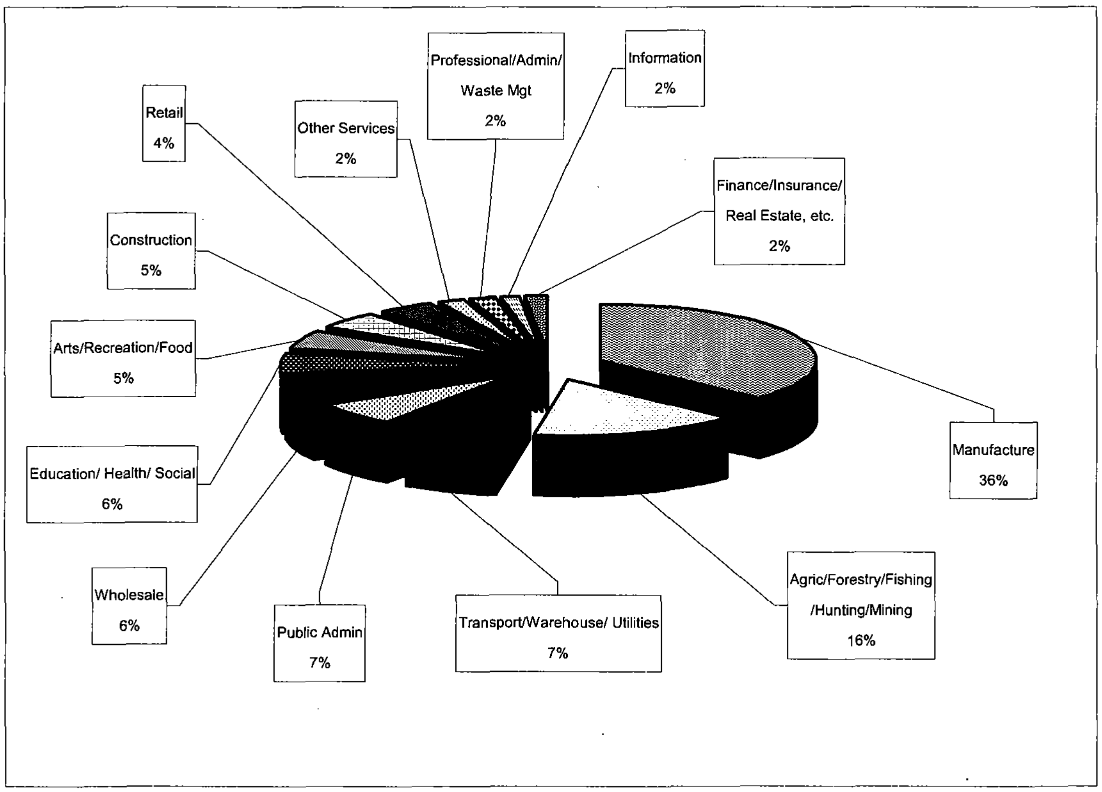

Figure 6-3. Employment distribution by industry in Unalaska.

6.1.8 Economy

Information on the economy of Unalaska was compiled from the City of Unalaska Comprehensive Plan and the Aleutians West Coastal Resource Service Area Plan unless otherwise noted.

Unalaska has the most diversified and complex economy of all the communities in the Aleutians. As the largest community in the Aleutians, the economy of this city is a driving force in the economy of the entire region. Unalaska is recognized both as an international trade center and a regional transportation and trade hub. Commercial fishing and fish processing are the major economic components, and the fishing and port-related service sectors are well developed. A vital segment of Unalaska's business sector provides service, repair, and maintenance to the domestic and foreign fishing fleets, plus service to onshore and offshore based processors. Dutch Harbor provides natural protection for fishing vessels. The Great Circle shipping route from major west coast ports to the Pacific Rim passes within 50 miles of Unalaska, which makes Unalaska a candidate for transshipment of cargo between Pacific Rim trading partners.

Between 1988 and 2001 the port of Dutch Harbor/Unalaska ranked as the number one U.S. port for volume of commercial fish landed, with an average annual landing of approximately 290 million kg, a low of approximately 153 million kg (1988) and a high of approximately 379 million kg (2001). With respect to value of landings during that same 14-year period, the port ranked number one in the U.S. between 1992 and 1999; ranked second in 1989, 1990, 1991, 2000, 2001, and 2002; and third in 1998.

Early in the 20th century, fishing and fish processing in Unalaska centered on the herring, salmon, and cod. From the late 1960's until the early 1980's, the red king crab fishery dominated fishing and fish processing in Unalaska. When that fishery was suspended during the early 1980's, the fishing industry diversified into ground fish and related products such as surimi, resulting in a shift from seasonal to year-round economic activity. Seven major shore-based seafood processors are located in Unalaska: Alyeska Seafoods, Unisea, Icicle Seafoods, Royal Aleutian Seafoods, Westward Seafoods, Prime Alaska Seafoods, and Osterman Fish. In addition to seafood processing, Unalaska provides goods and services to offshore seafood processors and to various foreign vessels and their crews, including foreign unscheduled cargo ships transporting fish products.

During the 1980's and 1990's the Unalaska economy experienced strong economic growth due to the strength of the ground fish industry. During the 1990's Unalaska saw an increase in tourism with increased inquiries to the Unalaska/Port of Dutch Harbor Convention and Visitors Bureau, increased cruise ship traffic, and increased visitors to the island. Visitors arrive by air, seasonally via the Alaska Marine Highway System (state ferry system), by cruise ship, and by private boats. With world record halibut caught in Unalaska in 1995 and 1996, charter fishing boats are in demand.

Unalaska's success as a thriving fishing center has resulted in demand for moorage space for the transient commercial fishing fleet that exceeds supply. This results in congestion at the docks, delays in loading and unloading materials and supplies, and damage to vessels and docks due to rafting. To meet moorage demand, the harbormaster rafts vessels as many as five or six deep during peak periods. This practice is costly in terms of damage to vessels and docks. Interior and exterior vessel damages occur from vessels swaying back and forth and against each other. Steel hulls hitting against structures places stress on the frames of the vessel. In addition, the constant rocking motion damages docks and pilings. Figure 6-4 shows the locations currently used for mooring commercial fishing vessels.

Over the past decade, the typical Unalaska vessel has evolved into a longer, wider, and deeper fishing vessel. Over half (55 percent) of vessels entering the harbor in 1999 ranged in size from 30 to 60 meters. Overall, 546 transient fishing vessels registered with the harbormaster in 2000. Most of this commercial fishing fleet is from the Pacific Northwest. However, some of the demand is from large transient vessels from neighboring ports that prefer Unalaska because of its marine and airport facilities and fleet services. Although other ports are closer to the Pacific Northwest than is Unalaska, nearby harbors are unable to serve the Unalaska fishing fleet because they are unable to support the volume and size-class vessels. Existing harbors and future port expansions will not provide sufficient space for large transient commercial vessels that frequent Unalaska. Commercial fishing vessels unable to secure moorage between fishing seasons find shelter in distant harbors, greatly increasing their operating expenses.

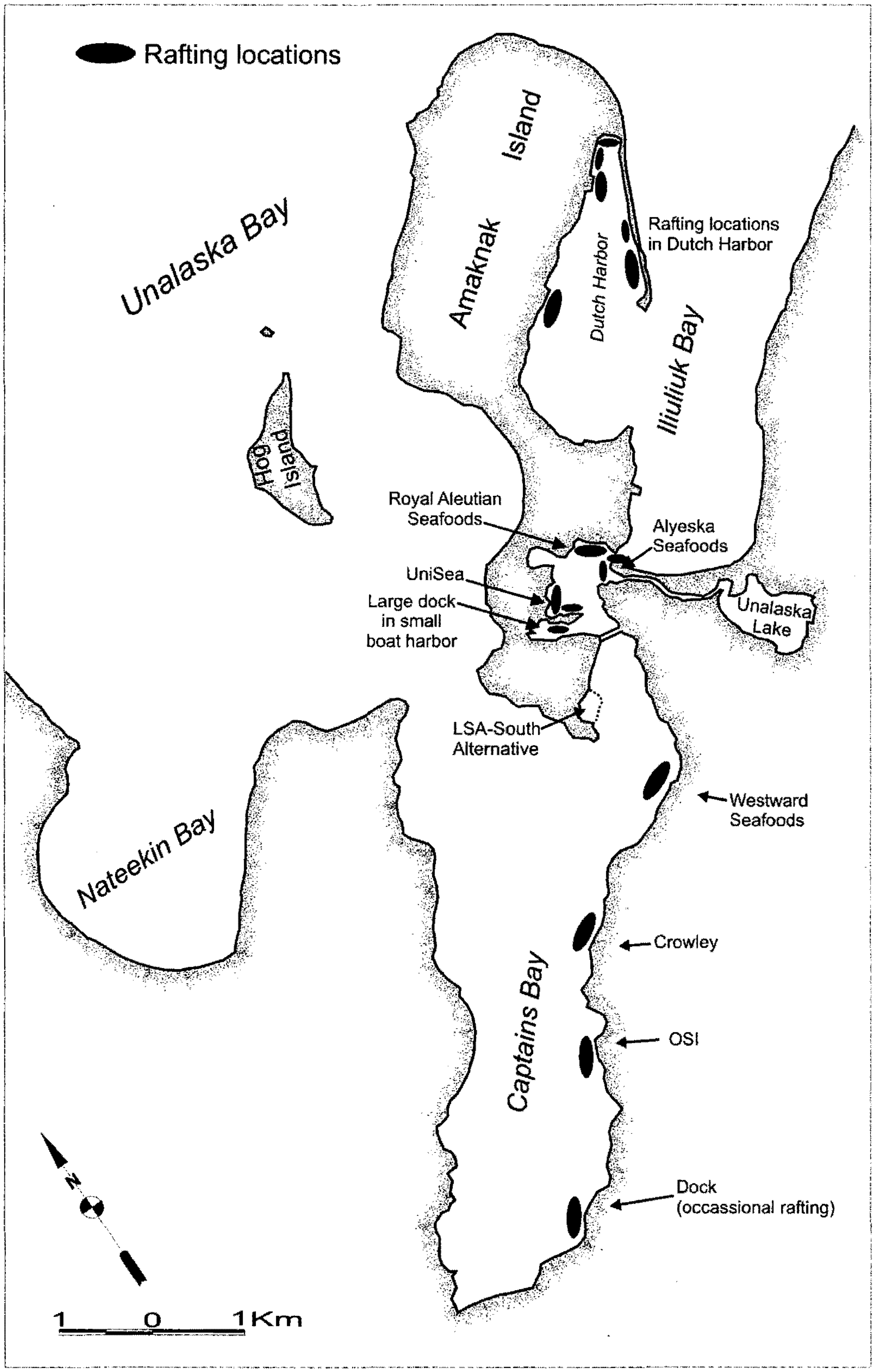

Figure 6-4. Rafting locations for commercial fishing vessels in Unalaska.

Commercial fishing based out of Unalaska is conducted throughout the year. Table 6-3 shows the openings and closings by month of each fishery from data obtained from the Alaska Department of Fish and Game website for the Bristol Bay/Bering Sea and supplemented from information provided by the City of Unalaska.

Table 6-3. Fisheries annual cycle by month

General Season	J	F	M	A	M	J	J	A	S	O	N	D
Adak Red King Crab	■	■								■	■	■
Aleutian Island Baridi Tanner	■	■	■									
Aleutian Island Brown King Crab	■	■	■					■	■	■	■	■
Atka Mackerel	■	■	■						■	■		
Bering Sea Bairdi Tanner Crab	■	■	■								■	■
Bering Sea Red/Blue King Crab									■	■		
Halibut			■	■	■	■	■	■	■	■	■	
Herring	■	■				■	■	■	■	■	■	■
Opilio Snow Crab	■	■	■									
Pacific Cod	■	■	■	■	■	■	■	■	■	■	■	■
Pollock A Season	■	■	■	■								
Pollock B Season						■	■	■	■	■		
Salmon						■	■	■				
Sablefish (Blackcod)		■	■	■	■	■	■	■	■	■	■	
Turbot					■	■	■	■	■	■		
Yellowfin/Rock Sole	■	■	■	■	■	■	■	■	■	■		

Source: ADF&G, 2003. Commercial Fishing Seasons in Alaska: Bristol Bay/Bering Sea and City of Unalaska

The most intensive and valuable fisheries at Unalaska take place during the winter months (January through March), but preparation for these fisheries sometimes starts several weeks before the fisheries open. During these times, the local population swells dramatically with the arrival of seasonal plant workers and offshore fishing crews, visiting technicians, and business representatives. Vessels engaged in winter fisheries and vessels preparing for fishery openings result in a very high moorage demand in Unalaska.

The annual fishing cycle starts in January when the trawl cod season opens. Many vessels trawling for cod deliver to shoreside processors and need dock space to replenish. Other vessels arrive at Unalaska in early January to prepare for the snow crab season, which opens in mid-January (ADF&G 2003) but is sometimes delayed as late as April because of unfavorable ice conditions in the Bering Sea. During years when the season opening for snow crab is delayed, crab fishing vessels "stack up" at Unalaska and demand for moorage is higher than normal.

Demand for dock space in Unalaska increases in early February as large trawlers arrive in Unalaska to fish for walleye pollock. The high-stakes walleye pollock fishery is divided into an "A" season fishery and a "B" season fishery. The A pollock fishery opens in January and continues through June. Other smaller fisheries for cod, and Atka mackerel take place in winter, but the major fisheries are for pollock and snow crab. These intensive, high-stakes fisheries continue into mid-April and demand for dock space is very high during these fisheries. Vessels fishing for snow crab and A season pollock are generally exceed 30 m. Some pollock trawlers are in the 40 to 60-meter range.

The demand for dock space lessens during early summer when smaller vessels in the 18 to 30-meter range dominate summer fisheries for Atka mackerel, sablefish, and Pacific cod. Some of the larger vessels leave Unalaska for the summer, but a few large trawling vessels fish for bottom fish while some larger vessels spend the summer in Unalaska gearing up for the high-stakes Season B trawl fishery that opens in June. Moorage demand increases during August when vessels return to Unalaska to prepare for this fishery. Fishing for B Season pollock continues into October.

More large fishing vessels arrive at Unalaska during August and September to prepare for the brown and red king crab seasons that typically open in August, September, and October, and for the Tanner crab season that opens in November. Moorage demand increases steadily though August and is high while these vessels are in port preparing for these fisheries. Crab fishing vessels conflict with the mooring needs of shoreside delivery trawlers and returning pollock B Season trawlers looking for moorage while they prepare for the pollock A fishery. The Tanner crabbers return to Unalaska for moorage in November. There is little fishing activity in December when most fishing vessels are in port for the holiday season, but moorage demand is heavy. Additional information on the value and tonnage caught at Unalaska fisheries is found elsewhere in this report.

More detailed information about fisheries and mooring demand is in Appendix B, Economics.

6.1.9 Environmental Justice Considerations

Figure 6-5 shows the 2000 population by race and ethnic origin. A federally recognized tribe–the Qawalangin Tribe of Unalaska–is located in the community. A little more than half the population of Unalaska is composed of racial minorities. Twelve-and-one-half-percent of the individuals, and 2 percent of families, were below the poverty level.

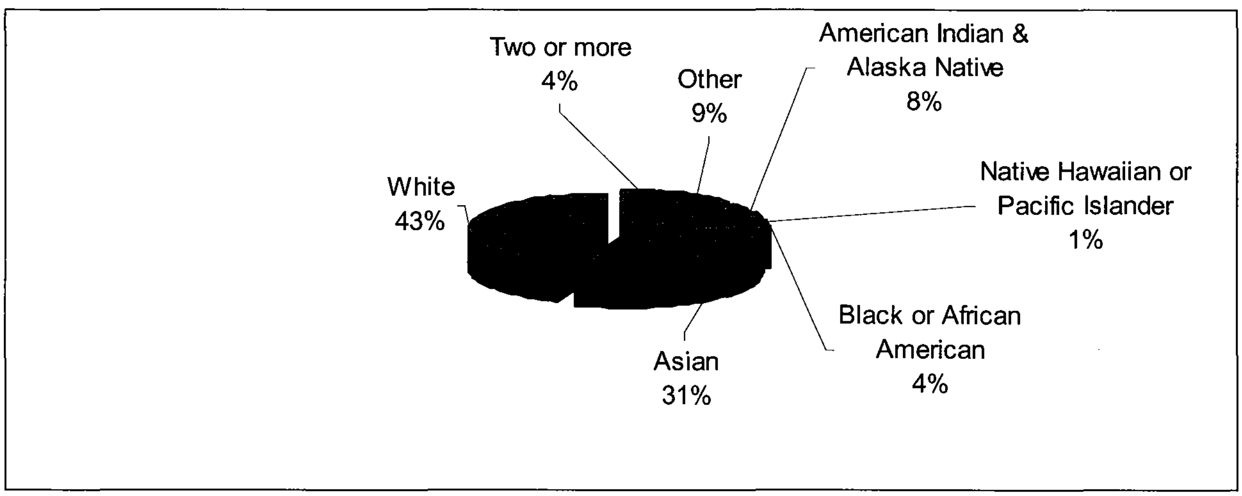

Figure 6-5. Unalaska population by race and ethnicity (2000 Census).

6.1.10 Protection of Children

On April 21, 1997, Executive Order 13045, Protection of Children From Environmental Health and Safety Risks was issued to identify and assess environmental health and safety risks that may disproportionately affect children. Figure 6-6 shows locations of schools and playgrounds that are expected to be used frequently by children. There are no large daycare centers in Unalaska, and no residences are in the immediate area of LSA alternative sites. Residences are near the Expedition Inlet site.

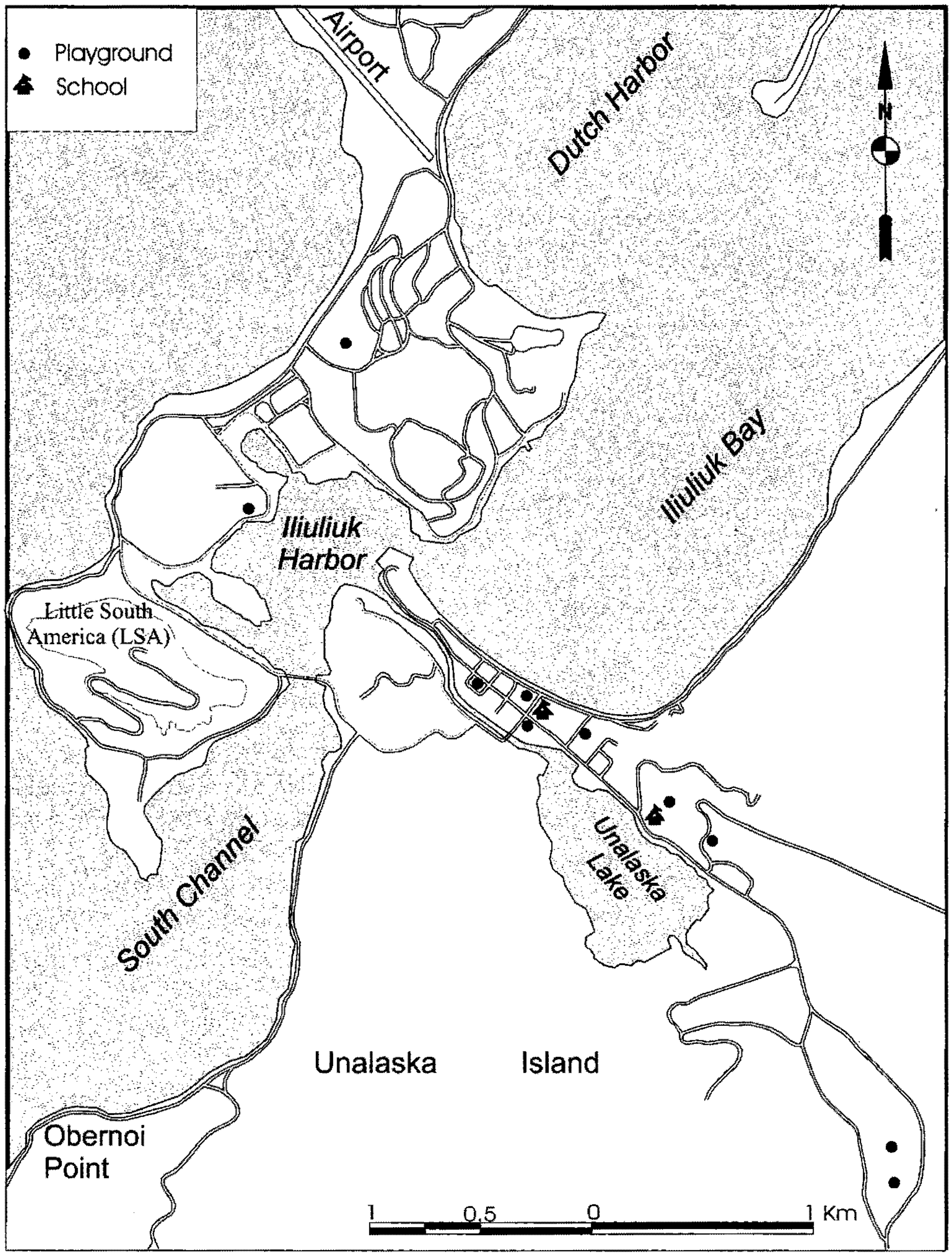

Figure 6-6. Schools and playgrounds in Unalaska.

6.2 Physical Environment

6.2.1 Climate

The Unalaska area has a maritime climate primarily influenced by strong low-pressure centers generated in the Bering Sea and western Pacific Ocean. Cool summers, mild winters, and year-round rainfall characterize the climate. Snow falls primarily between November and April and the average annual snowfall is 105.7 cm. Rains may occur any time of the year. Annual average precipitation is 147 cm. The wettest months are October, with a record of 41cm, and November, with a record of 39 cm. Fog is common from April through September. Normal winter temperatures range from -2.8 °C to +2.8 °C, while summer temperatures range from +4.4 °C to +15.5 °C. Temperatures can reach record lows of -45 °C and record highs of +26 °C. Strong winds can occur throughout the year. Summer winds are generally from the south and typically are lighter while winter winds are predominantly from the north and are generally stronger. The mean wind speed is 27 km/hr.

6.2.2 Topography and Bathymetry

Upland topography is generally steep and rocky with primarily rocky shorelines on the exposed coasts. Beaches are normally present only in protected areas. Bathymetry also reflects the nature of the formation and relatively small degree of alteration by erosion.

6.2.3 Hydrology and Oceanography

Area Watershed. Precipitation is the primary factor controlling the amount and availability of surface water on Amaknak and Unalaska islands. Surface water on the islands occurs as lakes, ponds, wetlands, streams, and seasonal drainages. Streams draining into Iliuliuk Harbor and South Channel near the harbor sites considered in detail are relatively minor contributors of freshwater and sediment into this marine system. No streams drain into the alternative harbor sites considered in detail, and no nearby stream would contribute enough sediment or freshwater to affect harbor operation or maintenance at any of the sites considered in detail.

Oceanography. The mean tide range at Unalaska is 0.67 meters and the diurnal range is 1.13 meters. The tides are generally diurnal with two highs and two lows daily. Tide levels, referenced to mean lower low water (MLLW), are shown below. Extreme high water levels result from the combination of astronomic tides and rises in local water levels due to atmospheric and wave conditions. Water surface elevations have been recorded as high as +2.01 meters and as low as -0.82 meter at Dutch Harbor under combinations of extreme high or low-pressure systems and tides.

Currents in Unalaska Bay are driven primarily by wind and only partially by the tide. Wind direction is the predominant factor in determining current direction and orientation of the gyre patterns. CH_2M Hill conducted an extensive study of currents in 1994 using mathematical modeling and field measurements to evaluate water circulation in the Unalaska area. Results indicate that current velocities are generally driven by winds and are seasonal in nature. Only during periods of low velocity winds do the tidal currents dominate the circulation patterns in the bay. In general, wind-driven current velocities are 5 to 15 cm/sec along the western shores of Amaknak Island and from the eastern passage of Captains Bay to the south end of Iliuliuk Harbor. The major difference between summer and winter wind-driven circulation patterns is that circulation patterns reverse between summer and winter. Flushing time simulation data indicate that 95 percent of the entire volume of Unalaska Bay and contiguous water bodies is replaced with water from outside the bay every 20 to 50 days. In general, flushing times are shorter in Iliuliuk Harbor and Iliuliuk Bay and longer in Captains Bay. No appreciable differences in flushing times appear to result from changes in wind patterns between summer and winter.

Table 6-4.Tide elevations, Unalaska, Alaska

Level	Elevation (m MLLW)
Highest Tide (predicted)	+1.55
Mean Higher High Water (MHHW)	+1.13
Mean High Water	+1.04
Mean Low Water	+0.37
Mean Lower Low Water (MLLW)	0.0
Lowest Tide (predicted)	-0.55

Source: NOAA National Ocean Service

Tidal currents contribute less to the overall circulation patterns in the project area. A maximum flood current velocity of 0.39 cm/sec and a maximum ebb current velocity of 1.2 cm/sec are predicted in the *Tides & Currents* program for Unalga Pass approximately 1.3 kilometers from Unalaska Bay.

The net littoral drift appears to be from north to south in the southern half of Captains Bay. Predominant currents indicate that sediment transport is to the north in the northern half of the bay. At the LSA sites, the pocket beach geometry indicates a deposition area for sediments transported to the south along the beach. The rivers and creeks in the area, however, supply relatively small volumes of sediments to the beaches along the east side of Captains Bay.

Available data indicate that Unalaska Island does not experience significant storm surges. Rugged terrain onshore and steep bathymetry immediately offshore are conditions that tend to preclude high storm surges. Storm surges at Unalaska typically are less than 0.5 meter. Highest surges are likely to be 0.5 to 1.0 meter, in addition to wave set-up and tides during extreme low-pressure events. As indicated in the table 6-4, tides at Unalaska are the major factor in the fluctuations in water surface elevations. The wind-driven transport of seawater is the second most important factor, followed by wave set-up.

Ice Conditions. The Unalaska area is south of the southern limit of the main Bering Sea icepack, but sea ice is present occasionally in Unalaska Bay during winter for short periods under northerly wind conditions. This is primarily drifting sea ice that has been blown south from the main ice pack. Some local icing conditions along the shoreline can occur during extreme cold temperatures where fresh water enters Unalaska Bay at the creek mouths. Strong low-pressure systems associated with storms in winter generally bring warmer temperatures that prevent the formation of significant quantities of ice. Some ice has been reported in the Iliuliuk Harbor area from local minor freshwater sources, but it is relatively short lived.

Iliuliuk Bay can also experience minor drifting sea ice during northerly winds but is generally ice free and navigable year round. Extreme cold conditions can cause minor icing along the shoreline; however it does not cause any serious navigation problems in the bay or in Dutch Harbor itself.

Captains Bay can also experience minor icing conditions during northerly winds but is generally ice free and navigable year round. Extreme cold conditions can cause minor icing along the shoreline; however, it does not cause any serious problems in the bay or at the existing dock facilities. Pan ice has been reported to form in Captains Bay during unusually cold weather conditions. The ice can move up or down the bay with changes in the prevailing wind direction. Ice thickness of up to 0.2 meter has been reported.

6.2.4 Water Quality

General Marine Water Quality. Because of the relatively small amount of development and human activity on most of the Aleutian Islands, the water quality in the region surrounding Unalaska is generally excellent. However, with the development of the Gulf of Alaska and Bering Sea fisheries and the associated support facilities in Unalaska/Dutch Harbor, the water quality of Unalaska Bay has degraded considerably. The primary sources of contamination affecting marine waters in the area are seafood processing facilities that discharge organic waste material into Unalaska Bay, the various vessels that anchor in the area and use harbor facilities, and fuel facilities that spill and discharge petroleum products.

Five seafood processors, the City of Unalaska, and a live crab holding facility have outfalls in the area and vessels or vessel support facilities introduce pollutants into the water. Beginning in 1990, various water bodies in southern Unalaska Bay have been placed on the Alaska Department of Environmental Conservation's (ADEC) Section 303(d) list of impaired water bodies because of episodic releases of petroleum products and failures to meet state residue and dissolved oxygen standards. Near Unalaska, the failure to meet residue and dissolved oxygen standards is generally associated with the discharge of organic and industrial wastes, primarily from seafood processing facilities, whereas the chronic failure to meet petroleum product standards is predominantly associated with large-scale fueling and industrial operations rather than the operation of harbor facilities.

ADEC and EPA have established Total Maximum Daily Loads (TMDL's) to regulate the discharge of wastes from the seafood processing facilities in southern Unalaska Bay but have not yet developed restoration or water quality improvement plans for the listed water bodies. Based on ADEC's 2002/2003 Integrated Water Quality Monitoring and Assessment Report (ADEC 2004), South Unalaska Bay remains on the list of impaired water bodies for failing to meet settleable solids and dissolved oxygen criteria, and Illiuliuk Bay/Harbor and Dutch Harbor remain on the list for failing to meet petroleum hydrocarbons, oil and grease criteria. Captains Bay was listed for settleable solids from seafood processing waste but has been removed from the list of impaired water bodies since 1998. With one exception, where an impaired stream runs into a harbor, ADEC has not listed constructed harbors on their impaired water body list.

The water quality at all three harbor site alternatives considered in detail in this report is degraded from its natural condition. However, the fact that Captains Bay was removed from the list of impaired water bodies and that spill report data demonstrates a significant decline in the frequency and magnitude of petroleum releases over the last 10 years indicate that water quality in the Unalaska area has improved substantially.

Seafood Processing Waste Discharge. Seafood processor and industrial waste is discharged into the marine waters near all developed portions of Amaknak and Unalaska islands. Most of the volume of organic wastes from seafood processing facilities is discharged off the western shores of the southern half of Amaknak Island just north of Captains Bay, but facilities also discharge waste into Iliuliuk Bay and Captains Bay (CH2MHILL 1994). The primary water quality impacts from the discharge of organic wastes are an increase in turbidity and a decrease in dissolved oxygen. Water quality impacts are greatest near the outfalls, but water quality has been degraded by the introduction of large amounts of organic material throughout southern Unalaska Bay. The TMDL's and other pollution control requirements established for the seafood processing facilities have improved the water quality in Captains Bay enough to de-list it and are expected to result in the attainment of the water quality standards in the remaining listed water bodies in the near future (ADEC 2004).

Based on the locations and estimated volumes of waste historically discharged from individual outfalls and consideration of various transport and dispersion mechanisms, impacts from seafood processing facilities are expected to be higher near the existing harbor facilities in Expedition Inlet than at the two Little South America sites considered in detail as alternatives. In general, existing water quality at the two Little South America sites is likely to be somewhat better than at Expedition Inlet because they are farther from sources of large volumes of seafood processing waste. Based on their proximity to each other and the relative distances to significant sources of organic waste to both the north and south, water quality at the two adjacent Little South America sites is probably about the same.

Petroleum Discharges. Water quality in the Unalaska/Dutch Harbor area has been significantly degraded, compared with surrounding areas in the Alaska Peninsula and Aleutian Islands, by higher numbers of fuel spills as well as larger spill quantities associated with individual releases. The higher number of fuel spills and associated quantities is probably attributable to the vessel traffic, the type of fishery serviced at Unalaska, and the huge volumes of fuel transferred in this relatively small port system (more than 70 million gallons per year). Figure 6-7 provides the approximate locations and quantities associated with fuel spills in the Unalaska area that were reported to the

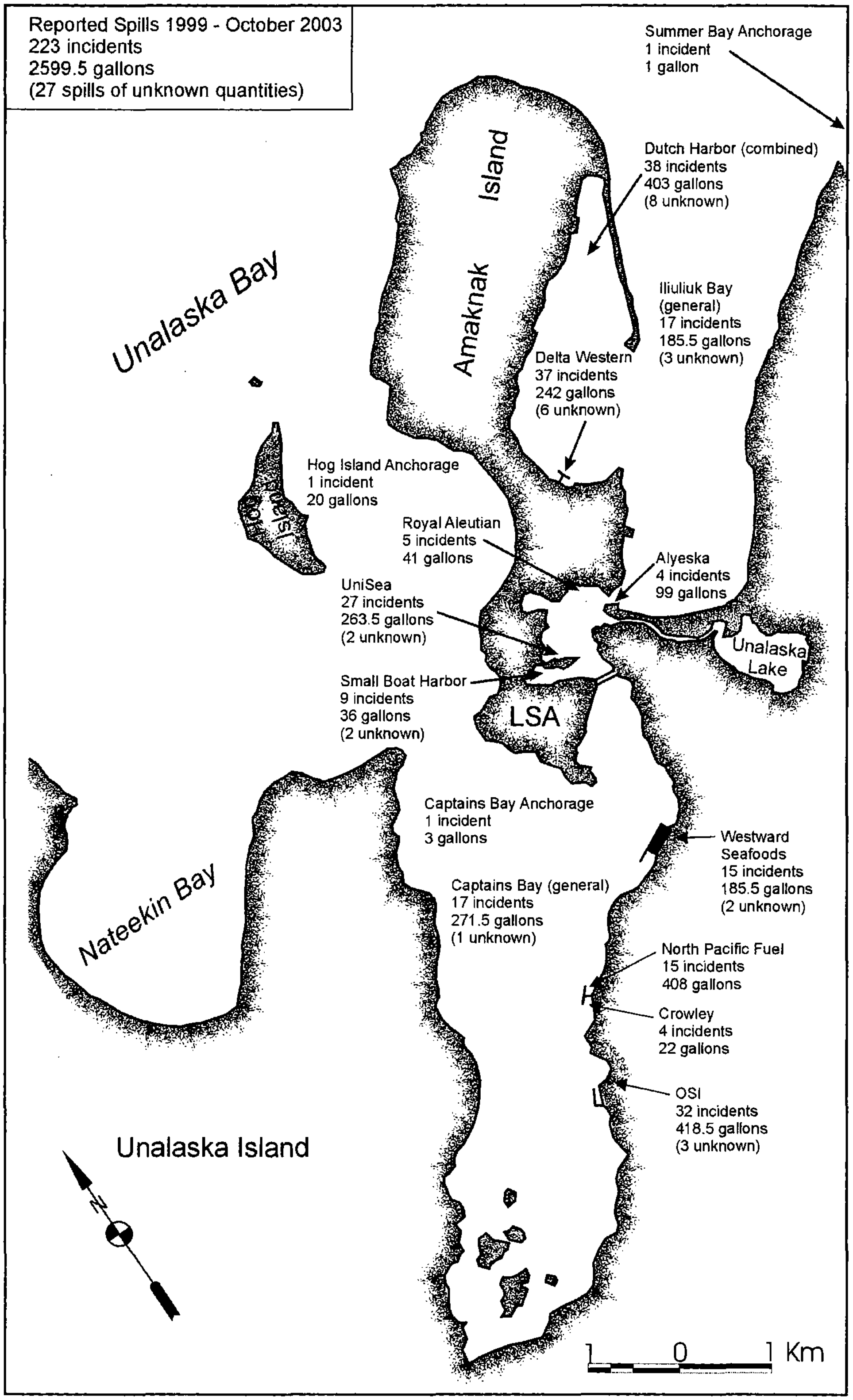

Figure 6-7. Approximate spill locations and quantities (U.S. Coast Guard Spill Data).

U.S. Coast Guard between January 2000 and October 2003. The number of spills has dramatically decreased in the past several years. From 1993 to 1995, 331 spills were reported at Unalaska. In the 3 years from 1997 through 1999, the number of reported spills was 107. In the nearly 4 years between January 2000 and October 2003, 164 fuel spills were reported to the U.S. Coast Guard. This reduction is likely attributable to the efforts by the City of Unalaska to reduce petroleum spills and contamination and stronger enforcement.

However, according to ADEC's 2002/2003 Integrated Water Quality Monitoring and Assessment Report, Illiuliuk Bay/Harbor and Dutch Harbor will remain on the list of impaired water bodies until controls resolve the water quality problems associated with the release of petroleum products.

Fuel-related contaminants, primarily originating from the industrial and fuel transfer related activities in the area, currently exist in the waters adjacent to Little South America, but the water quality near Little South America is significantly better than water quality closer to fuel transfer and industrial operations. In general, water quality is expected to be poorer near areas currently used for fueling and fish processing activities and to improve with increased distance from those activities. Harbors appear to contribute far less to the degradation of water quality near Unalaska than industrial and fueling facilities.

6.2.5 Air Quality

Limited industrial development, low population density, and strong meteorological influences combine to maintain good to excellent air quality throughout the entire Aleutian Island chain and surrounding regions. No non-attainment areas exist in the region. Point sources of air pollution in the vicinity of Unalaska do not significantly degrade air quality in the general area. Air quality in Unalaska is generally considered good. Air pollution sources in the vicinity include: land-based and floating seafood processing plants, moored fishing vessels, aircraft, automobiles, fuel transfer activities, and the City of Unalaska. Activities that generate air emissions include: incinerating solid wastes; vessel, motor vehicle, and aircraft exhaust; motor vehicle traffic in dusty or unpaved areas; fuel evaporation; and electrical power generating equipment and facilities. Air quality generally improves with distance from sources of pollution.

6.2.6 Geology, Soils and Sediment

Geology. Bedrock under Unalaska and Amaknak islands is composed of thick sequences of coarse and fine-grained sedimentary and pyroclastic rocks intermixed with dasitic, andesitic, and basaltic flows and sills known as the Unalaska Formation. Volcanic intrusions (plutons) are exposed throughout the island.

Makushin, an active volcano 2,037 meters high, dominates the north-central portion of Unalaska Island. Rocks from flows and pyroclastic ejection uncomformably cap the Unalaska Formation and intruded plutonic rocks in locations.

Unalaska and Amaknak islands, like many other islands of the Aleutian chain, were severely glaciated during the Pleistocene epoch (1.8 million to 11,000 years ago) and are characterized by glacial landforms. The erosional forms now observed are minimally altered by postglacial erosion and probably reflect late-stage Pleistocene glaciations (ACMP 1995).

Soils. General information about soil conditions on Amaknak and Unalaska Islands indicate shallow bedrock onshore at all alternative locations. In general, beaches are relatively thin surficial layers of sand, gravel, and cobbles overlaying shallow bedrock.

Soils near the Little South America sites have been significantly disturbed by the extensive quarrying operations. The bedrock formation is being actively mined as a material source for various projects in the Unalaska area. There are sand and gravel deposits on the beach along the immediate shoreline. Exposed bedrock is evident at the southern tip of Little South America and at the small ridge located midway south from the bridge along the shoreline. Surface materials at Little South America appear to be mostly sand and gravel with isolated small boulders and shallow bedrock. Six of eight test pits excavated just above mean lower low water along the most protected portion of the southeastern shoreline encountered bedrock at depths ranging from 0.1 to 1.3 meters below ground surface (bgs). The depths of the two test pits that did not encounter bedrock were limited to less than 2.5 meters bgs. The exposed bedrock consists of blocky or equant, mottled green and purple porphyry (igneous rock composed of large conspicuous crystals and the groundmass in which the crystals are embedded).

Soil conditions at Dutch Harbor, Margaret Bay, Iliuliuk Harbor, and Captains Bay were not investigated in detail. Indications are that they would be similar to those found at the Little South America site. Shallow bedrock is evident in the numerous areas excavated along the road to the Dutch Harbor spit and Captains Bay and has been observed during pile driving activities at existing in-water structures at Expedition Inlet.

Sediment Characterization. Thirteen sediment samples were collected from 10 locations along the shoreline and one deep water offshore location near Little South America in March 2000. The sample locations along with their associated sample numbers are indicated in figure 6-8.

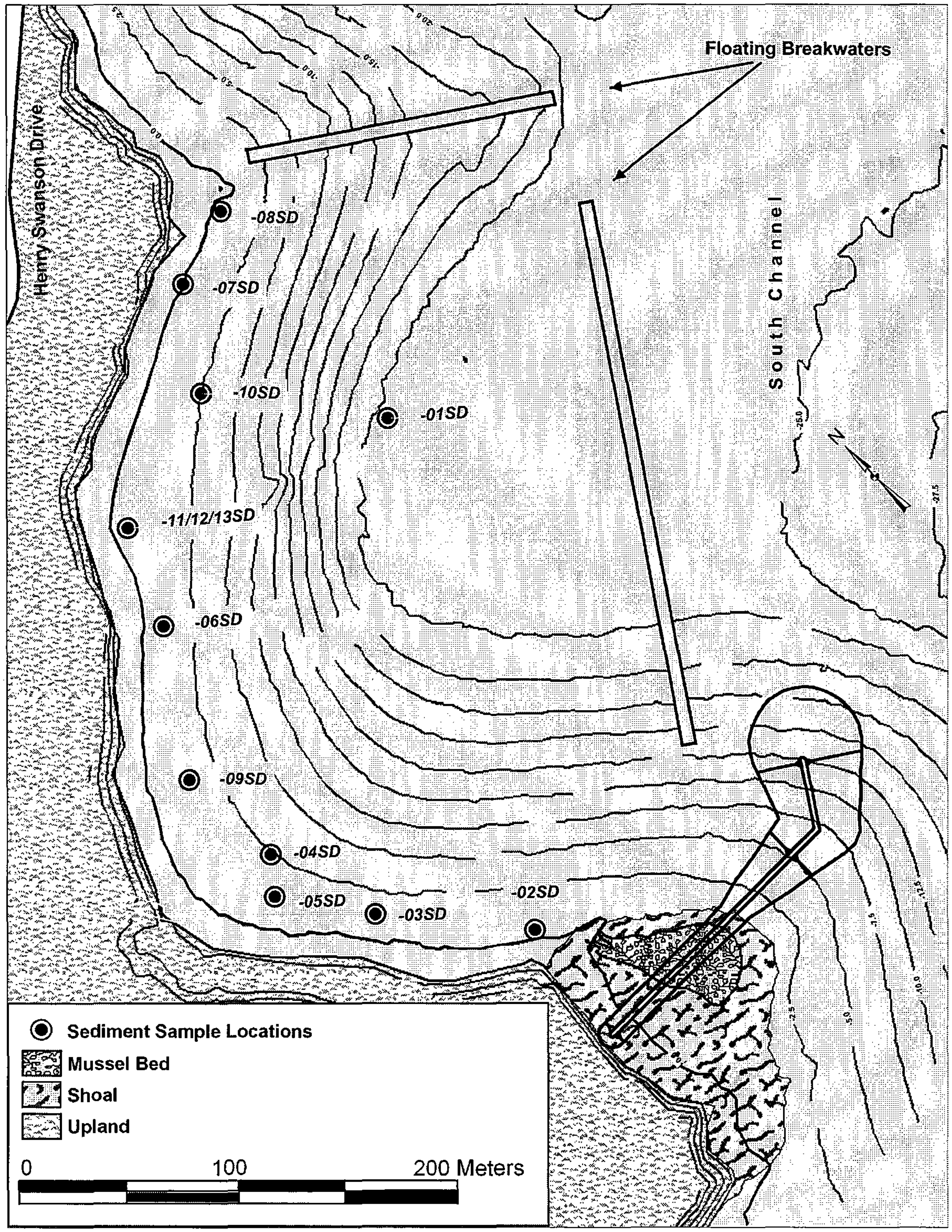

Figure 6-8. Sediment sample locations.

Samples were tested for a variety of chemical and physical characteristics to determine potential use and disposal options. In the absence of applicable state sediment standards, the chemical results were compared to State of Washington, Department of Ecology, Marine Sediment Quality Standards (MSQS's) and State of Washington, Department of Natural Resources Screening Levels (SL's) from their Puget Sound Dredged Disposal Analysis (PSDDA) Report. MSQS's and SL's provide conservative reference concentrations that have been shown to not cause an observable adverse impact on marine organisms. The results were also compared to Alaska Department of Environmental Conservation (ADEC) Cleanup Levels to determine upland use options.

Although very low levels of some fuel-related compounds were reported in some samples, no MSQS's or SL's were exceeded. Only arsenic concentrations (up to 6.8 mg/Kg in sediment that would be dredged) exceeded the associated ADEC cleanup level of 1.8 mg/Kg. Though several samples exceeded the arsenic cleanup level, all the samples of potential dredge material are within the normal range of background arsenic concentrations found in soil and sediment samples collected on Amaknak and Unalaska Islands. The highest contaminant concentrations generally were reported in the sample from the deeper offshore sample site. The highest reported concentrations of the reported fuel related semivolatile organic compounds (SVOC's) and metals, along with the associated sediment reference criteria, are provided in the tables below.

Table 6-5.Chemical results, SVOCs (reported in parts per million)

Detected Analyte	Highest reported concentration	SL	MSQS*
Benzo(a)anthracene	0.021	0.45	0.297
Benzofluoranthenes	0.035	0:8	0.621
Bis-(2-ethylhexyl)phthalate	0.059 B	0.47	127.0
Chrysene	0.038	0.67	297.0
Fluoranthene	0.025	0.63	432.0
Phenanthrene	0.012	0.32	270.0
Pyrene	0.033	0.43	2700.0
LPAH	0.012	0.61	999.0
HPAH	0.152	1.8	2592.0

Table 6-6. Chemical results, metals (reported in parts per million)

Detected Analyte	Highest reported concentration	SL	MSQS*	CL
Arsenic	15.0 B	70.0	57.0	2
Cadmium	1.9	0.96	5.1	5
Chromium	21.0	NA	260.0	26
Copper	57.0	80.0	390.0	NA
Lead	19.0 B	70.0	450.0	400
Mercury	0.2	0.21	0.41	1.4
Silver	0.48 B	1.2	6.1	21
Zinc	88.0 B	160.0	410.0	9,100

* MSQS has been TOC normalized. B: Analyte was reported in the associated Method Blank.

The results concur with findings from 1989 that indicate the area has elevated concentrations of fuel-related pollutants, but at levels well below referenced screening standards.

Particle-size distribution results ranged from poorly graded sand with silt to poorly graded gravel with sand. All the sediment samples were composed primarily of material larger than silt, but the highest amount of fine material was reported in the deep water sample that was intended to characterize a potential dredged material disposal site that is not expected to be used.

Less information is available for areas outside Little South America. In general, less protected areas have less sediment accumulation and the sediment present is of coarser composition. Coarse sediments have a lower capacity to accumulate petroleum contamination than fine sediment. Additionally, areas closer to fueling and industrial activities would generally have higher concentrations of pollutants associated with those activities.

6.3 Biological Resources

This section identifies typical organisms and community associations of these groups in the Aleutian Islands and relates them to the three sites at Unalaska considered in detail for a new harbor site. The U.S. Fish and Wildlife Service Coordination Act Report (Appendix H,) focused on five principal biological resources of particular concern. They are seabirds and waterfowl, red king crab, juvenile fish, and intertidal habitat, and clambeds. Section 2.4.4 of this report identifies these same resources as particularly important, but in different and perhaps broader terms. Section 2.4.4 focuses on marine habitats, algaes (seaweed) benthic invertebrates, fish, marine mammals, and birds.

6.3.1 Vegetation

Unalaska and Amaknak Islands are part of the Aleutian Islands ecoregion, which extends from the Alaska Peninsula to the Kamchatka Peninsula (Nowacki et. al, 2000). The flora is adapted to a maritime climate regime and shows a blend of species common to North America and Asia. Typical vegetation grades from low shrub growths of willows, mixed with ericaceous-heath, dryas-lichens to grass communities.

Dominant ecosystems near the potential project sites are mainly defined as alpine tundra and moist tundra. Alpine tundra vegetation is found in the upland terrain and grading into lowlands. It consists primarily of low shrubs including crowberry (*Empetrum nigrum*); bog blueberry (*Vaccinium uliginosum*), mountain cranberry (*Vaccinium vitis-idaea*), salmonberry (*Rubus spectabilis*) and several dwarf willows. Forbs such as wild celery (*Heracleum lanatum*), monkshood (*Aconitum maximum*), wild geranium (*Geranium erianthum*), petrusky (*Ligusticum scoticum*), Nootka lupine (*Lupinus nootkatensis*), and chocolate lily (*Fritillaria camschatcensis*) are also commonly found in foothills and lowlands. Moist/wet tundra replaces the alpine tundra vegetation along old beach lines and shorelines. A tall-grass community dominated by beach rye (*Elymus arenarius*) is found well established in beach berms. Fiddlehead fern (*Atyrium filix-femina*) and seacoast angelica (*Angelica lucida*) are among other species found intertwined with beach rye in the tall-grass community. Dispersed along the driftwood line are species like seabeach senecio (*Senecio pseudo-arnica*), seabeach sandwort (*Honckenya peploides*), and oysterleaf (*Mertensia maritima*).

These assemblages typical of the ecoregion are represented at the three sites considered in detail. Development at all three sites has modified the land and the vegetation assemblages. The greatest modification has been in the uplands above the LSA-South site where vegetation has been removed by quarrying and at Expedition Inlet where Airport Beach Road and other development has removed vegetation.

6.3.2 Inter-tidal and Sub-tidal Communities

NOAA (undated) identifies nine shoreline habitat rankings in the Aleutians West Coastal Resources Service Area as follows:

Exposed rocky shores
Exposed wave-cut platforms in bedrock
Fine to medium-grained beaches
Mixed sand and gravel beaches
Gravel beaches
Riprap
Exposed tidal flats
Sheltered rocky shores
Sheltered tidal flats
Salt and brackish water marshes

Each of these shoreline habitats is present on Unalaska Island.

Expedition Inlet Site. Expedition Inlet is a small cove classified as sheltered rocky shore and gravel beach in the NOAA ranking scheme. The inlet has been used intensively since World War II. The shoreline is rocky, with cobbles and boulders in the higher energy intertidal zone and finer material in deeper water. Table 6-7 identifies bottom material recorded by divers on four transects in Expedition Inlet. The composition is typical of this type of sheltered habitat, with one exception. USFWS divers described material along in water more than about 10 meters deep as a dark, “pudding-like” substance that is likely oxidized fish processing waste (Schroeder personal communication).

Table 6-7. Expedition Inlet site substrate composition (USFWS 2003)

Distance from Shore (m.)	0	10	20	30	40	50	60	70	80	90	100
Transect 1	C	C	C/Si	C/Si	C/Si	C/Si	SL	SL	SL	SL	SL
Transect 2	B	B/P	G/P	G	SL	SL	SL	SL	SL	SL	SL
Transect 3	B	G	G/C	G	C/H	Si	Si	C/H	P/C	C	C
Transect 4	Br	P	P	P/G	G	G	P	P	P/G	P/G	P

Code: S=Sand (,2mm), G=Granular (2-4 mm), P=Pebbles (4-64 mm) C=Cobbles (64-256 mm), Br=Boulders (256+ mm), B=Bedrock, Si=Silt, Sl =Sludge.

The shoreline in Expedition Inlet is steep and the intertidal zone extends out less than 10 meters from shore. Divers reported rockweed (*Fucus sp.*), fringed sieve kelp (*Agarum clathratum*), winged kelp (*Alaria sp.*), and sea lettuce (*Ulva sp.)* within 10 meters of shore (USFWS 2000). Invertebrates reported in this zone were anemones (1 species), periwinkle snails (1 species), mussels (1 species), barnacles (1 species), hermit crabs (2 species), green sea urchins (*Strongylocentrotus droebachiensis*), polychaete worms (1 species), limpets (2 species), and sea stars (1 species). The intertidal substrate in this zone is cobble and boulders favored by these types of invertebrates.

The subtidal zone, which begins less than 10 meters from shore, contained fringed sieve kelp, red ribbon kelp (*Palmeria palmata*), sea hair (*Enteromorpha intestinalis*), and pink rock crust (*Lithothamnium sp.*). Invertebrates in this zone include anemones (3 species), sponges (2 species), snails (3 species), clams (5 or more species), barnacles (1 species), hermit crabs (2 species), helmet crabs (1 species), tanner crabs (1 species), king crab (1 species), shrimp (miscellaneous species), green sea urchins (*Strongylocentrotus droebachiensis*), Polychaete worms (4 species), tritons (1 species), chitons (1 species), sea cucumbers (1 species), and sea stars (2 species). King crab (*Paralithodes camtschaticus*) seen at this site was a pod of 200 or more juvenile crabs over a pebbly bottom in association with sieve kelp.

Invertebrates were widely distributed. The diversity and abundance indicates a typical and functional biological community for this habitat type, except in the areas deeper than about 10 meters where the "pudding-like material" was reported as the principal bottom type. The margins of the deep area contained abundant and diverse invertebrate communities while in deeper water farther into areas covered by the "pudding-like material," the bottom was almost bare of observable kelp and invertebrates.

LSA-South Alternative Site. Much of the LSA-South alternative site shoreline is a pocket beach composed primarily of sand, gravel, and cobbles. It is bounded to the north by a small rocky point composed predominantly of cobbles, boulders, and finer granular material and to the south by a more prominent rocky point of boulders and exposed bedrock. The exposed bedrock at the south is an "exposed wave-cut platform in bedrock" by the NOAA (undated) shoreline habitat classification. The intertidal area of this shelf is appreciably different habitat than the remainder of the LSA-South site intertidal habitat and is described separately.

The extreme high tide margin of the LSA-South site beach is marked by a dense fringe of beach sandwort well anchored into the sand. Farther down the intertidal, soft filamentous algae covers the coarser substrates. The lower edge of the intertidal is defined by a band of mussels extending from the southern rocky point and tapering for more than 100 meters westward.

Bottom material in the upper subtidal, from the lowest tidal range to 2 to 4 meters deeper than the lowest tide, generally is about the same type of material as in the adjacent intertidal bottoms. The deeper subtidal zone is sand, gravel, pebbles, and cobbles, with pockets of finer-grained material within 100 meters of shore. Areas farther from shore and in deeper water have more sandy and silty areas. None of the "pudding-like" bottom material reported in Expedition Inlet was found at the LSA-South site. Material like this would not be expected because the LSA-South site has not had as much exposure to industrial uses and has more wave action and better circulation to remove soft materials.

Subtidal communities reported off the beach at the LSA-South site and off the rocky points at the northern and southern boundaries were generally similar and varied more with changes in habitat types than between locations. Principal algae species at his location were fringed sea kelp, sea hair kelp, rockweed, and pink encrusting algae.

Invertebrates in subtidal habitat at the LSA-South site contained many of the same species as were reported in Expedition Inlet, but numerically the populations at the LSA-South site shift to species associated with rockier habitats. Divers at LSA-South reported that predatory sea stars, green sea urchins, and plumose anemones were more abundant in the subtidal habitats. Clams, cockles, and other bivalves were abundant in the finer-grained areas of the bottom. Divers also reported hermit crabs, decorator crabs, shrimp, and a single observation of a king crab.

Adult and juvenile king crabs are known to seasonally use the deeper water in or offshore from LSA-South alternative site (USFWS 2003, Smith 1989). USFWS caught nine king crabs in a pot during the July 2003 survey (USFWS 2003), and 13 adult king crabs were caught in pots set near the nearby Westward Seafoods in 2000 (USFWS 2000). Personal-use crab pots set in the deeper waters near the site and conversations with local fishermen, indicate that adult king crab are seasonally present at and offshore from the LSA-South site.

No specific indication of water quality was noted in community structure or in individual invertebrates examined at the LSA-South site.

Another important commercial crab species, Tanner crab, (*Chionoecetes bairdi*) inhabits deeper parts of Unalaska Bay, but was not observed in abundance in shallow, near-shore waters including the LSA-South site.

Table 6-8. Substrate composition at the LSA-South alternative site (USFWS 2003).

Distance from Shore (M)	**0**	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**
Transect 1	C	C	C/Br	C/Br	C	C/Br	G/C	G/P	G/P	G	G
Transect 2	C/G	C/G	C/G	G	G	G	G	G	G	G	G

Code: G=Granular (2-4 mm), P=Pebbles (4-64 mm) C=Cobbles (64-256 mm), Br=Boulders (256+ mm).

A complete list of the species reported by USFWS on dive transects at the LSA-South site is in the 2000 draft Coordination Act report (USFWS 2000) and a subsequent dive survey (USFWS 2003). A summarization of the species found on the LSA-South alternative site is in table 6-8 and a pictorial characterization of near shore marine resources along the combined transects is in figure 6-9.

Table 6-9. Fish and invertebrate species at the LSA-South alternative site (USFWS 2000, 2003)

Common Name	Species	Zone	Survey year
Marine Plants			
Fringed sieve kelp	Agarum clathratum	Inter-subtidal	2000/03
Sea hair	*Enteromorpha intestinalis*	Intertidal	2000
Rock weed	*Fucus spp.*	Intertidal	2000/03
Pink algae	*Lithothamnium sp.*	Inter-subtidal	2000/03
Red ribbon	*Palmeria palmata*	Subtidal	2003
Sausage weed	*Scytosiphon spp.*	Subtidal	2003
Sea lettuce	*Ulva sp.*	Subtidal	2003
Aquatic Invertebrates			
Barnacles/Crabs			
Acorn barnacle	*Balanus nubilus*	Intertidal	2000
Barnacle	*Balanus spp.*	Intertidal	2000
Pacific red hermit crab	*Elassochirus gilli*	Subtidal	2003
Widehand hermit crab	*Elassochirus tenuimanus*	Inter-subtidal	2000/03
Lyre crab	*Hyas spp.*	Subtidal	2000/03
Decorator crab	*Oregonia gracilis*	Subtidal	2003
Hermit crab	*Pagurus spp.*	Inter-subtidal	2000/03
Red king crab	*Paralithodes camtschaticus*	Subtidal	2003
Thatched barnacle	*Semibalanus cariosus*	Inter-subtidal	2003
Helmet crab	*Telmessus cheiragonus*	Inter-subtidal	2000/03
Mollusks			
Pink scallop	*Chlamys spp.*	Subtidal	2000
Nuttall/heart cockle	*Clinocardium nuttallii*	Inter-subtidal	2000/03
Artica hiatella	*Hiatella arctica*	Inter-subtidal	2003
Mya complex (4 species)	*Mya spp.*	Inter-subtidal	2003
Truncated soft-shelled clam	*Mya truncata*	Inter-subtidal	2000
Pacific blue mussel	*Mytilus trossulus*	Intertidal	2000/03
Lyre whelk	*Neptunea lyrata*	Subtidal	2000
Alaska falsejingle	*Pododesmus macroschisma*	Inter-subtidal	2000/03
Littleneck clam	*Protothaca staminea*	Inter-subtidal	2000/03
Butter clam	*Saxidomus giganteus*	Inter-subtidal	2000/03
Sea Stars			
Orange sea cucumber	*Cucumaria miniata*	Subtidal	2003
Mottled sea star	*Evasterias troschelii*	Inter-subtidal	2000/03
Six-armed star	*Leptasterias hexactis*	Intertidal	2000
Sunflower star	*Pycnopodia helianthoides*	Inter-subtidal	2000/03
Snails/Limpets			
Shield limpet	*Collisella digitalis*	Inter-subtidal	2000
Oregon triton	*Fusitriton oregonensis*	Intertidal-subtidal	2000/03
Shield limpet	*Lottia pelta*	Intertidal-subtidal	2003
Margarites snail	*Margarites pupillus*	Intertidal-subtidal	2000/03
Artic moon snail	*Natica clausa*	Subtidal	2000/03
Channeled dogwinkle	*Nucella canaliculata*	Intertidal-subtidal	2003
Mask limpet	*Tectura persona*	Intertidal-subtidal	2000
Plate limpet	*Tectura scutum*	Intertidal-subtidal	2003

Table 6-9. Fish and invertebrate species at the LSA-South alternative site (USFWS 2000, 2003) (continued).

Common Name	Species	Zone	Survey year
Anemones			
Green anemone	*Anthopleura xanthogrammica*	Intertidal	2000
Crimson anemone	*Cribinopsis fernaldi*	Subtidal	2003
Plumose anemone	*Metridium giganteum*	Intertidal-subtidal	2000
Plumose anemone	*Metridium senile*	Intertidal-subtidal	2003
Tube-dwelling anemone	*Pachycerianthus fimbratus*	Intertidal	2003
Christmas anemone	*Urticina crassicornis*	Intertidal-subtidal	2000/03
Worms			
Jelly tube worm	*Myxicola infudibulum*	Subtidal	2003
Tusk worm	*Pectinaria granulata*	Subtidal	2003
Western serpulid	*Pseudochitnopoma occidentalis*	Intertidal-subtidal	2003
Calcareous tube worm	*Serpula vermicularis*	Intertidal-subtidal	2000/03
Tube worm	*Spirorbis spp.*	Intertidal-subtidal	2000
Terrembilid worm	?	Subtidal	2003
Sponges			
Crumb of bread sponge	*Hymeniacedon spp?*	Subtidal	2003
Hermit sponge	?	Subtidal	2003
Shrimps			
Shrimp	*Crangonidae*	Subtidal	2003
Krill	*Euphausia spp.*	Subtidal	2000
Other	*Mysids, Pandalids, etc.*	Subtidal	2003
Coonstripe shrimp	*Pandalus hysinotus*	Subtidal	2000
Urchins			
Green Sea Urchin	*Strongylocentrotus droebachiensis*	Intertidal-subtidal	2000/03
Chitons			
Black Katy chiton	*Katharina tunicata*	Intertidal	2003
Chiton	*Tonicella spp.*	Subtidal	2000
Fish			
Pacific cod	*Gadus macrocephalus*	Intertidal-subtidal	2003
White-spotted greenling	*Hexagrammos stelleri*	Subtidal	2003
Rock sole	*Lepidopsetta bilineata*	Intertidal-subtidal	2000/03
Snake prickleback	*Lumpenus sagitta*	Intertidal-subtidal	2003
Great sculpin	*Myoxocephalus polyacanthocephalus*	Intertidal-subtidal	2000/03
Sculpin	*Myoxocephalus spp.*	Subtidal	2000
Pink salmon	*Oncorhynchus gorbuscha*	Intertidal	2000

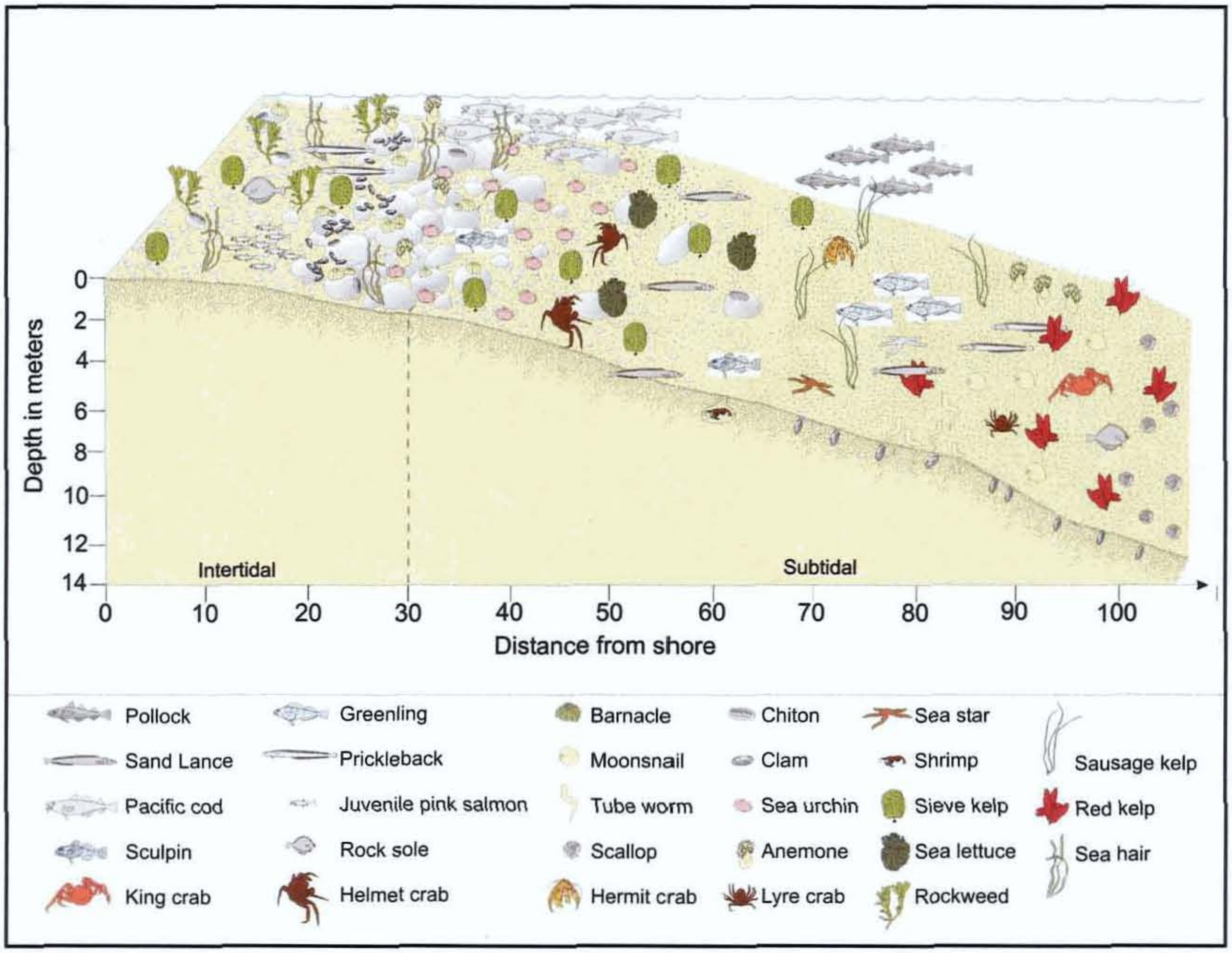

Figure 6-9. Little South America near shore marine resources.

The bedrock and boulder reef that forms the point at the southern boundary of the southern end of Amaknak Island includes a 0.15-hectare mussel bed with diverse and productive intertidal habitat (figure 6-10). The reef begins to be exposed at about 1 meter above MLLW and is composed of 4 general communities: (1) a mussel bed, (2) barnacle reef, (3) boulder field, and (4) bedrock shelf. The communities are described as:

Blue Mussel Bed. This community is composed predominantly of blue mussels (*Mytilus edulis*) tightly intermixed with rockweed, between +0.5 and +1.0 meter MLLW. The mussels appear to be attached to each other, the rockweed, and to a limited extent to the barnacle reef under them. This dense mat of mussels and rockweed is as much as 30 cm thick. The mussel bed supports an assemblage of invertebrates including burrowing sea cucumbers, top snails, turban snails, dog winkles, and some chitons and hermit crabs. Sea lettuce grows around the mussel bed perimeter. Boulders in the bed are heavily encrusted with mussels and at least two species of barnacles. The shells of dead barnacles, mussels, clams, and sea urchins are collected in small open pockets between the live mussels. Small fish are in the mussel-rockweed assemblage and between the mussel-rockweed mat and the underlying barnacles and sea cucumbers.

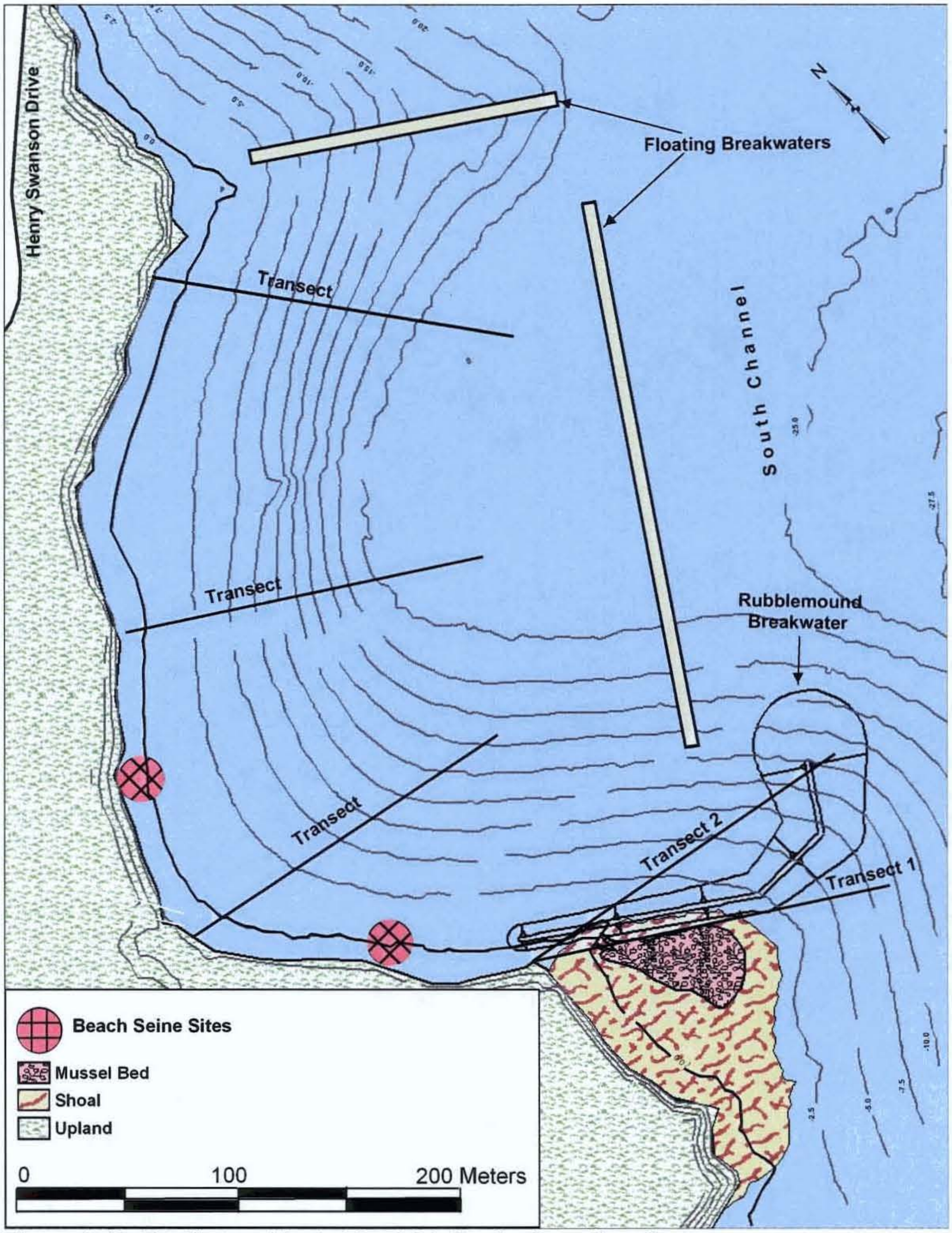

Figure 6-10. Reef/mussel bed at the LSA-South alternative site.

The seaward edge of the mussel bed ends abruptly at about 0 MLLW. The exposed bedrock in deeper water is devoid of mussels, rockweed, and barnacles. The only apparent explanation was that predators intolerant of exposure by low tides were preying on mussels, barnacles, and other attached biota that attempted to colonize the upper subtidal zone. Sea urchins and sea stars were abundant in the adjacent subtidal zone.

<u>Barnacle Reef</u>. Tightly packed barnacles with pockets of exposed bedrock and tide pools characterize this part of the reef. Smaller rocks encrusted with *Fucus* and barnacles occasionally are present. Irregular raised surfaces are heavily encrusted with barnacles. Sea lettuce and red algae *(Halosaccion glandiforme)* grow between the barnacles on this part of the reef. The upper reaches of this community are bedrock with small pockets of sand, silt, and organic debris. Barnacles are tightly packed in the lower areas and beneath much of the mussel beds. Individual barnacles are up to 2 cm in diameter and 10 cm long, and they are compressed into hexagonal tubes by the density of the assemblage.

<u>Boulder Field</u>. Boulders and areas of exposed bedrock intersperse the barnacle reef. The boulder field and barnacle reef extends from +1.5 to about -0.5 meters MLLW. Interconnecting tide pools and other low areas of the barnacle reef have collected fine particles and sediment. The boulders are heavily encrusted with barnacles and the brown algae *(Fucus spp)*. Snails, limpets, and chitons are found on the underside of the boulder and smaller rocks. The pools of water next to the boulders contain sea cucumbers, tidepool sculpins, and other small fish. Mussels, marine algae, sea stars, snails, green isopods, marine worms, spindle whelks, and green sponges inhabit this part of the shoal.

<u>Bedrock Shelf</u>. Encrusting pink algae and green sea urchins, brown and green algae, and anemones, small fish, and sea stars inhabit the crevices of the bedrock shelf.

Aerial photographs from less than a decade ago do not show any evidence of the mussel-rockweed assemblage on the shelf at the point or on the adjoining beach. The assemblage may be successional, killed back by periodic storms or freezing, or may have recolonized after water quality improved in recent years.

LSA-North Alternative Site. The beach at the LSA-North site is similar to the rocky point that defines the north boundary of the LSA-South site. The intertidal beach is predominantly gravel, cobble, and pebble or coarse sand with limited colonization by rockweed and mussels on the larger rocks and sea lettuce and other filamentous algae on the more stable areas of the intertidal beach.

This site is immediately adjacent to the LSA-South alternative site and the deeper subtidal habitat appears to be similar to the rockier habitats of the LSA-South site. One of the data sets collected by divers at the LSA-South site was on a transect within 50 meters of the LSA-North site. The species list in Table 6-8 is believed to be generally representative of those species, with a shift away from infaunal forms that require soft bottom and with more representation by epifaunal invertebrates that require hard substrates.

6.3.3 Fish

There are at least 474 exclusively marine and 25 anadromous species of fish in Alaska (Mecklenburg et al. 2002). An average survey in the southern Bering Sea or the Gulf of Alaska west to Unimak Pass would catch about 100 of these species along with about 200 species of invertebrates (Kessler 1985). Most or all these species would be found in Unalaska Bay. Many species are found only in deep water, but many others inhabit broader depth ranges and may be found as juveniles or seasonally as adults in the near-shore marine waters surrounding Unalaska Island. Unalaska Bay, the major embayment on the north side of Unalaska Island, is a maximum of about 140 meters deep and includes habitat important to most of these marine species. Several smaller bays including Summer Bay, Captains Bay, and Iliuliuk Bay are parts of Unalaska Bay. The LSA-North and LSA-South alternative sites are in shallow water near the mouth of Captains Bay, and the existing boat harbor is in a small bay off the natural Iliuliuk Harbor, which is connected to Iliuliuk Bay (figure 2-1). Captains Bay and Iliuliuk Bay are more than 100 meters deep and many of the deeper water species as well as most of the shallow water marine communities of the Aleutians would be represented in Captains Bay and Iliuliuk Bay.

Surveys of near-shore fish communities at 11 seine-sampling sites in Captains Bay and Iliuliuk Bay in July 1999 (Robards 1999) found that abundance was high, but species diversity was low, with only 16 species, including invertebrates, caught during the survey. Limited seining and focus on areas with similar habitat may have attributed to the low species diversity. Three main sampling areas were seined. Areas with the highest to lowest catch per seine deployment were: Margaret Bay (1,714), LSA-North (1,481), Front Beach (1,292), LSA-South (650), Captains Bay (539), and Dutch Harbor (24). Juvenile pink salmon (*Oncorhynchus gorbuscha*) and juvenile walleye pollock (*Theragra chalcogramma*) dominated most of the seine catches. Juvenile Pacific cod (*Gadus macrocephalus*) dominated the Captains Bay catch. While juvenile pink salmon were common in the near shore catches, the commercially more important salmon of the region were not collected in any abundance. Sockeye (*O. nerka*) and coho salmon (*O. kisutch)* juveniles are more motile than pink salmon and tend to move farther offshore soon after they migrate into marine waters.

Expedition Inlet. At least nine species of fish including white spot greenling (*Hexagrammos stelleri*), rock sole (*Lepidopsetta bilineata*), Pacific cod, snake prickleback (*Lumpenus sagitta*), great sculpin (*Myoxocephalus polyacanthocephalus*), Crescent gunnel (*Pholis laeta*), smallmouth roquil (*Bathymaster leurolepis*), Sturgeon poacher (*Agonus acipenserinus*), and Arctic shanny (*Sitchaeus punctatus*) were observed by divers along transects in Expedition Inlet. These species inhabit relatively shallow water and they would likely be found throughout Unalaska Bay. The Pacific cod that divers saw were juveniles.

Juvenile Pacific cod were the most abundant (322) in seine hauls at this site, followed by juvenile pink salmon (55), and Dolly Varden (8). Other species represented by one to a few individuals were Pacific sandlance (*Ammodytes hexapterus*), great sculpin, sockeye salmon (*O. nerka*), white-spotted greenling, chum salmon (*O. keta)*, and coho salmon (*O.*

kisutch). No direct effects of contamination were noted in the fish collected. More specific information is presented in the Fish and Wildlife Coordination Act report (Appendix H).

LSA-South Site. The composition of the near-shore fish community was determined by seining from the beach (figure 6-10, FWS 2000, 2003). Juvenile pink salmon and walleye pollock dominated the seine catches in 2000, but low numbers of a few other species including great sculpin, Dolly Varden (*Salvelinus malma*), sand lance (*Ammodytes hexapterus*) and Atka mackerel (*Pleurogrammus monopterygius*) were caught. Smith (1989) also caught juvenile Pacific cod on this site.

Pacific sand lance (2,800), followed by juvenile Pacific cod (450) dominated two seine hauls in 2003. Small numbers of Pacific sand fish (*Trichodon trichodon*), rock sole, great sculpin, juvenile pink salmon, white-spotted greenling, masked greenling (H. *octogrammus*), sturgeon poacher and helmet crab were also collected.

Both the Robards (1999) and USFWS (2000) surveys found low species diversity dominated by juvenile pink salmon and walleye pollock. Low diversity but high abundance of a few species is likely typical of the site. The relative abundance of juvenile fish would likely shift among species during the season. The juvenile pink salmon probably come from the many nearby pink salmon-producing drainages, which include Iliuliuk Creek in Unalaska and several small creeks that flow into Captains Bay. They would only be in the harbor area for a few weeks. Juvenile pollock might be at the site for longer periods during the summer, and high numbers of sand lance and juvenile Pacific cod would be expected at the site at times during the summer months (USFWS 2003). Most species would be expected to move offshore to deeper and warmer water during the winter months. A few sedentary sculpin and small flatfish might occupy the site during winter.

The LSA-South alternative site is not known as a spawning area for Pacific herring (*Clupea pallasi*, F. Bowers personal communication). The food and bait herring found in Unalaska are believed to spawn on the northern shore of Bristol Bay near Togiak (M. Foster personal communication).

LSA North-Site. In two seine hauls at the LSA-North site, juvenile Pacific cod dominated the hauls in 2003 (40), followed by Pacific sand lance (21), pink salmon (10), and juvenile sockeye salmon (3). Dolly Varden (2), great sculpin (1), and crescent gunnel (1) rounded out the remainder of the catch. The rockier beach at this site may have adversely affected seining success. With exception of sandlance, which would be associated with sandy bottom conditions, the composition of the catch was generally similar to the catches at the adjacent LSA-South site, although smaller numbers were collected. Robards (1999) reported much larger numbers of juvenile fish, especially walleye pollock, at the LSA-North site.

6.3.4 Mammals

Prior to Russian settlement, no large terrestrial mammals were native to the Aleutian Islands except for the Arctic fox (*Alopex lagopus*), which was endemic to the western Aleutians (Murie 1959). Russians, and other Europeans who followed the Russians, subsequently introduced red (*Vulpes vulpes*) fox to many of the Aleutian Islands for the fur trade, but according to traditional knowledge red, cross, and silver foxes may have been on Unalaska Island before the Russians arrived (Chief Alexis Yatchmenoff in Murie 1959:295). Small mammals including Arctic ground squirrels (*Citellus parryi*) were introduced to some islands to feed the foxes. Other species introduced to some Aleutian Islands include Norway rats, cattle, dogs, cats, horses, and European rabbits. Some of these introduced animals are feral and range free on Unalaska Island. According to Murie (1959) other small mammals native to Unalaska Island include Unalaska saddle-backed shrew (*Sorex hydrodromus*), tundra vole (*Microtus oeconomus unalascensis*), and collared lemming (*Dicrostonyx groenlandicus unalascensis*).

Marine Mammals. Harbor seals, Steller's sea lions, northern fur seals, sea otters, harbor porpoises, Pacific white-sided dolphins, and killer whales are likely to be observed in Unalaska Bay. Other whales, dolphins, and porpoises may occasionally be observed in Unalaska Bay, but they are generally noted in more open ocean waters outside Unalaska Bay. Haulouts for sea lions have been identified at Cape Sedanka on Sedanka Island and Old Man Rocks, about 28 km east of Unalaska. Harbor seals are distributed throughout Unalaska Bay, but are most often observed near the islands at the south end of Captains Bay and near the reef at the entrance to Iliuliuk Harbor, the west side of Hog Island, and the reef and rocky shoreline near Eider Point.

Sea otters (*Enhydra lutris*) and Steller sea lions (*Eumetopias jubatus*) are probably the most common sea mammals seen in inner Unalaska Bay. Both sea otters and sea lions may be present in small numbers near the LSA sites year round (USFWS 2000). Sea lions pass through South Channel near the LSA sites and occasionally congregate off the southern end of LSA (Golodoff 2004). Observations of sea otters were recorded incidental to winter surveys from 1999 through 2002 that targeted Steller's eiders. Most sea otters were seen loitering in kelp beds off the Dutch Harbor spit, but sea otters were occasionally seen in the shoal area on the southern tip of Amaknak Island. The abundance of sea otter food species at the LSA-South alternative site (table 6-8) suggests that sea otters do not use this area for feeding to any significant degree (USFWS Appendix H). Sea otters rapidly deplete sea urchins and other preferred prey in areas where the otters feed intensively.

Several species of whales including finback (*Balaenoptera physalus*), humpback (*Megaptera novaeangliae*), Minke (*Balaenoptera acutorostrata*), and orca (*Orcinus orca*), and occasionally harbor porpoise (*Phocoena phocoena*) are found in the outer Unalaska Bay area. Other species including blue (*Balaenoptera musculus*), sperm (*Physeter macrocephalus*), and northern right whales (*Eubalaena glacialis*) might be found in more oceanic waters of the southern Bering Sea (ADF&G et al. 1996). None of these whale species would be found near the project sites considered in detail for a harbor at Unalaska.

6.3.5 Birds

Sea Birds. Colony nesting areas for sea birds have been reported at Eider Point, Hog Island, the east and west sides of Little South America, and around the islands at the southern end of Captains Bay. The species, number of sea birds, and their locations in the Unalaska Bay area are presented in table 6-10 and shown on figure 6-11.

Table 6-10. Seabird colonies in Unalaska Bay.

Sea bird Colony No.	Location	Species Present	Estimated Population
23-004	South Amaknak Island	Pigeon guillemot	Present
		Horned puffin	20
23-043	Eider Point	Red-faced cormorant	30
23-045	Hog Island	Glaucous-winged gull	200
		Pigeon guillemot	142
		Horned puffin	54
23-065	Islet off South Amaknak Island	Pigeon guillemot	18
23-066	Captains Bay Islets	Pigeon guillemot	70
		Horned puffin	92

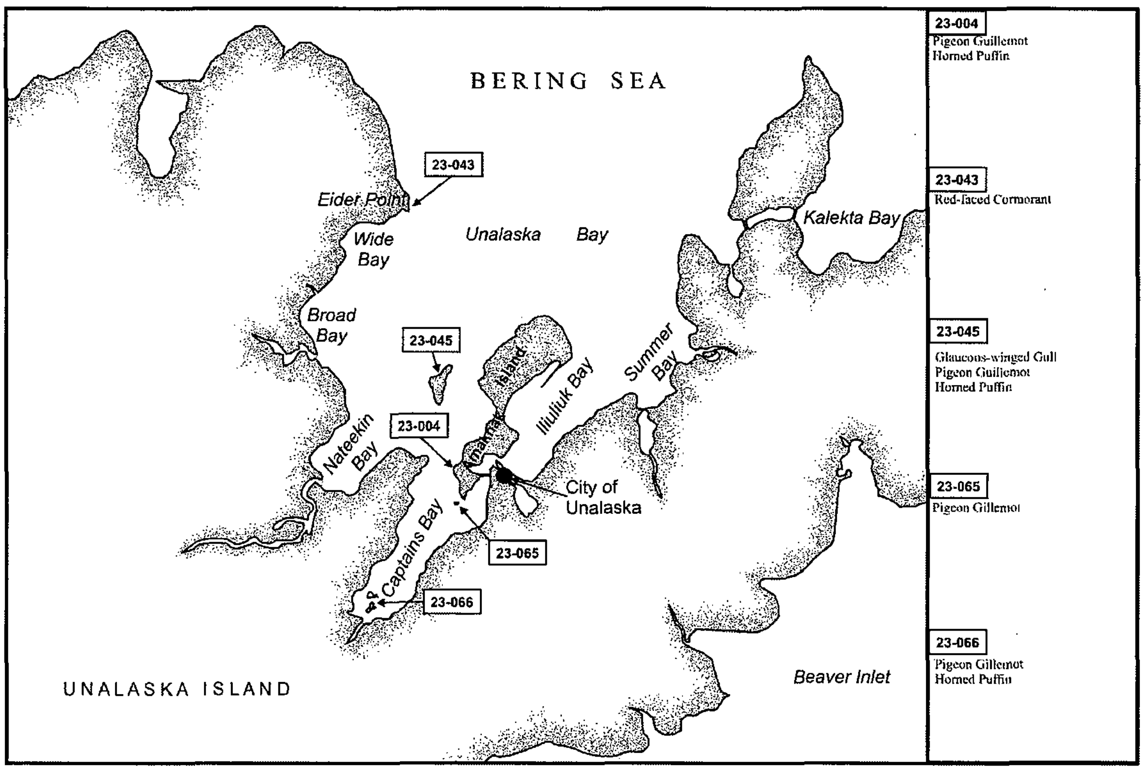

Figure 6-11. Sea bird colony locations in Unalaska Bay.

Waterfowl and Geese. Emperor geese and other waterfowl use the lakes and ponds, wetlands, estuaries, intertidal areas, and marine waters in Unalaska Bay for feeding, resting, nesting, and migration staging. Principal nesting habitat for waterfowl includes lake shorelines, wetlands, tall grass areas along lake margins, stream banks, and the small islands at the head of Captains Bay that are free from terrestrial predation. Nesting waterfowl include mallards, green-winged teal, scaup, red-breasted and common mergansers, and harlequin ducks. Emperor geese feed on reefs and along shorelines during low tides. When the sea is calm, they are commonly seen along the exposed west shore of LSA. When the sea is rough and they cannot use the west shore, they sometimes use the protected reef on the southern tip of LSA, and the shoreline north of the LSA project sites.

The Aleutian Islands are especially diverse in bird species, and avian fauna is an important part of the Unalaska ecology. Waterfowl and seabirds contribute a significant number of species to the list of birds found on Unalaska Island. Some of the seabird species are pelagic for most of the year, but spend the nesting season on land. The nesting colony nearest to the LSA-South alternative site is a horned puffin (*Fratercula corniculata*) colony near the isthmus of Amaknak Island (USFWS 1978). Larger colonies of seabirds are on Upiaga Island and Baby Islands in Akutan Pass off the northeast end of Unalaska Island.

Volunteers count birds in Unalaska each December during an event known as the Christmas Bird Count. The Christmas Bird Count gives a snapshot of the species present during winter months and would typically miss summer migrants. The most comprehensive list of birds found in the Unalaska area is the list compiled by Lt. Commander A. L. Cahn, USN, (1947), who recorded 62 bird species in the Unalaska area over 47 consecutive months during World War II (table 6-11). The species found by Lt. Commander Cahn represents most of the species found in the Unalaska area, but several species found in Unalaska today are missing from Cahn's list (table 6-11). ,

Conspicuously missing from Lt. Commander Cahn's observations at Unalaska are sightings of Steller's eider. It is not known why Cahn did not observe Steller's eiders during his 47-month-long observation because the brightly colored males and unique behavior of large aggregated flocks make them difficult to miss by a trained birder as Cahn apparently was. This small, and currently threatened eider, was once reported to nest on Amaknak Island (Dall 1873, Quakenbush et al. 2002) and is a now a common winter visitor in the Unalaska area.

Table 6-11. Birds found in the Unalaska area of the Aleutian Islands during World War II with notes on the timing of their arrival and departure (Cahn 1947).

Species	Arrival	Departure	Comments
Common loon	December	March	Common in winter
Red-throated loon	December	March +	Common in winter
Red-necked grebe	November	January +	Common in winter
Horned grebe	December	January +	Uncommon
Black-footed albatross	------------	------------	Pelagic and uncommon
Fulmar	Late summer	------------	Flocks and nests around Akutan Pass
Slender-billed shearwater	May	Mid-August	Pelagic in Bering Sea
Fork-tailed petrel	Fall	Spring	Pelagic in Bering Sea
Pelagic cormorant	September	May	Displaced from Amaknak Island by Navy base
Red-faced cormorant	Fall	Spring	Uncommon-seen in Captain's Bay
Emperor goose	Fall	Spring	Common locally
Mallard	Year round		More common in winter
Pintail	Fall	------------	Seen during fall migration
European teal (*Anas crecca*)	March	September	Seen only in the Makushin Valley
Green-winged teal (*A. carolinensis*)	All year except August		Common in the Makushin Valley
Greater scaup	December	April	Abundant-associated with harlequins and White-winged Scoters
Common goldeneye	October	April	Strictly a winter visitor
Bufflehead	Winter	------------	Only one seen in 47 months of survey
Oldsquaw	November	April	Common in large bays
Harlequin	September	May-June	Abundant during winter
Common eider	November	March	Common-not abundant-females dominate
King eider	December	March	More common than common eider
White-winged scoter	December	February	Abundant-seen with black scoter
Surf scoter	Winter	-------------	Rare-only 2 seen in 47 months of observation
Black scoter	November	April	Common in bays and lee of islands during gales
Red-breasted merganser	May	September	Common in Captain's Bay
Golden eagle	---------------	---------------	Uncommon around town
Bald eagle	Year round		Very common-nests on Amaknak Island cliffs
Sea eagle	---------------	---------------	Uncommon Asian visitor
Marsh hawk (northern harrier)	Summer		Uncommon
Rock ptarmigan	Year round		Uncommon-left Amaknak Island due to disturbance
Black oyster catcher	Summer		Rarely seen
Ruddy turnstone	Summer		Rare
Rock sandpiper	Year round		Common-not abundant

Table 6-11. The arrival and departure times of birds to Unalaska (Cahn 1947) continued.

Species	Arrival	Departure	Comments
Least sandpiper	Summer		Rare
Bar-tailed godwit	Summer		Rare
Northern phalarope	--------------	--------------	Common at sea from Amaknak Island to Unimak Pass-attracted to lights
Parasitic jeager	Year round		Rarely seen in Unalaska
Glaucous gull	Spring		Rare-does not associate with Glaucous-winged gulls
Glaucous-winged gull	Year round		Very common-abundant
Black-legged kittiwake	Year round		Common at Eider Point-rare on Amaknak Island
Thick-billed Murre	Fall	Spring	Rare and solitary visitor
Pigeon guillemot	Year round		Common resident-a few pair breed on south tip Amaknak Island and east shore of Captain's Bay.
Ancient murrelet	January	March	Abundant only offshore
Paroquet auklet	-------------	-------------	Rare-found only offshore
Crested auklet	-------------	-------------	Abundant only offshore
Least auklet	--------------	-------------	Common at sea
Horned puffin	May	September	Abundant in Bays-nests near troop activity on Unalaska Island
Tufted puffin	May	September	Less abundant than the horned puffin
Snowy owl	Winter		Rare on Unalaska Island
Short-eared owl	Summer		Uncommon
Belted kingfisher	Summer		Uncommon
Raven	Year around		Extremely abundant
American dipper	April	September	Seen only in Shaishnikof R., head of Captain's Bay
Winter wren	April	September	Shy and rarely seen along rocky shores
Water pipit	May	September	Common in swampy areas
Gray-crowned rosy finch	May	September	Common and tame
Savannah sparrow	May	September	Extremely abundant
Fox sparrow	--------------	-------------	Rare-1 seen in 47 months
Song sparrow	April	September	Common-Aleutian race
Lapland longspur	May	September	Abundant
Snow bunting	January	March+	Winter visitor

The USFWS and the Alaska District Corps of Engineers jointly surveyed Steller's eiders to assess their distribution and relative abundance at Unalaska during the winters of 1999 through 2002. The USFWS endangered species draft biological opinion (Appendix I) contains more information about this species and its presence near the sites considered for harbor construction. The general distribution and relative abundance of Steller's eiders during the survey period is pictured in figure 6-12.

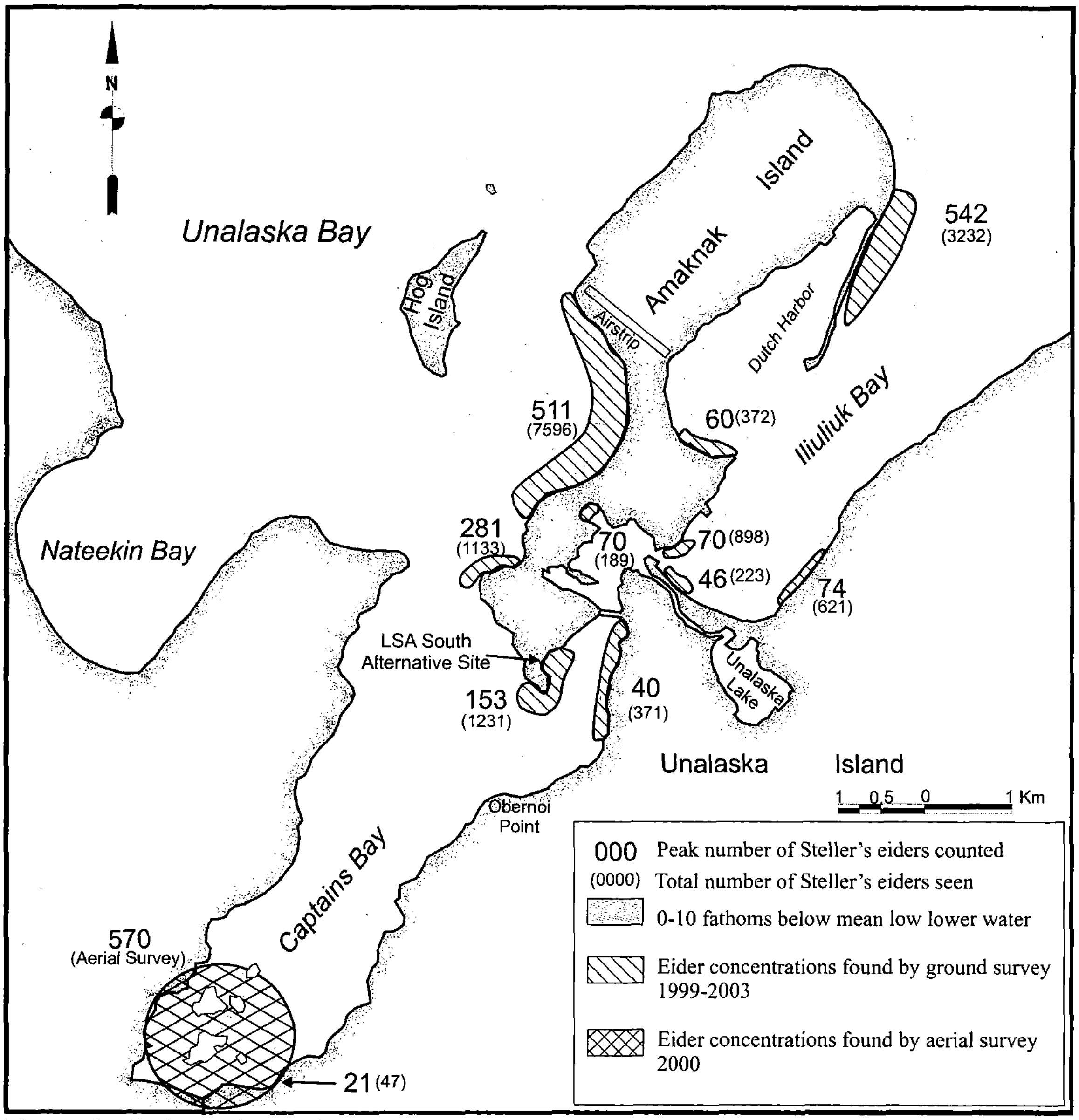

Figure 6-12. Areas in Unalaska Bay where Steller's eiders were observed to congregate during winter surveys from 1999 through 2002.

Steller's eiders typically are in near-shore areas less than 10 meters deep where they feed mostly on marine snails and amphipods. They are also sometimes attracted to areas where fish processing plants discharge waste. Fish processing plants discharge waste into Unalaska Bay along the east shore of Amaknak Island south of the airport runway, which may account for the concentrations of eiders found there. Many sea ducks, including Steller's eiders, congregate on the lee sides of islands during gales. Strong winds from northerly directions are common during winter, which might explain some observations of Steller's eiders on the lee side of Amaknak Island during the surveys. The peak and cumulative total numbers of Steller's eiders seen during the surveys are shown in figure 6-12.

Steller's eiders are only abundant in Unalaska during the late autumn and winter months. They begin to arrive in mid to late November, peak in abundance in January and February, and depart from the area in late March. By early April, only a few eiders remain in the Unalaska area.

Waterfowl and sea birds nest and rear broods throughout the Aleutian Islands, including Amaknak Island. No notable waterfowl or seabird nesting or rearing habitat was identified near any of the alternative sites considered in detail. The most intensive waterfowl use of waters around Amaknak Island is during the winter, when sea ducks and other waterfowl from northern Alaska and Siberia may congregate for several months. Principal concerns about potential project effects on waterfowl and seabirds were related to wintering populations.

Expedition Inlet. Small numbers of ducks and other water birds were counted at Expedition Inlet as part of the Iliuliuk Harbor survey during the 1999 to 2002 eider surveys. Several species counted at other sites were seen at Expedition Inlet, but in small numbers and without any indication that the inlet or any area in it was of particular value as habitat.

LSA-South Site. Surveys at the LSA-South site were conducted inside the approximate boundaries of the LSA-South alternative site for 38 days in a 3-year period. A maximum of 86 Steller's eiders were counted on one day and a total of 535 were present during the 38 days surveyed. Most of the Steller's eiders within the boundaries of the alternative were in water less than 10 meters deep, and a few were resting on the beach just above the waves. Most were in waters of the southern half of the site.

Biologists counted 427 harlequin ducks during 37 of 38 surveys over a 3-year period. These birds were typically feeding or resting in the shallower water of the site. During 37 of 38 surveys over the 3-year period, long-tailed ducks (301), black scoters (323), and white-winged scoters (514) were observed in waters of the LSA-South alternative or offshore of those waters. White-wing and black scoters typically forage and rest in water farther offshore than Steller's eiders, and long-tailed ducks usually occupy a niche in still deeper water.

The southern end of Amaknak Island, which includes the LSA-South survey sector and the adjacent sector, was one of several sites that Steller's eiders frequently used in the areas surveyed during the winters of 1999-2002. As many as 153 Steller's eiders were counted in one day around the southern end of the island, and a total of 1,231 were counted there during the entire survey (figure 6-12). Most of the eiders seen at that location were in relatively shallow water and were generally described as foraging or loafing (resting). The topography and habitat in this location would appear to support both uses. The south end of LSA is a wave barrier to the high-energy waves and to some extent the wind from the longer fetches in most directions. This appears to produce favorable resting habitat. The relatively shallow water, the diverse bottom habitat, and the abundance of invertebrates reported by divers apparently form suitable feeding habitat. This frequently used feeding and resting habitat includes the LSA-South harbor site alternative and the coastline south and west of the site. Peak abundance generally was observed in water less than 10 meters deep. There are no eagle nests at this alternative site, but there is a regularly used perch above the beach at the south end of the project area.

LSA-North Site. The bottom is rockier and drops more steeply into deep water at this site than at LSA-South. There is less soft-bottom habitat, and presumably fewer Steller's eider prey organisms, at this site than at the southern end of the island. Steller's eiders were observed in this area only twice during 39 surveys over a 3-year period (39 birds one time, 8 birds the next).

Biologists counted 306 harlequin ducks in 38 surveys over a three-year period. Harlequin ducks were observed in every survey sector on every survey, with rare exception. Their adaptation to high-energy marine environments seems to allow them to utilize habitat throughout the survey area. Although their diet in the Unalaska area is unknown, they typically feed on invertebrates including mollusks and crustaceans as well as amphipods. Unlike other sea ducks, they have the unique ability to feed on chitons and limpets despite the strong attachments of these invertebrates to rocks. Harlequin ducks are present in the Unalaska area (all survey sectors) each year when surveys began in late November were still present in April. Cahn (1947) stated they arrive in mid-September and depart in May although some stragglers have been observed as late as mid-June (perhaps these were non-breeders).

Biologists counted 395 long-tailed ducks, 285 black scoters, and 879 white-winged scoters in 38 surveys over a three-year period. The relatively large number of these ducks at the LSA-North site is not surprising. They are capable of exploiting deeper water and are typically found farther offshore in water too deep for Steller's eiders and harlequin ducks. There is an active, productive bald eagle nest immediately across the road from the LSA-North alternative site.

6.4 Threatened and Endangered Species

Threatened Steller's eiders and endangered Steller sea lions are at least occasionally observed in the immediate area of the two LSA sites considered in detail. Sea otter is a candidate species that has incurred drastic population declines in recent years and may be listed as threatened or endangered in the future. Several species of endangered whales, including finback, humpback, sei, blue, sperm, and northern right whales inhabit offshore waters in the North Pacific Ocean and southern Bering Sea (ADF&G et al. 1996), but would not be found in the shallow waters near the alternative project sites. Finbacks and humpbacks might be found occasionally in the outer waters of Unalaska Bay. Listed species are identified in table 6-12.

Table 6-12. Species in the Unalaska area that are listed as endangered and threatened, or as a candidate for listing.

Species	Status	Where found	Present in the Immediate Project Area?
Blue Whale	Endangered	Atlantic and Pacific oceans including the Bering Sea	No
Humpback Whale	Endangered	Atlantic and Pacific oceans including the Bering Sea	No
Sperm Whale	Endangered	Atlantic and Pacific oceans including the Bering Sea	No
Sei Whale	Endangered	Atlantic and Pacific oceans including the Bering Sea	No
Finback Whale	Endangered	Atlantic and Pacific oceans including the Bering Sea	No
Northern Right Whale	Endangered	Range unknown but seen in the Bering Sea	No
Steller's Eider [a]	Threatened	Arctic and sub-arctic eastern Russia and Alaska	Yes, November through March
Short-tailed Albatross	Endangered	North Pacific Ocean including the Bering Sea	No
Steller Sea Lion [b]	Endangered	North Pacific Ocean including the Bering Sea	Yes
Sea Otter [c]	Candidate	North Pacific Ocean coasts including the Aleutian Islands	Yes
Puget Sound Chinook Salmon	Endangered	Coastal Eastern North Pacific Ocean waters	Unknown, but possibly on rare occasion

a. Only the Alaska nesting population is threatened.
b. Steller sea lions west of 144° west longitude are endangered; east of 144° are threatened.
c. Threatened or endangered status is imminent.

The short-tailed albatross is endangered worldwide, and is not typically found in nearshore waters unless temporarily blown in by storms. They eat primarily pelagic squid and other small fishes on the ocean surface and are seen following working fishing vessels in the North Pacific Ocean and southern Bering Sea (figure 6-13). There are no food resources on any of the project sites that would be attractive to short tailed albatrosses and they would not be typically found on any of the project sites.

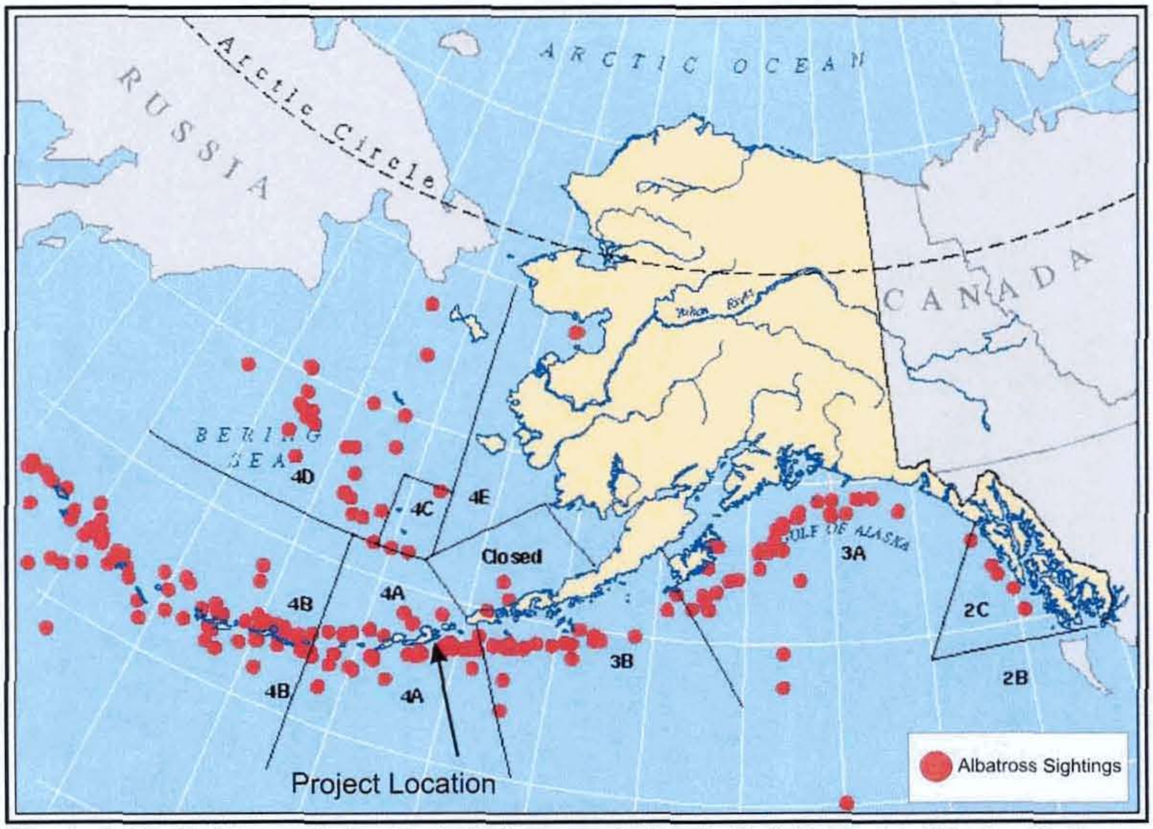

Figure 6-13. Sightings of short-tailed albatross in the Gulf of Alaska and Bering Sea (AKNHP 2003).

Steller's eider is a predominantly Siberian sea duck, many of which winter along the Alaska Peninsula and the Aleutian Islands. Ninety-six percent of Steller's eiders nest in Siberia and are not listed as threatened, but the 4 percent of the population that nests in Arctic Alaska is listed as threatened. Up to about 1,500 Steller's eiders from the Russian and the threatened Alaskan population winter in the Unalaska area. It is impossible to distinguish between the Siberia and Alaska nesting populations when they mix during winter, so all Steller's eiders wintering in Alaska are treated as threatened. There is no way yet to tell how the Alaska nesting population is distributed, but if they were distributed evenly, then 45 to 60 of the Steller's eiders wintering at Unalaska might be from the Alaska nesting population.

Steller's eiders feed in nearshore waters up to about 10 meters deep where they consume small mollusks and crustaceans. They are also known to rest in flocks offshore or even on land within the intertidal zone. The reef at the southern tip of LSA supports a diverse invertebrate community dominated by mussels, and up to 153 Steller's eiders have been seen using this reef habitat (figure 6-12). Invertebrates at the nearby LSA-South site may not be as abundant as on the reef, but up to 86 eiders have been seen using the LSA-South site, primarily for loafing.

Steller sea lions inhabit coastal areas of the North Pacific Ocean including the Gulf of Alaska and the Bering Sea. They are endangered west of 144° west longitude and threatened east of 144° west longitude. This western stock has undergone a 70 percent decline in population since about 1980 (50 CFR 226.202). Unalaska is within the Steller sea lion conservation area.

Steller sea lions eat a wide range of fish, but also consume cephalopods, crustaceans, birds and occasionally other pinnipeds. The sharpest population declines have occurred in the Aleutian Islands where the least diverse diet of primarily walleye pollock and Atka mackerel occurs (Winship and Trites, 2003). Adult sea lions weigh from 600 to 1,200 pounds and consume between 5 and 6 percent of their body weight per day. The LSA project sites do not have sufficient numbers of adult fish to sustain Steller sea lions, but they use the South Channel adjacent to the LSA-North and South alternative sites (figure 4-2) primarily for passage between Captains and Iliuliuk bays.

Steller sea lions congregate on land at haulouts and rookeries. Haulouts are used for resting while rookeries are used for breeding and birthing. Rookeries are protected from human intrusion and commercial fishing (table 12; 50 CFR Part 679). The closest sea lion protection zone to the project site is the rookery at Cape Morgan on Akutan Island (figure 6-14). There are no haulouts near the project sites. Haulouts closest to the project sites are on Akutan Island and at Cape Sedanka (50 CFR 226.202).

Other listed species were considered in the initial assessment of project effects. Eskimo curlews have not been seen in Alaska since 1886 and are believed to be extinct. The Aleutian shield fern (*Polystichum aleuticum*) is known only on Adak Island, 1,290 km southwest of Unalaska Island, and is not found on Unalaska Island or in the project area. Chinook salmon of the endangered stocks typically range throughout the Gulf of Alaska east of Unimak Pass and would not likely be found in the Unalaska area.

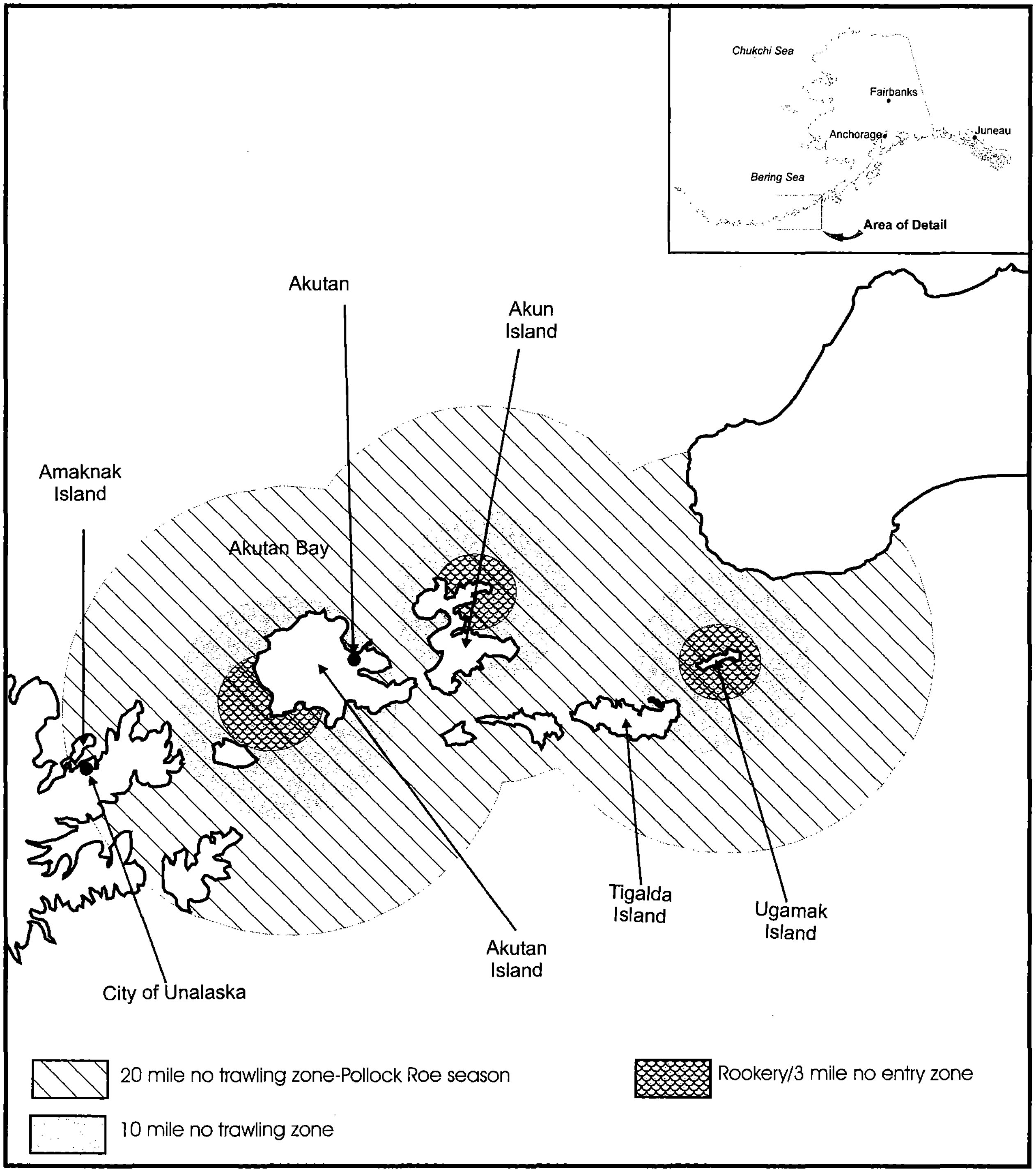

Figure 6-14. Sea lion protection zones in the Unalaska and Akutan areas.

6.5 Essential Fish Habitat

As directed in 50 CFR Part 600, the Magnuson-Stevens Act Provisions: Essential Fish Habitat (EFH), Federal agencies consult with the National Marine Fisheries Service on all actions or proposed actions, authorized, funded, or undertaken by the agency that may adversely affect EFH.

Essential fish habitat means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. For the purpose of interpreting the definition of essential fish habitat: "waters" includes aquatic areas and their associated physical, chemical, and biological properties that are used by fish, and may include areas historically used by fish where appropriate; "substrate" includes sediment, hard bottoms, structures underlying the waters, and associated biological communities; "necessary" means the habitat required to support a sustainable fishery and a healthy ecosystem; and` "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle.

The Alaska District has coordinated with National Marine Fisheries Service and developed the following list of fish and shellfish species that could be present in the general project area.

Walleye Pollock. Adult walleye pollock are migratory and spend the winter months in deeper water off the continental shelf. They spend the spring and summer months in inshore waters from 90 to 140 meters deep. They mostly feed only during summer and do not feed at all during the spawning season. The diet consists of euphausiids and small fishes including juvenile pollock. Adult pollock occur both on the outer and mid-continental shelf and are usually not associated with coastal waters. They would not typically be found on any of the project alternative sites.

Walleye pollock in the Bering Sea spawn in dense schools near the surface mostly in March and mostly over water from about 90 to 200 meters deep. Spawning in the Bering Sea occurs at temperatures from 1° to 3 °C. Development of the eggs is temperature dependent; in colder water, eggs take longer to hatch. The eggs and early larval stages are planktonic and found within the upper 30 meters of water, but older juvenile pollock are found throughout the water column. Juvenile pollock spend their days in deeper water, but feed near the surface at night.

Juvenile pollock distribute spatially according to the strength of their year class. Strong year classes are found from the outer to inner continental shelf, while weak year classes are found only on the outer shelf. Juveniles from strong year classes might sometimes be found atproject alternative sites, as reported by Robards (1999) at the LSA-North site, where they would feed primarily at night on copepods and small crustaceans.

Skates. At least nine species of skates of the genus *Raja* and *Bathyraja* are found in Aleutian Island waters. Most inhabit water along the continental shelf deeper than 50 meters. The adults of some species are primarily predators eating mostly fishes, cephalopods, and large crustaceans while adults of other species consume mostly smaller benthic crustaceans (Orlov 1998). Juvenile *Bathyraja* skates eat mostly marine worms and amphipods. Skates are mostly deepwater species and would not typically be found on any of the project alternative sites.

Sculpins. Sculpins are a large family of bottomfish inhabiting a wide range of habitats from tide pools to water 1,000 meters deep. Most sculpins spawn in the winter. All species lay eggs, but in some genera, fertilization is internal. Eggs are generally laid among rocks and are guarded by the males. The larval stage is found across broad areas of the shelf and slope. Smaller sculpins generally eat small invertebrates, but larger species eat small fish and crustaceans. Several species of sculpins typically inhabit nearshore areas and sculpins were found at the project alternative sites during surveys (USFWS 2000, USFWS 2003).

Rock Sole. Rock sole occupy relatively shallow water throughout their range. Rock sole are common throughout the Aleutian Islands region in depths from 100 to 300 meters and occasionally are found at 500 meters. In the eastern Bering Sea they occur from shallow waters to depths of 200 to 300 meters.

Rock sole spawn in deeper water during winter and spring throughout their range. The yellowish-orange eggs of rock sole are demersal and adhesive. The larvae are planktonic. Young rock sole assume their bottom-dwelling existence at about 20 mm and occur in shallow water in some localities. Little is known about where rock sole spend their first year of life on the seafloor, but by age 1 they are found with the adults. Rock sole were observed in the intertidal zone (USFWS 2000) and caught in beach seining (USFWS 2003) at the LSA-South alternative site, so they are at least seasonally present at the site.

Pacific Cod. Pacific cod inhabit coastal Pacific Ocean waters from California to southern Japan. They are mostly benthic at depths ranging from about 15 to 550 meters. Adult cod migrate to relatively deep water to spawn during the winter spawning season, but spawning is probably correlated with temperature rather than depth. Cod eggs are demersal and hatch in about 12 to 28 days depending on the water temperature. Small cod mainly feed on copepods while the large adults are mainly piscivorous. The adults do not feed during spawning. Juvenile cod less than one year old mostly occupy coastal habitats and move to deeper water as they grow. Juvenile Pacific cod are at least seasonally present at the LSA alternative sites (USFWS 2000, USFWS 2003).

Rockfish. Several species of rockfish in the genus *Sebastes* and *Sebastolobus* are present in the Unalaska area. Most of them are semi-demersal and can be found at depths ranging from 25 to 875 meters; however, commercial concentrations usually occur at depths from 100 to 500 meters. Rockfish are long lived and mature relatively late in life. Little is known about the early life history of most rockfish species, but the juveniles of some species occupy near-shore nursery habitats during the summer months. No juvenile rockfish were caught or seen at any of the alternative sites (USFWS 2000, USFWS 2003).

Flathead Sole. Flathead soles range from California across the Pacific Rim including the continental shelf of the Bering Sea. The adults are benthic and prefer soft and muddy bottoms to about 1,100 meters deep. Flathead sole are more common at depths from about 100 meters to 850 meters.

Adults use separate winter spawning and summertime feeding habitats. Winter habitat is near the shelf margins and the adults migrate to the mid and outer continental shelf in April or May each year for feeding. Spawning starts as early as January, primarily in deeper waters near the margins of the shelf. Eggs hatch in 9 to 20 days depending on temperature. The eggs and larvae are planktonic. Size at metamorphosis and the age at 50 percent maturity are unknown. Bays and estuaries with non-rocky shelf composition are important for juvenile flat head sole in Oregon, and we assume that habitat requirements would be similar in the Bering Sea. No flathead sole were captured or observed during dive and beach seine surveys at the project alternative site (USFWS 2000, USFWS 2003), and based on their habitat requirements it is assumed that they would not be typically found at the sites considered in detail.

Atka Mackerel. The Atka mackerel is not a true mackerel, but is 1 of 10 species of greenlings found in the North Pacific Ocean. Adult Atka mackerel gather in large localized schools, usually at depths less than 200 meters and generally over rough, rocky, and uneven bottom near areas where tidal currents are swift. Adults are pelagic during much of the year but annually migrate inshore to spawn. Prior to spawning the males move to nearshore areas of the Aleutian Islands during the early summer and establish nesting sites where females come to lay eggs. Eggs are deposited on rocky substrate or on kelp in waters from about 15 to 160 meters deep and are guarded by brightly colored males. Eggs hatch in 40 to 45 days, releasing planktonic larvae that become widespread. The biology of Atka mackerel is not well understood and little is known about the early juvenile period. The larval, juvenile, and adult Atka mackerel play key roles in the marine ecosystem as an essential forage species for planktivores, marine birds, piscivorous fishes, and marine mammals, including the endangered Steller sea lion. Nesting sites in the Aleutian Islands region have never been surveyed, and it is unknown to what extent Atka mackerel utilizes the nearshore habitat surrounding the islands or deeper offshore areas (Lauth and McEntire 2002). Neither adult nor juvenile Atka mackerel were found during dive or beach seine surveys on the project alternative sites (USFWS 2000, USFWS 2003).

Forage Fish Species. Several species of forage fish require EFH. They include smelts, capelin, eulachon, and sand lance. Sand lance is the species of forage fish most common at the LSA project alternative sites. This species spends much of its time buried in sandy substrate, but forms large schools to feed and spawn. Much of its activity is at night. It occupies a variety of depths from intertidal to about 100 meters. Spawning is in the spring and the adults eat mostly copepods and their nauplii. This species ranges from southern California to Japan and through the western Canadian Arctic. It is abundant through out its range where it is important to a large number of predatory fish, sea birds, and marine mammals.

Large numbers of sand lance were seined in sandy habitat with a beach seine at the LSA- South site (FWS 2003). Fewer numbers were caught on the other alternative sites.

Tanner Crab. Several species of Tanner crabs, *Chionoecetes sp.*, are found in Alaska. The species of Tanner crab in the Unalaska Bay area is *C. bairdi*, locally and commercially known as bairdi crab. Bairdi crabs prefer soft, muddy bottoms and migrate inshore to water generally less than 50 meters from February to June to molt and mate. Tanner crab larvae are planktonic and migrate vertically within the water column to feed. After several molts, the larvae settle to the bottom and begin life as juvenile crabs. The juvenile crabs begin a seaward migration soon after settling and are found farther offshore by the late juvenile stage. Adult and juvenile bairdi were seen during dive surveys of the Unalaska boat harbor and at the LSA-North site (USFWS 2003: USFWS

2004a), but were not seen during surveys of the LSA-South site. Soft bottom substrate in the existing harbor could be more suitable for this species than substrates found on the LSA alternative sites.

Red King Crab. Several species of king crab are found in the Bering Sea, but the species found in Unalaska Bay is the red king crab, *Paralithodes camtschatica*. Red king crabs are typically found on soft bottoms less than 300 meters deep. Red king crabs are migratory and migrate into shallow inshore areas less than 50 meters to molt, mate and release eggs. Larval stages are generally distributed in the upper 30 meters of water. After several larval molts, the larvae settle to the bottom and begin life as juvenile crabs. Young-of-the-year require near-shore relatively shallow habitat where they sometimes form pods containing hundreds of late juvenile stage crabs. One pod was reported just outside Expedition Inlet (USFWS 2003). Late juvenile stage crabs are most active at night and disperse from the pod to feed and molt.

The substrate on the LSA alternative sites is suitable for red king crabs and adults are at least seasonally caught in pots set near the sites. Juveniles were also seen during dive surveys on the LSA-South site (USFWS 2003).

Golden King Crab. The golden king crab is a deep-water species related to the red, blue, brown, and scarlet king crabs in Alaska. Golden king crabs generally inhabit high relief habitat such as inter-island passes of step continental slopes at depths from 100 meters to 1,000 meters. Female abundance is greatest between 270 and 360 meters, while male crab abundance is greatest between 270 and 640 meters. Little is known about the early life histories of this species. Abundance of late juvenile crabs increases with depth, and they are most abundant at depths greater than 550 meters. It would be unlikely to find this EFH species on any of the project alternative sites in consideration.

6.6 Cultural Resources

This section discusses traditional resource use by the Unangan people, resource use by the community in general, and cultural and historical resources in the project areas. Those concerns discussed in Section 2.4.3 primarily were focused on personal use harvest of resources, recreational use, non-commercial use, and archaeological and historical sites.

6.6.1 Traditional Uses of Resources by the Unangan Community

Subsistence practices over the last 10,000 years in the Unalaska/Dutch Harbor area have been reconstructed through archaeological data, ethnographic information, and traditional ecological knowledge. It is clear that Unangan subsistence focused on marine resources. The island chain forced sea mammal migrations through the intervening passes and concentrated the animals within a restricted area. Fish, shellfish, and sea mammals were important subsistence items. Abundant birds made egg collecting and bird hunting important economic activities (Denniston 1974; Hoffman 2002; Lantis 1984; Yesner and Knecht 2003).

Hunting and gathering included all members of the community and resources were shared within and between communities. It has been estimated that the Unangan relied on marine mammals for 30 percent of their subsistence harvest, fish for 30 percent, birds and eggs for 20 percent, marine invertebrates for 15 percent, and plants for the remaining 5 percent (Veltre 2003). In all, half the food resources of the Unangan in the early 1980's were composed of traditional foods (Veltre and Veltre 1982).

Sea Mammals. The Unangan traditionally relied heavily on harbor seals, sea lions, fur seals, harbor porpoises, and occasionally walrus. While several hunters from Unalaska are still very active, the ban on firearm discharge within the City of Unalaska has ended hunting in waters near harbors. Harbor seals are regularly seen throughout Unalaska Bay (Boughton 1974; Resource Analysts et al. 1993). They provide meat and oil for food, and materials for tools, clothing, lamp fuel, and gun oil (Veltre and Veltre 1982). Today, seals are shot from skiffs near haulouts in Wide Bay west of Unalaska or Beaver Inlet on the east shore of Unalaska Island (Veltre and Veltre 1982).

Steller's sea lions are hunted in the outer areas of Unalaska Bay, including Wide Bay and Kalekta Bay (Boughton 1974; Patterson et al. 1983). They also are hunted at Bishop Point, the Wislow Island area, Unalga Island, and Beaver Inlet. For the most part, they are hunted from skiffs with firearms. Veltre and Veltre (1982) reported that sea lion meat was preferred to harbor seal, although more harbor seals were taken annually.

Fur seals migrate through the Unalaska area in late autumn on their southerly migration and are harvested (Veltre 2003 personal communication; Veltre and Veltre 1982). Harbor porpoises and Pacific white-sided dolphins have been observed in Iliuliuk and Dutch harbors, but there are no reports of these animals being hunted today (Boughton 1974). Walrus also are no longer harvested (Patterson et al. 1983; Veltre 2003 personal communication). The sea otter population began to rebound in the second half of the 20th century and some hunters have resumed harvesting them (Qawalangin Tribe letter 2004).

Fish and Invertebrates. Salmon are important subsistence resources in Unalaska (Resource Analysts *et al.* 1993; Veltre and Veltre 1982). Pink, chum, sockeye, king, and silver salmon are harvested in the Unalaska/Dutch Harbor area. A small run of sockeye salmon spawn in Unalaska Lake from mid-May to the end of June (Veltre and Veltre 1982). The majority of the subsistence-harvested sockeye are taken from Reese Bay, about 5 miles west of Unalaska. The silver salmon subsistence harvest focuses on the Nateekin River and Broad Bay, both on the west side of Unalaska Bay (ADF&G regulations 2002-2004). From mid-June to end of October, there is a strong run of pink salmon in Nateekin Bay and smaller runs in Broad Bay, Captains Bay, and Humpy Cove (in Summer Bay). Some chum salmon are harvested from Iliuliuk River (Veltre and Veltre 1982). Rod and reel fishermen take salmon from accessible rivers and lakes (Veltre and Veltre 1982) and with personal use set nets. The USFWS federal subsistence regulations for 2003-2004 allow that 25 salmon may be harvested per person in the household. Around Unalaska, salmon can be harvested with a net, with some limitations, during commercial fishing season.

Dolly Varden are harvested in Morris Cove Creek, Humpy Creek, Summer Bay Creek and Lake, Iliuliuk River and Unalaska Lake, Pyramid Creek, Shaishnikoff River, Nateekin River, and Makushin River (Resource Analysts et al. 1993; Veltre and Veltre 1982). Herring and groundfish are harvested in the Unalaska/Dutch Harbor area (Research Analysts et al. 1993; Veltre and Veltre 1982).

Dungeness crab, red king crab, and Tanner crab are present in the Unalaska/Dutch Harbor area (Research Analysts et al. 1993). Crab and shrimp are harvested in Iliuliuk Bay, the northeast part of Captains Bay, and Nateekin Bay using crab pots and nets near shore (Resource Analysts et al. 1993; Veltre and Veltre 1982). Razor clams, cockles, steamer clams, blue mussels are harvested in Wide Bay, Broad Bay, Nateekin Bay, Captains Bay, Summer Bay, Humpy Cove, Morris Cove, and Hog Island (Patterson et al. 1983). Clams, mussels, sea urchins, and chitons are hand picked off rocks, collected off the beach or in the intertidal zone (Resource Analysts et al. 1993). Pollution in the Unalaska Bay area has decreased the numbers of invertebrates collected near town (Resource Analysts et al. 1993;Veltre and Veltre 1982). Few people were still gathering eggs in 1982 (Veltre and Veltre 1982), and in 2003, Veltre collected no information about the general use of eggs (Veltre 2003), but some Unangan continue this practice today.

Birds. Today, waterfowl are harvested in Captains Bay, Nateekin Bay, Broad Bay, and Summer Bay. Species taken include mallard, teal, scaup, goldeneye, mergansers, pintail, gadwall, and bufflehead. Ptarmigan are also hunted in these areas (Resource Analysts *et al.* 1993; Veltre and Veltre 1982). State regulations allow rock and willow ptarmigan to be hunted from August 10 to April 30. Hunters may take 20 ptarmigan per day. Prohibition of firearms discharge has essentially ended hunting within the Unalaska city limits.

Plants. Blueberries, mossberries, salmonberries, and strawberries are collected. Although berries are found throughout the eastern part of Unalaska Island, most berry picking is focused on the western part of the island, Captains Bay, Summer Bay, Nateekin Bay, and Broad Bay. Other plants collected include pushky, or wild celery, wild rice, morel mushrooms, petruski (an herb), and fiddlehead ferns (Patterson et al. 1983; Veltre and Veltre 1982; Veltre 2003). Algae are collected from the intertidal zone (Veltre and Veltre 1982).

Other Subsistence Activities. Other resources continue to be used for purposes other than food. Particularly grasses for basket-making, sea mammal gut, bones, and fur for dolls and other items, and some plants for dyes, steam bath beaters, and medicines (Veltre and Veltre 1982).

LSA–South Site. This site has a history of traditional use. Some residents indicated they have used the intertidal area just south of the proposed boat harbor for harvesting invertebrates including mussels, chitons, and clams. Veltre (2002) reported reluctance on the part of his informants to collect invertebrates from the site and did not identify any collection of foodstuffs from the intertidal area at the LSA-South site in recent years. Other residents stated that the area had not been used for traditional subsistence in at least 25 years. The main reason cited for the decrease in use is concern that petroleum hydrocarbons, fish processing waste, and paralytic shellfish poisoning may contaminate animals harvested in this area. Signs warning of paralytic shellfish poisoning discourage collection and consumption of invertebrates. The LSA-South site is still occasionally used for personal use crab fishing. About 30 crab pots were observed offshore in the deeper waters in and adjacent to the LSA-South site in July 2001. Crab pots were also observed at or near the site in July 2000. Some plants are still collected along the east shore near the site but generally away from the roads and quarry.

The intertidal area at the southern end of Little South America is within walking distance from Dutch Harbor and the part of the city on Unalaska Island. This area was identified during scoping meetings as being a good place for hiking, bicycling, picnicking, and bird and wildlife viewing. Ounalashka Corporation owns this land and those activities are allowed by permit.

LSA – North Alternative. This alternative site is not known to be an important traditional use area. Crab pots are placed off the coast of this site. Plants may be collected along the shores. Invertebrates are not regularly collected because of contamination from petroleum hydrocarbons and fish processing waste. Some fishing may take place, but it may have decreased due to contamination fears.

The LSA-North alternative is within walking distance of Dutch Harbor and Unalaska. It was identified during scoping meetings as a popular place to hike, bicycle, picnic, and watch birds and wildlife. Ounalashka Corporation owns most of the land and these activities are allowed by permit.

Combination LSA-North/Expedition Inlet Alternative. The effects on the LSA-North portion of this alternative would be the same as the LSA-North alternative. Changes to the Expedition Inlet would not impact traditional resource use by the Unangan people. Some traditional use takes place in the LSA-North area including crabbing, some plant collection, and collection of mussels, chiton, and clams. Some fishing may take place in the area as well. These activities have decreased in the last few decades due to contamination from petroleum hydrocarbons, fish processing waste, and lifestyle changes.

The Expedition Inlet and LSA-North sites are within walking distance from Unalaska and Dutch Harbor. The LSA-North alternative was identified during scoping meetings as a good place for hiking, bicycling, picnicking, and bird and wildlife viewing. Ounalashka Corporation owns much of the land and these activities are allowed by permit.

6.6.2 Resource Use by the Community of Unalaska

Resources in Unalaska are used in recreation and are sources of food for all members of the community of Unalaska. Activities include recreational sport fishing and other activities regulated by the Alaska Department of Fish and Game, recreational wildlife viewing, bicycling, hiking, boating, fishing, and wildlife viewing.

Marine Based Recreation. Silver and sockeye salmon are the most heavily targeted salmon for sport fishing and personal use in the Unalaska area. Some fishing is with rod and reel in the local lakes. The Makushin and Nateekin rivers are popular during August and September, particularly for silver salmon.

Rockfish are caught near shore for sport and personal use. Black and dusky rockfish are the predominant species caught (ADF&G 2003-2004 regulations). The Alaska Department of Fish and Game 2003 sport fishing regulations limit the rockfish harvest to ten per day with no size limits.

Pacific halibut is also popular for sport fishing and personal use. The current world record halibut (210 Kg) and the previous record (207 Kg) were caught in the waters around Unalaska. There is a small charter fleet in Unalaska that also targets halibut. Most halibut fishing takes place in July and August, but may start as early as May (ADF&G 2003-2004 regulations). The Alaska Department of

Fish and Game 2003 sport fishing regulations allow halibut to be caught from February 1 to December 31 with a daily limit of two per person.

The Alaska Department of Fish and Game 2003 sport fishing regulations require harvest records to be kept for all shellfish. Dungeness crab has a daily limit of 12 (males only, minimum 16 cm). Tanner crab are limited to six a day (males only, minimum 14 cm). Under these regulations, the harvest of king crab is not allowed. The harvest of other invertebrates is not addressed in the regulations and there are no statistics on these types of activities (e.g. collecting clams, chiton, shrimp) for the community in general. Local health professionals do not recommend harvest of benthic invertebrates from the LSA area because there is potential for paralytic shell poisoning and contamination.

Recreational boating, canoeing, and kayaking are gaining popularity in the area. Several businesses now offer fishing charters as well as wildlife viewing tours. The "Annual World Record Halibut Derby," held in Unalaska, has been gaining national recognition, and is expected to draw growing participation in the future.

Land Based Recreation. During scoping meetings in Unalaska, several community members stated that various sites around Unalaska were important to the community for recreational birding, hiking, picnicking, berry picking, bicycling, harvesting plants, and other activities. Several short marathons and bicycling events take place each year. Commercial and non-profit groups organize wildlife and bird watching tours as well.

LSA–South Alternative. Local residents indicated during scoping meetings and in letters that they have used the intertidal area just south of the proposed boat harbor for harvesting invertebrates including mussels, chitons, clams, and crab. This use has declined or stopped in recent years as a result of contamination and paralytic shellfish poisoning. Signs posted in 10 languages warn against shellfish collection and consumption. Crab pots were observed in the area in July 2000 and again in July 2001. Some people report collecting plants along the east shore near the proposed harbor site. In addition, some recreational fishing, particularly for salmon, takes place in the area, but is limited by concerns about contamination.

The intertidal area at the south end of Little South America is within walking distance from Dutch Harbor and Unalaska. This area was identified during scoping meetings as being a good place for hiking, bicycling, picnicking, and bird and wildlife viewing. Ounalashka Corporation owns much of the land and these activities are allowed by permit.

LSA–North Alternative. This area is not known to be a good place to collect invertebrates or to place crab pots. Some plant collecting takes place in the area of the north alternative. This area was identified during scoping meetings as a good place for hiking, bicycling, picnicking, and bird and wildlife viewing. Ounalashka Corporation owns much of the land and these activities are allowed by permit.

LSA – North and Expedition Inlet Combination. The LSA-North area and Expedition Inlet are not known as popular recreational or sport fishing areas, or for crabbing or collecting invertebrates. Some community members use the LSA-North site for hiking, bicycling, picnicking, and bird and wildlife viewing. Ounalashka Corporation owns much of the land and these activities are allowed by permit.

6.6.3 Archaeological and Historical Resources

The pre-contact period of the Aleutian Islands has been divided generally into the Anangula tradition that began 8500 to 7500 years before present (BP), and the Aleutian tradition, which began approximately 5500 BP in the eastern Aleutians and ended with contact with Russian explorers in AD 1741 (McCartney 1984). Knecht and Davis (2001) divide the pre-contact period of the Eastern Aleutians more specifically into the Early and Late Anangula phases (9000 to 7000 BP and 7000 to 4000 BP, respectively), followed by the Margaret Bay phase (4000 to 3000 BP), the Amaknak phase (3000 to 1000 BP), and the Late Aleutian phase (1000 BP to contact; Knecht and Davis 2001).

Two Early Anangula tradition sites (UNL-00115 and UNL-00318) have been reported on Hog Island northwest of Dutch Harbor (Knecht and Davis 2001). In the Unalaska area, the Margaret Bay site (UNL-00048) best represents the Late Anangula phase (Aigner 1983; Knecht and Davis 2001). Several Margaret Bay phase sites have been reported on Amaknak Island: Margaret Bay, Amaknak Bridge (UNL-00050), and Amaknak Spit (also called Tanaxtaxak and UNL-00055), (Bacon 1977; Knecht and Davis 2001; McCartney 1984; Yarborough 1989). The Summer Bay (UNL-00092) and Amaknax (UNL-00054) sites on Unalaska Island were attributed to the Amaknak phase (Knecht and Davis 2001). The Tanaxtaxak/Amaknak Spit site, Eider Point (UNL-00019), and Reese Bay (UNL-00063) on Unalaska Island were attributed to the Late Aleutian phase (Knecht and Davis 2001).

When the Russians arrived at Unalaska Island in the 1740's, there were 24 settlements. By 1805, only about 800 people were reported in 15 settlements. In 1765, a permanent Russian settlement was established in Unalaska Bay at the site of the present town of Unalaska. It was known by the Unangan name of *Iliuliuk* and the Russian name *Gavanskoe selenie*. This was the principal settlement in the area. A naval expedition commanded by Captain Krenitzyn dropped anchor in Captains Bay on Unalaska in 1768 (Black 1999). In 1791, Shelikov established the Unalashka Company. By 1805, storehouses, barracks, a locksmith's shop, and gardens had been built at the settlement. A church was erected in 1808 (Liapunova and Miklukho 1996; Veniaminov 1984).

When the Russian Orthodox priest Ivan Veniaminov arrived in 1824, there were 10 communities on Unalaska Island with 470 people living in 65 homes (Veniaminov 1984). At that time, the Russian-American Company had nine structures at *Gavanskoe selenie* – a church with a bell tower, five houses, three storehouses, five sod houses, and a cattle yard. Iliuliuk, the neighboring Unangan settlement, had 27 sod houses. There was also an elementary school, a hospital, and an orphanage. Between the two settlements there were 196 Unangan and 75 Russians and "Creoles" (Veniaminov 1984).

With the United States' purchase of Alaska in 1867 there was an influx of Americans working with the fishing and whaling industries. The port of Dutch Harbor continued to be important for provisioning whaling and fishing vessels bound for the Bering Sea. Dutch Harbor also served as a gateway to the gold fields in Klondike and Nome and was a distribution point for fox hunters in the Aleutians (Faulkner and Spude 1987).

A presidential executive order set aside land in 1902 but the United States Navy did not come to Unalaska and Amaknak until 1911. A Naval Section Base, Naval Air Station, the Iliuliuk Submarine base, and a detachment of marines were established on Amaknak Island in 1941 because of increasing concerns about Japanese activities in the Pacific (Denfeld 1987; Yarborough 1989). Facilities included a dock, machine shops, mess halls, barracks, a chapel, a fire station, dispensary, gymnasium, administration buildings, and a submarine base commander's house. The following year, a ship repair and maintenance facility was added to the submarine base (Yarborough 1989; Yarborough 1999). In 1945, the submarine base was decommissioned and the air station was changed to an air facility. The Naval Operating Base was decommissioned two years later (Yarborough 1999).

A major effect of the war was the U.S. Government's removal of the Unungan people to relocation camps in southeast Alaska. The Japanese took the people on Attu to concentration camps in Japan. The Unungan occupied the island chain for the past 10,000 years. The few that remained behind were part of the Aleutian campaign to take the islands back from the Japanese. The people returned in 1945 but not everybody was able to return to their original villages.

LSA–North Alternative. Quarry operations adjacent to this site have impacted a recently reported archaeological site (no AHRS number). The site is discussed below.

The Amaknak Bridge site (UNL-000050) is on the northern edge of this alternative, but is not expected to be directly impacted by this alternative. This site has been attributed to the Margaret Bay phase (Bacon 1977:16, 19; Knecht and Davis 2001; McCartney 1984; Yarborough 1989). The site is currently being excavated in conjunction with the realignment of the bridge.

The LSA-North alternative is within the boundaries of the Dutch Harbor Naval Operating Base and Fort Mears, U.S. Army, National Historic Landmark (Dutch Harbor NHL). On the west shore of Little South America were 22 ammunition magazines and tunnels for storage of explosives. The submarine net across Captains Bay was also monitored from Little South America (Denfeld 1987; Knecht 2000). Several buildings in the area would be impacted by this alternative and this will in turn impact the landscape of the NHL The landscape is a contributing part of the Dutch Harbor NHL.

Combination Alternative. No archeological sites have been reported in the immediate area of Expedition Inlet. Use of the quarry could impact a recently reported archaeological site (no AHRS number assigned) on the margin of the existing pit.

As with the LSA-North alternative, the reduced LSA-North portion of this alternative is adjacent to the Amaknak Bridge site (UNL-000050).

The LSA-North and Expedition Inlet alternative is within the boundaries of the NHL. The harbor would affect the landscape, a contributing component of the Dutch Harbor NHL. Removal of building foundations would also be an adverse effect to the appearance of the NHL. The south side of the staging area would be within the area of the contractors' camps, occupied during the construction of Fort Mears. Depressions left behind by the buildings and from other activities would be impacted by the new staging area for harbor construction. This would be an adverse effect to the Dutch Harbor NHL.

LSA–South Alternative.

The first occupation of Little South America likely began with the colonization of the island. Dr. Richard Knecht, an archaeologist formerly with the Museum of the Aleutians, discovered an early archaeological site in the bank of the quarry during the spring of 2003 (Knecht pers. comm. 2003). There were approximately 3 meters of the World War II component deposits covering the earlier material. Large blades, obsidian tools, lithic debitage, and a microblade lie in the intact strata underneath. Knecht estimated that the deposits dated to the Anangula phase (between 9000 and 4000 BP; Knecht 2003 personal communication). There is no information about the condition of this site since it was first reported and an archaeologist will need to locate and evaluate the site before the quarry is used to supply material for the harbor.

UNL-00047 is 100 meters southwest of the harbor site. Like the site found in the quarry walls, it too has a core and blade technology. While it did not contain shellfish or bone items, it did have intact strata despite being disturbed by a World War II gun emplacement and other World War II construction (Knecht 2000, Veltre *et al.* 1984:41, 43). UNL-00047 was determined by the Corps to be eligible for the National Register of Historic Places under Criterion D because there are few excavated sites older than 3,000 years old in the Aleutian Island chain. The site could provide significant information about early Unungan culture of the eastern Aleutian Islands. An increase in the number of visitors and users brought by the harbor and associated upland development is likely to cause indirect adverse effects to this site.

There are three other pre-contact sites on the southwestern side of Little South America at the junction where the road divides north and south. UNL-051, 052, and 053 were probably parts of a single site that had been split by road, building, and magazine construction during World War II. Veltre *et al.* (1984:38) noted that while much of the site was taken away as fill, or disturbed by construction, there were still shell-bearing deposits containing stone flakes remaining behind. This site has not been evaluated for eligibility for the National Register of Historic Places. The midden is outside the construction area and it may not be affected by the increased traffic to the harbor if Ounalashka Corporation continues to restrict access to their lands through their permit system.

The Museum of the Aleutians has been excavating an extensive pre-contact Unungan site (UNL-050) at the bridge, northeast of the harbor location. The excavation is part of mitigation for bridge realignment by the Alaska Department of Transportation and Public Facilities. This site contains abundant subsistence information, house remains, and some burials. The harbor would be reached using the existing road, and the harbor and its construction would not affect the site. UNL-050 would be affected by unrelated bridge realignment that should be completed before the harbor is built.

There is only one post-contact site recorded in the harbor area that was built before World War II. If there were other pre-war structures present, they were probably demolished during the intensive construction period during the war. A two-story herring saltery building and dock (UNL-00291) was built by a man named Carlson in the little bay on the southeast side of Little South America. A saltery was on the first floor and living quarters on the second. He planned to fish for herring and cod, but died before he could use the saltery (Swanson in Knecht 2000). The building was probably removed during World War II, and all that is left are pilings in the intertidal zone. The site was found not eligible for the National Register of Historic Places because of the lack of integrity, and because the pilings would be removed during the construction of the harbor.

The Dutch Harbor Naval Operating Base and Fort Mears U.S. Army National Historic Landmark (Dutch Harbor NHL) covers most of Amaknak Island. A landmark receives this designation because of historical events that reflect our heritage as a nation. The Dutch Harbor NHL is important to our national heritage because of its role as a defensive installation during World War II, when it was the westernmost base protecting the U.S. mainland from Japanese attack. It was attacked twice in 1942 by the Japanese, which led to the evacuation of the Unungan people from the Aleutian Islands. The base also supported the entire Aleutian campaign and the military events that led to the end of Japanese occupation of United States lands.

The Seabees built a defensive site to help protect Fort Mears on Hill 400 on Little South America in response to the Japanese bombing of Unalaska on June 3 and 4, 1942. They placed four 155 mm guns on Panama mounts at the top of the hill. Near the guns were a two-story, concrete artillery fire control station and a wood fire control station. Scattered around the hill were steel magazines to store the ammunition for the guns and two warhead tunnels. The magazines were elephant steel magazines camouflaged with sod and grass. A switchback road winds up from the base of the hill to the guns. Along the road are the remains of barracks, latrines, cabanas, telephone poles, foxholes, and warehouses. Contractors' camps were established on the north side of the hill facing Fort Mears, and the outlines of some of the structures are visible in the ground although no buildings remain. There is also a gun emplacement at the southern tip of the island and a submarine net once spanned the entrance to Captains Bay from the southwestern shore. Hill 400 was part of the "Iron Ring" designed to defend Fort Mears from future attacks.

Although many of the buildings have since collapsed, the landscape is an important part of the district and a contributing component to the Dutch Harbor NHL. Viewed from the top, the layout of the defensive structures protecting both Fort Mears to the north and the entrance to Captains Bay to the south and the support buildings of barracks, warehouses, and latrines is obvious: "A spectacular view of Amaknak Island and the harbor can be seen from each gun mount and the observation post on Hill 400. This view, the high winds atop the hill, and the arduous climb up to the area, represents much of what men experienced who were stationed at Aleutian coastal defenses" (Johnson and Cook 1992: Section 7, p. 16).

This view is part of what conveys the important historic events to visitors. "At Little South America, landscape is particularly important to the District's historic character. Very few remnants of the coastal defenses actually exist and most of these are in ruins. However, because the rolling tundra of the Aleutians can be so easily and permanently disturbed, blast marks in the hillside, worn patches of grass along the roadside, and uneven vegetative growth clearly indicates where World War II construction took place. Since there was no construction on "Little South America" before 1941, and no development has taken place since the war, the disturbed landscape is historically integral to the District" (Johnson and Cook 1992: Section 7, Page 15). All buildings, structures, magazines and tunnels, blast marks, sod from buildings, gravel roads, and vistas are contributing properties to the National Historic Landmark. The expansion of the quarry, any upland development, and the construction of a harbor within this landscape would disrupt the World War II era landscape fundamental to the integrity of the National Historic Landmark and is an adverse effect to this historic property.

Across from the harbor site in Captains Bay is the area where the Unangan residents of Unalaska returned to their home after they were evacuated in 1942. Between July 19, 1942, when they were removed, and April 22, 1945, when they returned, they lived in relocation camps in southeast Alaska (Kolhoff 1995). They found many of their homes destroyed and their property stolen. Reconstruction took years, and recovery was never complete. The place the Unungan people disembarked has not been evaluated as a traditional cultural place; however, it is outside the area of potential effect. It would not be physically affected by the harbor.

Post-war development in the vicinity of the harbor appears to be confined to the quarry. This is an ongoing operation and would likely form the basis for upland development associated with the harbor.

6.7 Land Use

6.7.1 Current Land Use

More than 75 percent of the 1.77 million hectares of the Aleutian Islands are in the Aleutian Islands National Wildlife Refuge. The refuge was set aside in 1980 as a 1.34 million-hectare unit of the 1.98 million-hectare Alaska Maritime National Wildlife Refuge (AMNWR). Small areas already developed were excluded from AMNWR or wilderness designation. Existing land use by humans revolves around the seven communities of the archipelago (table 6-1), the single remaining active military installation on Shemya Island, and a few scattered cattle ranches. The remainder of the island lands is used only occasionally by people visiting for recreation, to collect bird eggs or other wild foods or materials for personal use, or for other short-term uses. Some of the islands designated as wilderness are closed to all human use, with rare exceptions granted for specific scientific or management purposes. Access to many of the other islands is on a limited permit basis.

Land use at or near most of the communities in the Aleutian Islands is not tightly zoned, and there is relatively little development to induce more restrictive land use controls. Unalaska, with its rapid growth in the last two decades, has developed more specific land use provisions.

The City of Unalaska encompasses about 30 thousand hectares of land and 26 thousand hectares of water. The City holds title to 484 hectares of land. General land uses in and immediately surrounding the city include residential, industrial, commercial, public and private institutional, government, undeveloped open space, tidelands, and wildlife refuge. Much of the land surrounding the city is designated as part of the Alaska Maritime National Wildlife Refuge.

In 1996 the City of Unalaska underwent a city-wide rezoning to encompass all land within the city limits. The rezoning also established zoning districts for tideland areas.

The City of Unalaska has 13 categories in its Zoning Ordinance. They are as follows:

Single-Family/Duplex Residential
Moderate-Density Residential
High-Density Residential
General Commercial
Marine-Related/Industrial
Marine-Dependent/Industrial
Watershed
Open-Space
Public/Quasi-Public
Subsistence Tidelands
Developable Tidelands
Holding District
Native Allotments/Restricted Deeds

The City of Unalaska adopted its first comprehensive plan in 1986. The plan was revised in 1993, and is currently under revision.

The LSA-North alternative site is on tidelands zoned "Developable Tidelands," with adjacent uplands zoned "Marine Dependant/Industrial." The LSA-South alternative site is on tidelands zoned "Developable Tidelands," with adjacent uplands zoned "Marine Dependant/Industrial." The Expedition Inlet site is on tidelands zoned "Developable Tidelands" with adjacent uplands zoned "Marine Dependant/Industrial" or "Marine Related Industrial." All the alternative sites considered in detail are zoned for uses compatible with harbor construction and operation.

Land at and around Expedition Inlet is used for a variety of commercial, public transportation, commercial, and industrial functions. There also is a small public park on what was formerly Expedition Island on the north side of the inlet. Lands are owned by different public and private entities.

Little South America is owned almost entirely by the Ounalashka Corporation. There are no residences or public facilities away from Airport Beach Road and "The Bridge to the Other Side," which connects Unalaska and Amaknak Islands. Those lands were transferred to the corporation in a land swap with the U.S. Fish and Wildlife Service (USFWS), and USFWS retains the right to prohibit development on those lands that would be incompatible with the laws and regulations that establish the purposes of the Alaska Maritime National Wildlife Refuge. The only commercial development on Ounalashka Corporation lands in Little South America are a live crab holding facility on Henry Swanson Drive adjacent to the LSA-North site and the active quarry between Henry Swanson Drive and the LSA-South site. The crab holding facility circulates water from South Channel through the indoor holding tanks and back into the channel. Contractors operate the quarry as needed and pay the Ounalashka Corporation on a unit basis for the rock they quarry. Quarry operators also use the nearby World War II underground magazines for storage of equipment and mining supplies.

6.7.2 Historic Land Use

There is a continuous record of human occupation in Unalaska Bay beginning approximately 9,000 years ago that continues into the present. As noted in Section 6.6.3 (Archaeological and Historical Resources), the first European visitors to the area were Russian fur traders who did not arrive until the 1740's, but were a constant presence in the bay through the remainder of the Russian possession of Alaska. Throughout that period, Russian trading companies required the original inhabitants of the Aleutian Islands, including the Unangax^, to hunt sea otters for the fur companies for little or no pay. They also divided families, relocated entire communities, and enforced Russian social policy, structure, and religion. The Russians controlled the whole of the Aleutian Islands until 1867, when Russian holdings in Alaska were sold to the United States.

The American government then claimed ownership and control of most lands in Unalaska Bay. Most Alaska Natives were locked out of land ownership because they were not considered American citizens. The United States Navy began building up defenses in Unalaska Bay in 1941 as World War II loomed. A brief description of these activities is presented in Section 6.6.3. After the attack on Dutch Harbor, 881 Alaska Native people were hastily evacuated from the nine communities in the Aleutian Islands. After the war, the government incorporated the residents of Attu, Biorka, Kashega, and Makushin into the communities of Unalaska, Atka, and Nikolski. Those who returned to their homes found them ravaged by weather and vandals, their possessions stolen, and their churches, cultural, and archeological sites looted. On August 10, 1988, Public Law 100-383 was signed calling for financial compensation and an apology from Congress and the President on behalf of the American people for the internment and subsequent losses (NPS 2004).

After World War II, the federal government continued to control most lands around Unalaska Bay. Some of the land was set aside as a wildlife refuge and an international treaty protecting sea otters and fur seals was signed. In 1959, Alaska became the 49th U.S. state and the federal government granted ownership of 28 percent of the land to the new state. Ownership of most land around Unalaska Bay remained in federal hands as a wildlife refuge. In 1980, President Carter combined 11 existing refuges and created the Alaska Maritime National Wildlife Refuge.

Congress passed the Alaska Native Claims Settlement Act (ANSCA) in 1971. This law granted 44 million acres and 1 billion dollars to village and Native corporations created under the act. At that time, Ounalashka Corporation selected a group of islands between Unalaska and Akutan islands (including the Baby Islands, Peter Island, Wislow Island, and Bird Island). Both Ounalashka Corporation and Akutan Corporation selected these islands because they were valuable and important subsistence areas. The islands included nesting habitat for various marine birds and at least one sea lion rookery. The Unangan people used this area for bird hunting, egg collecting, marine mammal hunting, fishing and other subsistence activities (Veltre 2003).

6.7.3 Land Ownership

The Federal government, ANCSA corporations, and federally recognized tribes own more than 95 percent of the land in the Aleutian Islands. Native ownership of subsurface rights generally is held by the regional Native Corporations. The Aleut Corporation is the regional corporation serving Unalaska and Dutch Harbor. The Ounalashka Corporation, representing financial interests of the federally recognized tribe in Unalaska, owns most of Amaknak Island and much of Unalaska Island.

In a 1987 agreement between Ounalashka Corporation and the U.S. Fish & Wildlife Service, subsurface rights of islands owned by Ounalashka Corporation totaling about 383 acres were exchanged for subsurface rights at Little South America (about 195 acres), which were controlled by the U.S. Fish & Wildlife Service. The agreement stated that any plans to develop the conveyed land would be reviewed by the U.S. Fish & Wildlife Regional Director, who would determine if "such use or development conforms to the laws and regulations governing use and development of the [Alaska Maritime National Wildlife Refuge]." The agreement also recognized that Ounalashka Corporation planned to develop a commercial quarry on the conveyed land (Ounalashka Corporation and USFWS agreement paragraph 3[b]).

In an accompanying Compatibility Statement to the Ounalashka Corporation and U.S. Fish & Wildlife Service agreement, the Refuge Manager concluded that "the 195-acre tract has little or no value for wildlife." It further stated that Ounalashka plans to extract gravel from Little South America were:

> ...compatible with the purposes for which the refuge was established and with the wildlife values of Little South America for the following reasons:
>
> • The habitat is already disturbed and supports little wildlife.
> • The native species located there are common to disturbed areas and/or have wide habitat tolerances; hence, they would either move to a different locality or tolerate the disturbance caused by the extraction.
> • The more sensitive species in the area, such as seabirds and waterfowl, do not depend on Little South America for any of their needs; they feed on the water and nest on undisturbed islands. Therefore, the gravel and rock extraction would not affect them (Ounalashka Corporation and USFWS agreement Compatibility Statement, Conclusion).

A July 24, 1991, letter from U.S. Fish & Wildlife Service to Ounalashka Corporation, referred to a site evaluation of Little South America that confirmed that there were no fish and wildlife values on the conveyed land. The letter also noted that there was industrial and commercial development in the area.

The Ounalashka Corporation owns the uplands adjacent to the LSA-North and LSA- South sites and parts of the uplands adjacent to the alternative site at the existing boat harbor. The City of Unalaska owns the tidelands at all three alternative sites considered in detail. The Ounalashka Corporation has expressed interest in developing existing quarry lands for commercial uses to support marine related development at Little South America but has not made financial commitment or developed specific plans. The City of Unalaska has a real estate agreement with the Ounalashka Corporation that would allow the city to use about 0.4 hectare of corporation land adjacent to the LSA-South site for harbor support facilities. Upland fill to create a staging area by the harbor near sea level would use a small area of Ounalashka Corporation land. The Ounalashka Corporation could be expected to develop parts of the existing quarry for commercial real estate to support the harbor and to allow construction of access roads to the lower staging area.

6.7.4 Special Designation Public Lands

Most of the Aleutian Islands are in the Alaska Maritime National Wildlife Refuge and much of that is in designated wilderness areas. The Aleutian Islands Unit of the refuge also is designated as a biosphere reserve. Biosphere reserves are protected areas of representative terrestrial and coastal environments that have been internationally recognized under the UNESCO Man and the Biosphere Program for their value in conservation and in providing the scientific knowledge, skill, and human values to support sustainable development.

None of the three project sites considered in detail are in the refuge, and the lands immediately adjacent are not refuge-owned lands. The harbor sites are not in or adjacent to any parks or other formally designated recreational or public use lands. Lands on Amaknak and Unalaska Islands developed and used by the U.S. military during World War II still retain evidence of that period. The Dutch Harbor Naval Operating Base and U.S. Army Defenses National Landmark District was designated to recognize the historical importance of the events and properties associated with those sites. All the lands of the three site alternatives considered in detail are in or near the NHL.

6.7.5 Coastal Management Plans

The three alternatives considered in detail are in the Aleutians West Coastal Resource Service Area (Aleutians West CRSA), which adopted enforceable and administrative policies for implementation of the Coastal Management Program in 1991. The district is a part of the statewide coastal management program. Formation of the district allowed local residents a direct role in the development of coastal resource policies that affect the Western Aleutians region. Federal, State, and local policies must be consistent with policies of the Aleutians West CRSA. Principal policies and standards relate equally to each alternative and are as follows:

- Priority for coastal development is given to water dependent and water related activities.

- Appropriate planning and mitigation is required for projects that will affect fish and wildlife and their habitats, commercial fishing activities, subsistence and personal use of resources, air and water quality, cultural resources, and recreational resources. Mitigation guidelines of the Aleutians West CRSA are consistent with those of the National Environmental Policy Act regulations.

- Compatibility with adjacent water and land uses.

- Dredging, disposal, and fill shall not cause significant adverse impacts to fish and wildlife habitat and life history requirements, will minimize the area being disturbed, will maintain adequate circulation and drainage, and will comply with state and federal regulations.

- In-water structures will avoid obstructing navigation and will be clearly marked.

- Maximize public notification of planning activities

- Upland habitats will be managed to avoid excessive runoff and to maintain water quality.

- Harbors will have provisions for storage, handling, and disposal of petroleum products, solid waste, and other waste material in accordance with local, state, and federal regulations.

- Plan for cumulative impacts.

- Access will be maintained to subsistence resources, and users will be contacted to identify concerns and mitigation measures.

- Encourage implementation of a Unalaska harbor management plan.

- Site development to avoid impacts to coastal processes.

- Minimize impacts to recreation on lands and waters open to public use.

- Protect cultural resource values.

Consistency with these applicable criteria was considered during plan development and is considered in final selection of a recommended

7.0 ENVIRONMENTAL CONSEQUENCES

7.1 Introduction

This section discusses how navigation improvements at Unalaska (and the alternative of no action) might affect environmental resources of concern. This section brings together the following:

- Concerns identified during scoping and interagency coordination described in Section 2, Purpose and Need (Problem Identification);

- The no-action and construction alternatives and adverse effects of mitigation alternatives considered in detail in Section 4;

- The resources of concern described in Section 6, Affected Environment.

Material in Section 7 is presented in the same general sequence as in Section 6 to help readers compare information about impacts with information about the resources in Section 6. Impact analysis is focused on the resources that are of particular concern and on the alternatives considered in detail in Section 4. The environmental impacts identified in this section are, unless otherwise stated, the impacts that would be caused by each alternative considered in detail as identified in Section 4.6. The alternatives include integral mitigation measures, but do not include features added specifically to compensate for impacts. Direct construction impacts are addressed under each resource heading. Cumulative and other indirect impacts are discussed near the end of this section.

The environmental consequences of the no-action alternative and each of the three action alternatives considered in detail (LSA-North, Combination, and LSA-South) are addressed in the sections that follow. Environmental consequences that would be similar for all three action alternatives are addressed under the single heading "Action Alternatives" rather than repeating the same consequences information.

7.2 Communities and People

7.2.1 Effects on Communities of the Region

No-Action Alternative. No effect on communities of the region.

Action Alternatives. A new harbor at any of the Unalaska sites considered in detail would provide moorage principally for boats that already operate out of Unalaska. The economics evaluation (Appendix B) indicates that the boats most likely to use the harbor also would be operating in the Bering Sea and North Pacific Ocean commercial fisheries. Any of the three harbor alternatives would be sized for boats more than 24 meters long. Although any of the harbor alternatives could be used for smaller boats, the economics of operating and paying for the harbor are likely to favor use by larger commercial vessels that could pay more for moorage.

7.2.2 Effects on Transportation

No-Action Alternative. Regional transportation patterns would remain as described in Section 6.1.

Action Alternatives. A harbor at any of the sites considered in detail would have little effect on regional transportation, availability, or cost of utilities or services in Unalaska. A new harbor would not affect regional economics or regional harbor demand because there are more than enough boats using Unalaska now without moorage to ensure that a new harbor would not affect demand at other harbors (Appendix B, Economics).

Boat operators using a new harbor could reduce operating and maintenance costs, resulting in a net economic benefit to those operators. While the economic benefits would be meaningful to present boat operators using Unalaska, they would not represent enough cost savings to induce additional boats to enter the Unalaska fishery.

7.2.3 Effects on Utilities and Basic Services

No Action Alternative. Utilities and basic services would remain as described in Section 6.1.

Action Alternatives. Providing basic utilities to any of the harbor sites considered in detail would cause minor disruption of traffic and activities during construction, but no other appreciable effects. There is sufficient excess capacity of all basic utilities and services to handle the relatively minor additional load from any of the 75-boat harbor alternatives.

7.2.4 Effects on Cultural and Recreational Opportunities

No-Action Alternative. Cultural and recreational opportunities would remain as described in Section 6.1.

LSA-North Alternative. Areas along the eastern shore of LSA are used occasionally for hiking, picnicking, beach combing, birding, and marine mammal watching and would be substantially altered. The landowner restricts land use on the eastern shore of LSA, including the two harbor sites. Loss of either of the two LSA sites to harbor construction and operation would further curtail recreation activities. Similar recreation opportunities may be available a few hundred meters south at the southern end of LSA and along the western shoreline, but the total area available for recreation would be reduced. Some of the present users of the LSA eastern shoreline at the two alternative sites expressed a strong desire to continue use of those sites for recreation. New recreational opportunities might not replace the existing uses, but would offer some benefit to recreational users. Some recreational users would enjoy walking over the docks of a new harbor where they could see the commercial fishing fleet and where they could look down into the harbor waters.

Combination Alternative. This alternative would cause the same effects as are identified for the LSA-North alternative.

Expedition Park is a small shoreline public use area on Expedition Inlet directly across the inlet from the moorage area considered in detail for the Combination alternative. The inlet shoreline is modified by Airport Beach Road, and would be further modified by moorage facilities, boats, and boat activity. Park users might prefer to retain the existing ambience.

LSA-South Alternative. This alternative would cause the same effects as identified for the LSA-North alternative.

The LSA-South alternative would incorporate a boat ramp that would allow recreational users to launch and recover small boats and kayaks. This would give recreational users much better boating access than they have now. A boat ramp would be more expensive to develop and more difficult to access at either the Expedition Inlet or LSA-North alternatives, so a boat ramp is not included in those alternatives.

7.2.5 Effects on Demographics

No-Action Alternative. Unalaska population numbers and makeup would remain unchanged.

Action Alternatives. A new harbor at any of the sites considered in detail would have little effect on employment, wages, or the population makeup of Unalaska. None of the alternatives would be large enough to substantially alter business opportunities that would attract more people to the Unalaska area.

7.2.6 Effects on Community Services

No-Action Alternative. Community services would remain unchanged.

Action Alternatives. All the harbor alternatives considered in detail would be close to existing services and could be served by the existing infrastructure without undue burden and without diminishing services to other users.

7.2.7 Effects on Employment and Income

No-Action Alternative. Employment and income in Unalaska and the Aleutian Islands region would remain unchanged. Tidelands at LSA and Margaret Bay could be developed, if required, to produce income for the Ounalashka Corporation and the Native people who depend upon the corporation for income.

Action Alternatives. None of the action alternatives considered in detail would substantially increase employment opportunities or income in Unalaska. Because more boats would likely be left in Unalaska during the off seasons, there might be more demand for boat-watching services, which could translate into a minor business or employment opportunity. Construction of any alternative would cause a short-term increase in jobs and income, although the contractor might bring in most of the workforce. Local businesses might also benefit from the sale of rock and other commodities and by providing services for harbor construction.

7.2.8 Effects on the Economy

No-Action Alternative. The economy of Unalaska and the Aleutian Islands would remain unchanged.

Action Alternatives. Construction of any of the action alternatives considered in detail would cause a short-term, mild increase in economic activity during construction. Boats using a new harbor would be mostly the same vessels working out of Unalaska now, causing little long-term effect on business opportunities or the broader economy. New retail or service businesses could be opened at a new harbor.

With a total design capacity of 75 boats, a new harbor probably would not be large enough to attract enough potential businesses to encourage major development. Existing high-volume fueling services are within 3 km of each alternative, so there is little likelihood that new fueling operations would be developed at the harbor. Smaller retail or service businesses might find enough incentive in the combination of available relatively flat ground along with a small, close-by clientele to open a small business or locate services at the harbor site.

7.2.9 Environmental Justice

Public scoping, coordination, and review of concerns raised for other proposed actions at the LSA-South site led to questions about whether a project might disproportionately affect a minority population. The principal concerns are evaluated as follows:

Project Induced Changes in Community Development and Street Traffic. Related material is presented in Section 7.2.2

<u>No-Action Alternative</u>. No effect

<u>LSA-North Alternative</u>. No effect. This alternative would not alter development near any population and would be accessed by traffic over one of the main streets in Unalaska and a road that does not serve residential areas.

<u>Combination Alternative</u>. This alternative would be constructed adjacent to housing used by minorities. Noise, lights, and activities could be objectionable, but probably would not constitute a significant effect.

<u>LSA-South Alternative</u>. No effect. This alternative would not alter development near any population. It would be accessed by traffic over one of the main streets in Unalaska and a road that does not serve residential areas.

Effects to Air Quality. Related material is presented in section 7.3.4.

<u>No-Action Alternative</u>. No effect

<u>LSA-North Alternative</u>. No effect. Emissions into this non-residential area would be expected to dissipate before reaching residential areas.

Combination Alternative. Emissions from construction and operations would dissipate quickly, but would be expected to affect people in adjacent residences. Potential effects are not expected to be significant.

LSA-South Alternative. No effect. Emissions into this non-residential area would be expected to dissipate before reaching residential areas.

Water Quality. Related material is presented in section 7.3.3.

No-Action Alternative. No effect

LSA-North Alternative. No effect. Water at this site and nearby areas that might be affected is not used for drinking, swimming, or food propagation.

Combination Alternative. No effect. Water at this site and nearby areas that might be affected is not used for drinking, swimming, or food propagation.

LSA-South Alternative. No effect. Water at this site and nearby areas that might be affected is not used for drinking, swimming, or food propagation.

Collection of Upland Plant Materials. Related material is presented in Sections 7.4.1 and 7.7.1.

No-Action Alternative. No effect

LSA-North Alternative. A small area of shoreline and other nearby vegetation would be lost, along with any plant collection activities at those sites. Quarry development for the large volume of rock required for this alternative (equivalent to about 2.6 hectares of rock to a depth of about 5 meters) could affect an appreciable area of upland vegetation. Development of the Ounalashka Corporation quarry just south of this alternative, if selected by the contractor, could affect several hectares of surrounding vegetation, including the hillside adjacent to the LSA-South site. Local users, including people of racial minorities, may collect vegetation around the quarry. Loss of this material would not substantially affect the ability of people to gather these foods for personal or traditional uses because the plants growing at this site are distributed throughout the Unalaska area.

Combination Alternative. A small area of shoreline and other nearby vegetation would be lost, along with any plant collection activities at those sites. Quarry development for the almost 83,000 cubic meters of rock required for this alternative (equivalent to about 1.6 hectares of rock to a depth of about 5 meters) could affect an appreciable area of upland vegetation. Development of the Ounalashka Corporation quarry just south of this alternative, if selected by the contractor, could affect several hectares of surrounding vegetation, including the hillside adjacent to the LSA-South site. Loss of this material would not substantially affect the ability of people to gather these foods for personal or traditional uses because the plants growing at this site are distributed through out the Unalaska area.

LSA-South Alternative. A small area of shoreline and other nearby vegetation would be lost to harbor construction, along with any plant collection activities at those sites. Quarry development of approximately 21,000 m^3 of core and "b" rock required for this alternative (0.4 hectare of rock to a depth of about 5 meters) could affect at least a small area of upland vegetation. Development of the adjacent Ounalashka Corporation quarry, if selected by the contractor, could affect at least a small area of surrounding vegetation, including the hillside adjacent to the LSA-South site. Quarry and project development together could largely destroy about 2 hectares of vegetation. Loss of this material would not substantially affect the ability of people to gather these foods for personal or traditional uses because the plants growing at this site are distributed through out the Unalaska area.

Collection of Marine Plants and Animals. Related information is presented in Sections 7.2.4 and 7.7.1.

No-Action Alternative. No effect

LSA-North Alternative. Seaweeds, mussels, and other invertebrates collected for food and crafts by people, including minority people in the Unalaska area, inhabit the lower intertidal area at this site and would be lost to users if this site was developed. Effects would be minor because the food organisms present, principally mussels, are abundant and widely distributed in the Unalaska area. People collecting these organisms for food could easily find them in many other locations around Unalaska. Safety concerns, particularly those related to paralytic shellfish poisoning, prevent people from collecting mussels or other materials from this site for consumption.

People fish, at least occasionally, with hook and line, nets, and traps for salmon, other fish, and king crab along the coast of LSA, Iliuliuk Harbor, Iliuliuk Bay, and in many other areas around Unalaska. This site is not known to be an especially well-used site for fishing, but the deeper waters in South Channel are used for trapping king crabs for personnel use. Personal use fishing is not regulated by race, and there is no particular reason to expect users to be disproportionately of minority race. Anyone displaced from fishing or crabbing at this site could use other available, nearby sites. Displacement from this relatively small area would not appreciably affect the ability of users to collect food for personal use.

Combination Alternative. Seaweeds, mussels, and other invertebrates collected for food and crafts by people, including minority people in the Unalaska area, inhabit the lower intertidal area at both LSA-North and Expedition Inlet sites and would be lost to users if this site was developed. Effects would be minor because the food organisms present, principally mussels, are abundant and widely distributed in the Unalaska area. People collecting these organisms for food could easily find them in many other locations around Unalaska. Safety concerns, particularly those related to paralytic shellfish poisoning, prevent most people from collecting mussels or other materials from this site for consumption.

People fish, at least occasionally, with hook and line, nets, and traps for salmon, other fish, and king crab along the coast of LSA, Iliuliuk Harbor, Iliuliuk Bay, and in many other areas around Unalaska. This site is not known to be an especially well-used site for fishing, but the deeper waters in South Channel are used for trapping king crabs for personnel use. Personal use fishing is not regulated by race, and there is no particular reason to expect users to be disproportionately of minority race. Anyone displaced from fishing or crabbing at this site could use other available, nearby sites. Displacement from this relatively small area would not appreciably affect the ability of users to collect food for personal use.

LSA-South Alternative. Seaweeds, mussels, and other invertebrates collected for food and crafts by people, including minority people in the Unalaska area, occur in about 0.7 hectare of the intertidal habitat at this site; however, most are largely limited to the southern half (about 0.4 hectare) of this habitat. Those resources would be lost to users if this site was developed. Effects would be minor because the food organisms present, principally mussels, are abundant and widely distributed in the Unalaska area. People collecting these organisms for food could easily find them in many other locations around Unalaska. Safety concerns, particularly those related to paralytic shellfish poisoning, prevent most people from collecting mussels or other materials from this site for consumption.

People fish, at least occasionally, with hook and line, nets, and traps for salmon, other fish, and king crab along the coast of LSA, Iliuliuk Harbor, Iliuliuk Bay, and in many other areas around Unalaska. This site is not known to be an especially well-used site for fishing, but the deeper waters in South Channel are used for trapping king crabs for personnel use. Personal use fishing is not regulated by race, and there is no particular reason to expect users to be disproportionately of minority race. Anyone displaced from fishing or crabbing at this site could use other available, nearby sites. Displacement from this relatively small area would not appreciably affect the ability of users to collect food for personal use.

Exposure to Contaminants.

No Action Alternative. No effect

LSA-North Alternative. A harbor at LSA-North would be expected to retain at least small amounts of petroleum products and could allow small amounts to escape into surrounding waters of South Channel. The water at and near that site is not used for drinking, swimming, or food propagation, and sessile invertebrates that would be exposed to contaminants for long periods are not customarily collected for food. Shorter-term exposure of fish and king crabs has not been shown to cause substantial uptake of petroleum products or to cause substantial effects to people eating them.

Combination Alternative. Same as the LSA-North alternative

LSA-South Alternative. Same as the LSA-North alternative.

Summary of Environmental Justice Impact Potential. None of the alternatives considered in detail would cause more than transitory effect or minor inconvenience to people, including low-income or minority people gathering edible plants or animals. The proposed action would not affect the potential of any population to be exposed to contaminants. The proposed action would not increase exposure to safety hazards, traffic in residential areas, noise, or lights to any population, including minority or low-income people. Any action alternative would, however, displace people, including minority and low-income people, from an estimated 2 hectares of beach and coastal uplands where they sometimes walk for recreation or use for picnicking. Alternative walking and picnic areas are available, so this would not seem to be sufficient reason to consider this action to be a disproportionate social justice impact.

7.2.10 Protection of Children

No-Action Alternative. Children would not be adversely affected by this alternative.

Action Alternatives. None of the three alternatives considered in detail are near schools, playgrounds, or large daycare centers. Residences are near Expedition Inlet, but are not immediately adjacent to the possible mooring areas there. All the alternatives are consistent with Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks, and none would increase danger to children.

7.3 Physical Environment

7.3.1 Area Watershed

No-Action Alternative. The no-action alternative would not result in any immediate changes to area watershed characteristics. However, on-going development at the quarry above the LSA sites would likely continue to change the local topography and surface water runoff pathways above the LSA sites.

Action Alternatives. No wetlands, lakes, ponds or streams in the immediate vicinity of the proposed sites would be impacted by construction or operation activities associated with any of the proposed action alternatives. However, development of the quarry adjacent to the LSA-South site and construction of road access to the LSA-South staging area would likely result from any of the action alternatives. That development could impact a small and apparently isolated wetland. Alternatively, the development of another quarry to obtain materials required to construct harbor components is possible. If a different quarry is developed to obtain materials for this project, a separate evaluation of the associated environmental impacts will be conducted and the evaluation prepared to meet requirements of Section 404(b)(1) of the Clean Water Act (Appendix G) will be modified to evaluate impacts to waters of the United States after the contractor submitted a quarry development plan. This would be done during development of plans and specifications for the project.

The existing topography would be modified, if required, to provide access to either of the LSA alternatives considered in detail. Modifications would cause minor and controllable impacts to existing seasonal surface water runoff pathways. Impacts to the topography may be locally extensive, but impacts to the area watershed would be minor. No significant net improvement or degradation of the existing physical watershed characteristics would be expected at any of the action alternative sites. National Pollution Discharge Elimination System (NPDES) runoff plans and the associated agency reviews would ensure protection of water quality and watershed characteristics.

7.3.2 Currents and Circulation

No-Action Alternative. Marine currents and water circulation at Unalaska and in the Aleutian Islands would remain unchanged.

LSA-North Alternative. Construction and operation would not impact existing area-wide currents or circulation patterns. However, breakwaters and moorage facilities at each action alternative site would impact currents and circulation patterns in their immediate vicinity.

Breakwaters at the LSA-North site would reduce, to a limited extent, the predominantly wind-driven, near-shore currents along the eastern coast of LSA. Impacts would be partially mitigated by using floating breakwaters on the northern and eastern limits of the harbor.

Moorage facilities and moored vessels would interfere with the predominantly wind-driven currents within the moorage basin but would not significantly impact currents or circulation outside the basin. The LSA-North site is more exposed and the channel is narrower at this site, so a project there could have more influence on circulation and currents than the other alternatives considered in detail.

Dredging would not alter bathymetry or shoreline contours except in relatively small and isolated areas. Dredging would not affect long-term circulation, but circulation could be temporarily restricted in small areas during dredging operations by silt curtains or other measures to prevent degradation of water quality and marine habitat away from the construction site.

This alternative would substantially reduce wave energy, current velocity, and circulation at the project site and moderately affect those parameters along the eastern coast of LSA outside the project. It would have little effect on currents and circulation in the remainder of South Channel and Captains Bay.

Combination Alternative. The component of this alternative at the LSA-North site would be smaller and have less impact than the LSA-North alternative, but would have similar effects on currents and water circulation near the shore. No breakwater construction would be required for additional moorage at Expedition Inlet. Very little impact to currents and circulation would be expected from activities associated with a project at the Expedition Inlet site because currents are limited there now. The closed nature of Expedition Inlet and its elongated shape orientated perpendicular to prevailing wind directions severely limit wind-driven currents in its present configuration. Adding additional moorage would not significantly interfere with currents or circulation but would exacerbate existing water quality issues.

LSA-South Alternative. Effects would be similar to those predicted for the LSA-North alternative. Currents and wind-driven circulation at the LSA-South site are already limited by the surrounding landforms. A new harbor would add an increment of effect to those existing conditions. In addition to the localized impacts, construction of offshore breakwaters and moorage facilities would reduce near-shore wave and current energy north of the site. The reduced wave and current energies could eventually result in the accumulation of sediment and possible beach formation near the southern end of the LSA-North site. During consultation with the Alaska Department of Environmental Conservation and Alaska Department of Transportation and Public Facilities, a circulation study to estimate the water circulation characteristics and retention times within the proposed harbor basin was briefly considered. Those agencies reviewed the proposed harbor design and considered existing circulation, water depths, and the extensive use of floating breakwaters. They determined that a water circulation study would not be necessary (Rumfelt, 2003).

7.3.3 Marine Water Quality

A recent evaluation of another Aleutian harbor (USACE 2003) showed that even with worst-case assumptions, harbor operations would be expected to produce less than one-tenth of one percent of the biological oxygen demand (BOD) produced by a large seafood processing facility. Water quality impacts associated with BOD, therefore, deal primarily with those from construction activities and the release of petroleum and other contaminants from vessel operation.

No-Action Alternative. Existing water quality would not likely change significantly. Spills would continue to result, in some unquantified number, from vessels damaged by inadequate mooring protection or from fueling and operation. At each alternative site, low levels of petroleum contaminants would continue to accumulate from industrial and transportation facilities and anchorage locations in Iliuliuk Harbor and Captains Bay.

LSA-North Alternative.

Construction Effects. Dredging, blasting, drilling, and placement activities would temporarily increase turbidity levels and suspended solid and dissolved nutrient concentrations and would decrease dissolved oxygen concentrations in adjacent waters. The time it takes suspended material to precipitate and the current velocities within the impacted water bodies determine the size and migration characteristics of construction-related turbidity/suspended solid plumes. Precipitation times are highly dependent on and inversely related to particle size.

Dissolved oxygen levels in aquatic habitats are usually reduced by the introduction of high concentrations of suspended particulates generated during dredging and open-water disposal operations. However, the reduction in dissolved oxygen concentrations associated with dredging is usually relatively small and brief compared with those associated with open-water disposal. Studies have shown only minimal or no measurable reduction in dissolved oxygen concentrations around dredging operations (Nightingale and Simenstad 2001). No open water disposal is required for the proposed action. The small amount of sediment present is composed primarily of sand and gravel with very small amounts of silt and organic material. Fines comprise between 1 percent and 6.4 percent of the mass of the samples of proposed dredged material at the LSA-South site. Observations indicate that even smaller percentages of fines are present in the sediment at the LSA-North site. Low water temperatures, the relatively short duration of dredging activities, and specific measures to contain suspended sediments would also minimize potential for promotion of nuisance growths of phytoplankton or oxygen depletion. Dredging at LSA for any of the alternatives considered in detail would not substantially affect dissolved oxygen levels or phytoplankton growth.

Spills of fuel, lubricants, or hydraulic fluid from the equipment used during dredging and breakwater construction could adversely affect water quality. Water quality impacts would depend on the amount and type of material spilled as well as specific conditions (e.g. currents, wind, temperature, waves, and vessel activity). In most cases, such spills would be small and cleaned up immediately, causing little observable impact.

Overall, impacts to water quality from construction activities would be minor. Construction-related impacts would temporarily degrade water quality, but not result in any long-term, adverse impacts to marine water quality. Impacts (e.g. increased turbidity and suspended solids, and possible reductions in dissolved oxygen) would generally be contained by silt curtains and/or timed to avoid important biological events. The dredging contractor would select the dredging method but would be required to meet NPDES and contractual standards. Effects would be short term and almost entirely confined to the project site.

Petroleum and Other Contaminants from Vessels Using the Harbor. After construction, the harbor would receive part of the existing vessel moorage and traffic from other areas of Unalaska waters. This transfer would likely improve safety, reduce spill potential, and facilitate spill containment and effective response/cleanup of significant releases with less impact to other harbor activities. Although net improvement in area-wide water quality is expected, water would be degraded to some degree at the harbor site.

Water quality at this site is already affected by industrial and transportation activities in Captains Bay, Iliuliuk Harbor, South Channel, and nearby waters of Dutch Harbor and Unalaska Bay. Iliuliuk Bay/Harbor and Dutch Harbor are listed as impaired water bodies. Analysis of sediment samples collected nearby found low levels of petroleum contamination. New harbor facilities would bring additional releases of small amounts of petroleum products from moored vessels and daily activities. The harbor would not add to the overall problem in the Captains Bay-Iliuliuk Harbor area. Instead, it would reposition boats already in those waters and would concentrate them at a location where effects of chronic petroleum losses and occasional larger spills from vessels would be more focused. How much more water quality degradation would result at the harbor sites cannot be accurately estimated because spills tend to be unpredictable in both frequency and quantity. However, considering the current and historical lists of impaired water bodies in the Unalaska area, their characteristics, and the pollution sources that resulted in their impairment, it is unlikely that the construction and operation of improved moorage facilities would contribute significantly to the exceedance of state water quality standards in nearby water bodies. If the Best Management Practices (BMP's) described in Section 4.5 are diligently implemented after construction, the effects of harbor operations are expected to be somewhat less than otherwise anticipated.

U.S. Coast Guard spill report data show that over a recent period of almost 4 years, 36 gallons of petroleum products were reported spilled at the existing 65-boat moorage facilities in Expedition Inlet (see section 6.2.3), and that there were several additional spills of unknown quantity during the same period. Quantities are usually estimated for larger spills, particularly in moorage areas, so these "unknown quantity" spills in harbors are usually small. A new harbor at the LSA-North site would moor only about 10 more vessels than at the existing small boat harbor. If all else were equal, vessels at a new harbor would be expected to release similar quantities of petroleum there rather than in other nearby waters.

The proposed action, however, would be designed to moor larger vessels than most of those using the existing small boat harbor. There are no data that show a correlation between boat size and potential for spill or spill quantity, but larger boats have more systems that use petroleum products (hydraulics, for example) and so might be expected to lose at least some additional increment of petroleum as chronic releases. In general, however, spills reported at Unalaska were largely associated with marine industrial activities and fuel transfer. Spills at the existing small boat harbor were the source of approximately 1.5 percent of the spill volume reported for the Unalaska area during the referenced reporting period. No fueling facilities or large marine industrial facilities are planned or are expected to develop at this site (see section 7.8 for discussion of induced and cumulative impacts). Assuming that chronic spills at new moorage facilities would occur at similar frequencies and magnitudes as the recent data for existing moorage facilities in Unalaska, an average of approximately 10 to 20 gallons of petroleum products are expected to be released annually in the new harbor. As data for existing facilities indicates, without fueling facilities, large spills at mooring facilities are rare.

Improved safety, operational controls, and related efficiencies at the LSA-North alternative could improve long-term marine water quality in the Unalaska area. Fewer vessels would be subjected to dangerous and damaging sea and mooring conditions that currently increase the risk of chemical and petroleum spills. The improved harbor facilities would be expected to reduce the frequency and severity of accidents and equipment failures. Additionally, improved harbor facilities would facilitate better management, planning, and effective response to future spills.

Water quality in the operating harbor would be affected by relatively small releases of petroleum products associated with boat operation and by occasional larger releases caused by accidents and equipment failures. Petroleum dissolved or suspended in the water column could occasionally be carried into surrounding waters and accumulate in nearby sediment in detectable amounts. However, the significant depths and the sediment's coarse nature and low organic content would limit the accumulation of petroleum products in the nearby sediment. There is little evidence that, in Alaska, water quality is substantially impaired or that there are detectable effects on biota outside comparatively sized harbors that do not have fueling facilities. Sediments in harbors tested for maintenance dredging in Alaska typically contain fuel-related organics (generally in the diesel range) and other fuel-related petroleum hydrocarbons, but concentrations rarely exceed screening levels except at sampling sites near fueling stations.

The reduction in spills recorded at Unalaska in recent years indicates that better planning, management practice, community awareness, and enforcement can appreciably reduce spills. Best management practices recommended as part of the mitigation plan for the proposed action, along with an on-site harbor management office, could further reduce petroleum spills.

Perhaps the single greatest effect any of the alternatives considered in detail could have on water quality would be during a large spill event. Openings from the harbor into the surrounding open water could be rapidly closed with booms already on site. A large spill could be effectively contained inside the harbor, greatly facilitating cleanup and reducing the potential effect on waterfowl, sea mammals, and other marine life.

Combination Alternative. Water quality effects of the LSA-North segment of the Combination alternative would be similar to those of the LSA-North alternative.
The sediment present at Expedition Inlet contains substantially more fine material than the other alternative sites. That fine material is likely to contain significant amounts of contamination from historical fuel spills, vessel maintenance, and from sources of organic wastes. If disturbed during construction, that material would cause short-term water quality problems. The fine material is predominantly in water more than 10 meters deep and all dredging would be in water no more than 5.5 meters below MLLW, so construction is unlikely to substantially disturb those materials.

LSA-South Alternative. Effects at the LSA-South alternative would be similar to those of the LSA-North alternative.

7.3.4 Air Quality

No-Action Alternative. Existing air quality would be unaltered by Federal navigation improvements.

Action Alternatives. Air quality in the immediate project area would be affected by emissions from harbor construction and operations. The proposed dredging and construction activities would primarily use diesel-powered dredging equipment and land-based heavy construction equipment and trucks. Fugitive dust emissions during construction are generally minimized by the wet working conditions associated with dredging operations and the natural meteorological conditions. Collectively, construction-related emissions would be temporary, intermittent, and would stop at the end of the construction period.

Vessels using the mooring basins would be the primary source of continuing air emissions during harbor operations. Pollutants of primary concern at harbors are nitrogen oxides, sulfur dioxide, and particulate matter less than 10 microns in diameter from diesel fuel combustion and carbon monoxide from gasoline combustion. New harbor construction or operational activities are not expected to significantly impact air quality in the Unalaska area. A slight improvement in area-wide air quality and a corresponding decrease in local air quality at the new harbor's location may result from the wider distribution of the emission sources associated with the LSA sites and from moored vessel use of supplied electrical power instead of electricity generated by the vessels. No new emission sources are anticipated, and because of the strong winds and other meteorological characteristics of the area, National Ambient Air Quality Standards are unlikely to be exceeded.

The impact of air emissions on sensitive members of the community is of special concern. Sensitive receptor groups include children, the elderly, and the acutely and chronically ill. The cumulative build up of air emissions from vessels could affect sensitive receptors if buildup occurred. However, stagnant atmospheric conditions that are conducive to the buildup of air pollutants are uncommon in the Unalaska area and no residences or other structures associated with sensitive receptor groups are near the LSA sites.

7.4 Biological Resources

Fish and Wildlife Coordination Act reports prepared by the USFWS representing the Department of the Interior (DOI) often identify biological resources of concern that the USFWS has determined should receive particular emphasis in the evaluation of water resource development projects. The 2004 final Coordination Act report for this project (Appendix H) does not specifically identify biological resources for this purpose, but the resource categories used for comparison of alternatives in that report indicate the resources the USFWS considers to be most important. The Coordination Act report states:

> *"Overall, the Little South America –South site was considered to contain the highest-value marine habitat because it had the greatest productivity in terms of intertidal area, clam biomass, and use by rearing juvenile fish and red king crabs."*

Based on this statement, the USFWS evaluation resources are: intertidal area, clam biomass, juvenile fish, and juvenile king crabs. The effects of each alternative on those resources are given particular attention in this section, along with the other biological resources of concern discussed in Section 6, Affected Environment. Section 6 of this FR/EIS does not use the same parameters as were used by the USFWS. Instead, it discusses resources such as vegetation, intertidal and subtidal communities, red king crabs and Tanner crabs (added to correspond with the USFWS evaluation resources), fish, mammals, birds, and then groups with special regulatory status. The USFWS categories are, in some ways, difficult to address. Those categories were selected by USFWS without participation by the Corps or other interested agencies, and the categories do not, in the opinion of some biologists, necessarily represent the most important components of the system being evaluated.

USEPA reviewers noted that there is considerable disparity between Corps and USFWS evaluations of impacts and stated that the final FR/EIS should compare the differing views. That comparison has been incorporated into the following discussion of environmental consequences. The discussion does not address the discrepancy between total areas of impact predicted by the USFWS and the Corps. The USFWS estimates added the total area of each of their five resource categories that would be affected to derive a sum that sometimes was greater than the entire project area. This methodology is used in more sophisticated systems working with habitat values and representing the views of more than a single agency. This methodology is not generally used with less complex systems and is not used in Corps evaluations for this report.

7.4.1 Vegetation

No-Action Alternative. A beach rye grass (*Elymus arenarius*) community (0.07 hectare) right above the intertidal zone in LSA-South alternative would be unaffected. Unstructured trails and other human activities related to development would continue to impact the vegetation established in the foothills.

LSA-North Alternative. Approximately 0.60 hectare of foothill vegetation found between the quarry and the shoreline would be covered under this alternative. Berry bearing plants, as well as other species collected for traditional or personal uses (pushky, petruski, fiddlehead ferns, etc.), are usually found in this vegetation type. Some sections of this vegetated belt have already been impacted by quarry and unstructured recreation activities. This alternative also would use approximately 0.40 hectare of quarry land, where vegetation has largely been removed. Quarry expansion to produce rock for this alternative would affect a substantial area. If the existing quarry south of this site was used, an area equivalent to 2.6 hectares quarried to a depth of about 5 meters would be required. This would likely impact about 3 additional hectares of the surrounding vegetation. Altogether, about 4 hectares of this predominantly foothill vegetation would be destroyed.

Combination Alternative. Approximately 0.02 hectare of beach rye grass at Expedition Inlet and a total of about 1 hectare of foothill and shoreline vegetation would be covered under this alternative. Berry bearing plants, as well as other species collected for traditional or personal uses (pushky, petruski, and fiddlehead ferns, etc.), may be found in this vegetation type. This alternative also would use approximately 1.29 hectares of land without vegetation (quarry grounds and beside Airport Beach Road by Expedition Inlet). Quarry expansion to produce rock for this alternative would affect a substantial area. If the existing quarry at LSA-South was used, an area equivalent to 1.6 hectares quarried to a depth of about 5 meters would be required. This would likely impact about 2 hectares of the surrounding vegetation.

LSA-South Alternative. This alternative would cover approximately 0.07 hectare of beach rye grass established along the beach berm and from 0.65 hectare to 1 hectare of foothill vegetation located between the eastern boundary of the existing quarry and the shoreline. A variety of berry bearing species and other species collected for traditional or personal uses are found in the shrubby vegetation. Some sections of this vegetation belt have already been impacted by quarry and unstructured recreational activities. This alternative also would use approximately 1 hectare of quarry grounds where vegetation has largely been removed. Quarry expansion to produce rock for this alternative would affect a substantial area. If the existing quarry at LSA-South was used, an area equivalent to 0.4 hectare quarried to a depth of about 5 meters would be required. This would be expected to impact approximately 1 hectare of the surrounding vegetation.

7.4.2 Intertidal and Subtidal Communities

No-Action Alternative. Existing conditions at Unalaska would not be changed. Over time, the composition and structure of existing communities likely would change in response to cyclic weather and oceanic changes and to changes in water quality.

LSA-North Alternative. Dredging and filling for this alternative would destroy or severely degrade intertidal and subtidal habitat that supports at least moderate communities of invertebrates similar to those in Expedition Inlet and the northern parts of the LSA-South site. Dredging to create a boat mooring area and fill for staging areas would destroy intertidal and subtidal macrophytes, sedentary invertebrates, and habitat used by both sedentary and motile invertebrates. Rubblemound breakwater placement would cause similar adverse effects to a small area of intertidal and a larger area of subtidal habitat and invertebrate communities.

Macrophytes. Rockweed (*Fucus sp.*), fringed sieve kelp (*Agarum clathratum*), sea lettuce (*Ulva sp.)*, red ribbon kelp (*Palmeria palmata*), sea hair (*Enteromorpha intestinalis*), and pink rock crust (*Lithothamnium sp.*) in both intertidal and subtidal habitat would be destroyed by dredging and fill placement. Recolonization after dredging, and colonization on the floats, rubblemound breakwater, and floating breakwaters of the project could be expected to partially replace algal biomass and primary productivity lost during construction. Full algal productivity, however, might not return.

Intertidal Invertebrates. A total of about 0.3 hectare of intertidal habitat would be affected. Construction would remove or cover the cobble and boulder substrate in about 0.11 hectare of the intertidal zone and the anemones, periwinkle snails, mussels, barnacles, hermit crabs, green sea urchins, polychaete worms, limpets, and sea stars that inhabited that part of the moorage site at the time of construction. The 0.08 hectare of intertidal area created by the seaward face of the fill would be similar to the material there now and would be recolonized to at least a limited extent by barnacles and other invertebrates that attach to hard surfaces.

Intertidal invertebrate communities in Alaska harbors tend to be populated predominantly by sturdier species of kelp, mussels, barnacles, and other organisms that can close or withdraw. Organisms that cannot, including bryozoans, plumose anemones, and the more delicate algae are especially likely to be impacted by oiling because they are exposed to any floating petroleum products during each tide cycle. The remnant communities typically are less complex, have less diversity and less biomass, and are more likely to contain individual organisms that show abnormal growth or pathology. At the LSA-North site, about 0.2 hectare of intertidal habitat would be inside the mooring area and would be moderately to severely affected by contamination and other effects of petroleum from boats in the harbor. Nearby intertidal habitat outside the harbor also could be affected. Additional shoreline between the bridge north of the site and the southern-most point of Little South America to the south, an additional area of about a hectare, could be subject to oiling and other chronic effects from boats using the harbor.

Subtidal Invertebrates. Predominantly rocky subtidal habitat and the anemones, sponges, snails, clams, barnacles, hermit crabs, green sea urchins, polychaete worms, tritons, chitons, sea cucumbers, and sea stars in that habitat would be destroyed by dredging (0.39 hectare) and by filling (1.2 hectares) (primarily for the rubblemound breakwater). More motile species in that habitat, including Tanner crabs and juvenile king crabs known to occasionally use deeper water at this site, and various species of shrimp, would be displaced temporarily by construction and would lose habitat to the breakwater. Altogether, habitat impacts from construction of the LSA-North alternative would include losses from the rubblemound breakwater footprint, the dredged area, and the area filled for staging. This area would total 1.59 hectares.

The blasting plan for mooring area excavation would include measures to minimize impacts, but invertebrates in the immediate area could be damaged or destroyed. Turbidity from dredging, blasting, and fill placement in the mooring and staging areas would be largely contained by silt curtains, but could smother or damage invertebrates in the immediate area.

Invertebrates and their habitat inside the harbor and beneath the floating breakwaters (6.4 hectares) would not be directly or immediately impacted to any great extent, but shading, operations activities, and low levels of pollutants contributed by harbor operations would reduce the value of habitat to invertebrates in and near the harbor. Shrimp, Tanner crabs, and king crabs would likely continue to use the harbor area after construction, but use could be curtailed.

Benthic invertebrate communities in existing harbors tend to be less diverse and to produce less biomass than similar areas that are not subjected to the effects of harbor operation, although response by many benthic organisms to experimental spills in the arctic has been shown to be relatively mild where oil in sediments was less than 100 mg/kg (Cross and Thomson 1987). In the LSA-North site, substantial reduction in invertebrate populations could result from petroleum spilled by boats in the harbor, but a functional benthic community could remain during the life of the harbor. Spilled petroleum and other contamination from boats might disperse from the harbor and could cause chronic effects to invertebrates between the bridge north of the harbor site and the southernmost point of Little South America, a near-shore area of about 20 hectares.

While harbor construction and operations would adversely impact intertidal and subtidal invertebrate and algal communities, the harbor would create extensive floating structures that are rare habitat in the marine environment. Floating docks, mooring slip floats, and supporting and anchoring structures all provide substrate that typically is heavily populated by macrophytes and invertebrates in Alaska harbors.

Floating breakwaters may benefit marine ecosystems by acting as an artificial reef, providing a habitat for algae, invertebrates, fish, and some species of marine birds, as was observed at the existing floats in Expedition Inlet (USACE 2002). The breakwaters would be box-like structures made of concrete. Concrete used to construct the floating breakwaters would be of neutral pH and textured to promote colonization. Concrete can be made with a texture comparable to natural reefs, and can develop communities similar to natural reefs (Pickering and Whitmarsh 1997, Pickering, et al. 1998, Maglio 2001). The floating breakwaters would provide about 4,400 m^2 of habitat and the floating docks and boat slips would add about another 0.5 hectare of floating habitat for a total of 0.9 hectare of this unusual habitat.

The rubblemound breakwater would create about 1.0 hectare of new rocky habitat depending on the plan selected. This created habitat might host a productive marine community, but there is no assurance that recolonization on the breakwaters would substantially replace invertebrates destroyed by breakwater placement.

Summation.

<u>Dredging, Fill, and Placement of Structures</u>.

- 0.1 hectare of intertidal habitat destroyed.
- 1.6 hectares of subtidal habitat destroyed.
- 0.1 hectare of rocky intertidal habitat created.
- 1.0 hectare of rocky subtidal habitat created.
- 0.9 hectare of floating-concrete subtidal habitat created.

<u>Petroleum and Vessel Traffic</u>.

- 6.4 hectares of habitat inside the harbor moderately degraded, including 0.2 hectare of intertidal habitat.
- 20 acres of habitat surrounding the harbor mildly degraded.

Comparison With USFWS Evaluation. This evaluation generally agrees with the USFWS assessment of effects to intertidal habitat, but the USFWS evaluation of effects to subtidal communities in the main text (appendix H, p. 41-42) focused on petroleum leaks and spills, illegal dumping of chemical cleaners, and effects of phytoplankton blooms, while the appendix to their report related to benthic invertebrates only evaluated effects to clams. USFWS conclusions therefore related primarily to clams rather than to the broader benthic community and its function. No direct comparison can be made between USFWS conclusions and those by the Corps related to impacts to subtidal benthic resources.

Combination Alternative.

Macrophytes. Rockweed, fringed sieve kelp, sea lettuce, red ribbon kelp, sea hair, and pink rock crust in both intertidal and subtidal habitat at both the Expedition Inlet and the LSA-North sites would be destroyed by dredging and fill placement. Recolonization after dredging and colonization on the floats, the rubblemound breakwater, and floating breakwaters for the project could be expected to partially replace algal biomass and primary productivity lost during construction. Return to full algal productivity, however, would be unlikely.

Intertidal Invertebrates. Construction in Expedition Inlet would cover about 0.3 hectare of sparsely populated intertidal habitat characterized by the USFWS as low-value habitat and 0.1 hectare at the LSA-North site characterized by the USFWS as moderate-value habitat. Within the two mooring areas, about 0.4 hectare of intertidal area would be adversely affected by harbor operations.

Subtidal Invertebrates. Within the harbor areas at both sites, construction would excavate a total of about 1.1 hectares and fill a total of 0.9 hectare of subtidal habitat. That habitat is predominantly rocky subtidal habitat inhabited by kelp, clams, anemones, seastars, and other invertebrates. The sparse to moderately dense and diverse assemblage would be destroyed by dredging and filling for this alternative. More motile species in that habitat, including various species of shrimp and other invertebrates, would be displaced by construction and would lose valuable habitat. Most commercial shrimp, Tanner crabs, and king crabs use deeper water than would be dredged, and would not be affected to any important degree by construction. The dredged area and the slopes of the filled areas might later be used to some extent, but the value of that habitat for invertebrates using that habitat now could be substantially reduced.

The additional mooring and maneuvering area in Expedition Inlet (about 3.5 hectares) not dredged for this alternative would not directly and immediately impact invertebrates to any great extent, but shading, operations activity, and low levels of pollutants from boats in the mooring area would reduce the value of habitat to invertebrates in and near the harbor. Shrimp and juvenile Tanner and king crabs would likely continue to use the harbor area after construction, but use could be curtailed. At the LSA-North site the Combination alternative would affect the same intertidal habitat as the LSA-North alternative, but would affect less (about 4.6 hectares) subtidal habitat, so a total of about 8.1 hectares of benthic habitat enclosed by the harbor would be affected directly by harbor operations

The blasting plan for mooring area excavation would include measures to minimize impacts, but invertebrates in the immediate area could be damaged or destroyed. Turbidity from dredging, blasting, and fill placement in the mooring and staging areas would be largely contained by silt curtains, but could smother or damage invertebrates in the immediate area.

Potential chronic contamination in the mooring area could be expected to adversely affect about 0.20 hectare of intertidal invertebrate community in Expedition Inlet, and the LSA-North component of the Combination alternative would affect the same 0.20 hectare area of intertidal as the LSA-North alternative.

Summation.

Dredging, Fill, and Placement of Structures

- 0.4 hectare of intertidal habitat destroyed or substantially reduced in value.
- 1.8 hectares of subtidal habitat destroyed or substantially reduced in value.
- 0.9 hectare of rocky subtidal habitat created.
- 1.3 hectares of floating-concrete subtidal habitat created.

Petroleum and Vessel Traffic

- 8.8 hectares of habitat inside the harbor moderately degraded.
- 28 hectares of habitat surrounding the harbor mildly degraded.

Comparison With USFWS Evaluation. This evaluation generally agrees with the USFWS assessment of effects to intertidal habitat, but the USFWS evaluation of effects to subtidal communities in the main text (appendix H, p. 41-42) focused on petroleum leaks and spills, illegal dumping of chemical cleaners, and effects of phytoplankton blooms, while the appendix to their report related to benthic invertebrates only evaluated effects to clams. USFWS conclusions therefore related primarily to clams rather than to the broader benthic community and its function. No direct comparison can be made between USFWS conclusions and those by the Corps related to impacts to subtidal benthic resources.

LSA-South Alternative. The LSA-South alternative would dredge and place fill that would destroy or severely degrade intertidal and subtidal habitat that supports rich communities of invertebrates common to both rocky and soft-bottom habitats. Dredging to create a boat mooring area and fill for staging areas would destroy intertidal and subtidal macrophytes, sedentary invertebrates, and habitat used by both sedentary and motile invertebrates. Rubblemound breakwater placement would cause similar adverse effects to a small area of intertidal and a larger area of subtidal habitat and invertebrate communities.

Macrophytes. Rockweed, fringed sieve kelp, sea lettuce, red ribbon kelp, sea hair, and pink rock crust in intertidal and subtidal habitat would be destroyed by dredging and fill placement. Recolonization after dredging and colonization on the floats, rubblemound breakwater, and floating breakwaters for the project could be expected to largely replace algal biomass and primary productivity lost during construction. Return to maximum algal productivity, however, might take a year or more and would be unlikely to match productivity of the system before harbor construction.

Intertidal Invertebrates. A total area of approximately 0.8 hectare of intertidal invertebrate habitat in the mooring basin would be lost to fill for staging area and breakwater. The southernmost segment of the fill for the staging area would cover the relatively dense but narrow band of rockweed and mussels that tapers out to the west from the reef. That band extends west along the beach at the base of the southern breakwater alignment (figure 4-8). The staging area also would cover the filamentous red and green algae that grow on the sandy/gravelly beach that is the intertidal substrate along the western and southern shorelines of the LSA-South site. Corps biologists estimated that the denser areas of the mussel bed covered about 0.04 hectare, but that scattered mussels covered a larger area up to 0.1 hectare. The text of the USFWS report (pg. 14) indicated the "mussel bed" covered two areas each 6 by 60 meters (a total of 0.07) hectare. The north part of the staging area fill would be over rockier substrate that is occupied by invertebrates typical of rocky intertidal habitat in protected areas of Unalaska Bay. The relatively sparse assemblage of invertebrates in the northern section of this intertidal zone included mussels, barnacles, limpets, and periwinkle snails (*Littorina sp.*). Chitons, urchins, sea stars, and crabs might be found lower in the intertidal zone.

The steeper and rockier face of the staging area would replace the gradually sloping sandy and rocky intertidal habitat along the beach. The rocky face would drop off sharply into the deeper water of the dredged area. The invertebrate fauna in the sandy portion of the LSA beach would eventually be replaced with a more diverse, but more common assemblage of organisms that colonize hard substrates. Rockweed and barnacles could colonize the face of the filled area while other species of marine algae and invertebrates typically associated with rocky intertidal and near subtidal substrates could colonize the lower slope of the staging area.

Intertidal invertebrate communities in Alaska harbors tend to be populated predominantly by sturdier species of kelp, mussels, barnacles, and other organisms that can close or withdraw. Organisms that cannot, including bryozoans, plumose anemones, and the more delicate algaes are especially likely to be impacted by oiling because they are exposed to any floating petroleum products during each tide cycle and tend to be reduced in number or lost. At the LSA-South site, a limited area of intertidal habitat would be inside the mooring area, but nearby intertidal habitat also could be affected.

Petroleum contaminants from boats in the LSA-South alternative could be expected to adversely affect intertidal communities inside the harbor. An additional area of intertidal habitat in the 0.5 km between the LSA-South site and the bridge at the north end of South Channel might be at least occasionally affected by petroleum released from boats in the harbor.

The intertidal zone of the reef just south of the LSA-South alternative would not be directly impacted by construction. Water flow through the breach at the shoreward end of the southern rubblemound breakwater and natural wave action would be expected to maintain water flow and wave action over the reef so that the rich, diverse community there would survive through the life of the project.

Subtidal Invertebrates. Dredging would destroy sedentary invertebrates and would damage, destroy, or displace the motile invertebrates in about 1.85 hectares of habitat from about 0 meter MLLW out to about -5.5 meters MLLW. Some of the dredged area would be in the lowest range of the intertidal zone, but most of it would be in the subtidal zone and would impact species typically found in this zone. A USFWS (2003) survey reported limpets, mussels, barnacles, clams, sea urchins, sea stars, and polychaete worms in the area that would be dredged. The biologically important, but not uncommon assemblage of invertebrates, would be lost or displaced by dredging.

Displacement of mobile invertebrates would be temporary, but recolonization by sedentary forms could take several years. Because maintenance dredging would not be required during the life of the LSA-South alternative, communities that recolonized the disturbed areas would be allowed to develop to natural climax assemblages.

The blasting plan for mooring area excavation would include measures to minimize impacts, but invertebrates in the immediate area could be damaged or destroyed. Turbidity from dredging, blasting, and fill placement in the mooring and staging areas would be largely contained by silt curtains, but could smother or damage invertebrates in the immediate area.

Breakwater placement would cover 0.55 hectare of habitat and the sedentary invertebrates in that habitat. The upper subtidal zone of the north side of the reef along the breakwater alignment is bare rock populated almost exclusively by sea stars and green sea urchins (USACE 2003 field report). USFWS (2003) surveys of the area that would be covered examined deeper sections of the breakwater alignment. They reported abundant and rich assemblages of snails, polychaete worms, limpets, barnacles, hermit crabs, mussels, clams, cockles, shrimp, sea urchins, anemones, and sea stars in the deeper water along the approximate alignment of the breakwater. Some of the shrimp would escape the fill material, but the remaining invertebrates reported would be destroyed by breakwater placement. King crabs, Tanner crabs, and other larger, more motile invertebrates using that area also would be displaced and would lose that habitat.

While breakwater placement would cover .55 hectare of habitat, it would create about 0.32 hectare of clean rocky habitat. Dense macrophyte and invertebrates communities typical of those in surrounding habitat have rapidly colonized breakwaters in other harbors in the Aleutians, but USFWS (2003) notes less successful colonization of armor rock placed at Unalaska. There is no certainty that a new breakwater at this location would be fully successful as a substrate for habitat, but it would likely restore some of the biological function lost to breakwater construction.

Invertebrates and their habitat inside the harbor and beneath the floating breakwaters (7.18 hectares) would not be directly and immediately impacted to any great extent, but shading, operations activities, and low levels of pollutants contributed by boats in the harbor would reduce the value of habitat to invertebrates in and near the harbor. Shrimp, Tanner crabs, and king crabs would likely continue to use deeper waters of the harbor after construction, but use could be curtailed. Over the life of the project, the productivity and diversity of the unusually diverse and abundant invertebrate community beneath the LSA-South alternative probably would be reduced substantially.

Table 7-1 lists species and invertebrates by group might be affected by construction of a harbor at the LSA south site. The filled area and inshore sections of the breakwater would mostly affect those organisms found in the upper intertidal zone, while blasting, dredging, and the outer section of the breakwater would affect organisms mostly found in the lower intertidal and subtidal zones.

Table 7-1. Invertebrates seen during dives at or near LSA-South alternative site (USFWS 2002, USFWS 2003), their tidal zone of occurrence, and project elements that might affect them.

Common name	Zone IT= Intertidal ST= Subtidal	Fill (0 to+5 m MLLW)[a]	Dredging (0 to –5 m MLLW)[a]	Breakwater (+3 to -18.5 m MLLW)[a]	Breakwater Recolonization Potential [b]	
					Rubble-mound	Floating
Fringed sieve kelp	IT-ST		X	X	X	
Sea hair	IT-ST	X		X		
Rock weed	IT	X	X	X	X	
Pink algae	ST		X	X	X	
Red ribbon	ST			X	X	X
Sausage weed	ST		X	X		
Sea lettuce	ST		X	X	X	X
Acorn barnacle	IT	X		X	X	X
Barnacle	IT-ST	X	X	X	X	X
Pacific red hermit crab	ST		X	X		
Wide hand hermit crab	IT-ST		X	X		
Lyre crab	ST		X	X	X	X
Decorator crab	ST				X	X
Hermit crab	IT-ST	X	X	X		
Red king crab	ST			X	X	
Thatched barnacle	IT-ST	X	X	X	X	
Helmet crab	ST		X	X	X	
Pink scallop	ST			X		
Nuttall/heart cockle	IT-ST	X	X	X		
Artica hiatella	ST		X	X		
Mya complex (4 species)	IT-ST	X	X	X		
Truncated soft-shelled clam	ST		X	X		
Pacific blue mussel	IT	X	X	X	X	X
Lyre whelk	ST			X		
Alaska falsejingle	ST		X	X		
Littleneck clam	IT-ST	X		X		
Butter clam	IT-ST	X	X	X		
Orange sea cucumber	ST		X	X		
Mottled sea star	IT-ST	X	X	X	X	
Six-armed star	ST		X	X	X	
Sunflower star	ST		X	X		
Oregon triton	ST		X	X	X	
Shield limpet	IT-ST	X	X	X	X	
Margarites snail	IT-ST	X	X	X	X	
Channeled dogwinkle	IT-ST		X	X		
Mask limpet	IT-ST	X	X	X	X	

Table 7-1. Invertebrates seen during dives at or near LSA-South Alternative site (continued)

Common Name	**Zone** IT= Intertidal ST= Subtidal	**Fill** (0 to+5 m MLLW) [a]	**Dredging** (0 to –5 m MLLW) [a]	**Breakwater** (+3 to -18.5 m MLLW)[a]	**Breakwater Recolonization Potential** [b]	
					Rubble-mound	Floating
Plate limpet	IT-ST	X	X	X	X	
Green anemone	IT-ST	X		X	X	X
Crimson anemone	ST			X	X	X
Plumose anemone	IT-ST	X	X	X	X	X
Tube-dwelling anemone	IT	X				
Christmas anemone	ST		X	X	X	X
Tusk worm	ST		X	X		
Western serpulid	ST		X	X		
Calcareous tube worm	ST		X	X	X	X
Slime worm	ST		X	X		
Tube worm	ST		X	X	X	X
Terrembilid worm	ST		X	X		
Crumb of bread sponge	ST		X	X	X	X
Hermit sponge	ST		X	X	X	X
Crangonid shrimp	ST		X	X		
Krill	ST		X	X		
Other shrimp	ST		X	X	X	X
Coonstripe shrimp	ST			X		
Green sea urchin	IT-ST	X	X	X	X	X
Black Katy chiton	ST		X		X	X

a. Meters MLLW.
b. Species likely to recolonize breakwater habitat.

While harbor construction and operations would adversely impact intertidal and subtidal invertebrate and algal communities, the harbor would create extensive floating structures that are rare habitat in the marine environment. Floating docks, mooring slip floats, and supporting and anchoring structures all provide substrate that typically is heavily populated in Alaska harbors. Some of the more delicate species of algae, plumose anemones, barnacles, mussels, and bryozoans could be expected to heavily colonize the submerged surfaces of floating breakwaters, docks, and boat slips. Those surfaces would total about 1 hectare of habitat.

Summation.

Dredging, Fill, and Placement of Structures

- 0.8 hectare of intertidal habitat destroyed.
- 2.5 hectares of subtidal habitat destroyed or substantially reduced in value.
- 0.3 hectare of rocky subtidal habitat created.
- 1.0 hectare of floating-concrete subtidal habitat created.

Petroleum and Vessel Traffic

- 7.2 hectares of habitat inside the harbor moderately degraded.
- 20 hectares of habitat surrounding the harbor mildly degraded.

Comparison With USFWS Conclusions. This section includes two of the five groups USFWS identified for evaluation: intertidal habitats and clam biomass (also expressed as clam beds). The USFWS habitat rating criteria (appendix 1 of their report) considers any intertidal habitat with mussels, regardless of their density or other attributes, to be of high value and any other intertidal habitat to be of moderate or low value. The Corps agrees that in this area, intertidal habitat with mussels tends to have more biomass and diversity than in most other sites. On the other hand, some mussel beds are relatively thin and have little more than rockweed accompanying them (much of the mussel bed on the LSA-South beach is like this) while others (on the reef next to the LSA-South breakwater alignment, for example) are far richer, with hermit crabs, sea cucumbers, small fish, snails, and other organisms associated with mussels. The Corps agrees that this second mussel bed is of high value, but does not consider the mussel bed on the beach at LSA-South to be of equal value. The upper intertidal at all three sites is sparsely populated with rockweed and scattered barnacles, and is of considerably lower value.

USFWS used two organisms to evaluate benthic (bottom) habitat and communities: clams, which the Corps addresses in this section, and red king crab, which are the subject of the next section. While clams may be the predominant biomass in some areas studied, they may not be available to many important predators and are less important as structure and food than some other invertebrates. While the Corps believes the USFWS evaluation of benthic habitat is not conclusive because they used a single indicator and tried to make precise calculations with imprecise data, the Corps does generally agree that benthic habitat in much of the southern half of the LSA-South site is richer and more diverse than benthic habitat reported in other areas of the three alternatives sites considered in detail.

7.4.3 Red King Crabs (Department of Interior Designated Resource of Concern) and Tanner Crabs

No-Action Alternative. King crab and Tanner crab use of the alternative sites would remain unaltered and their productivity would remain unaffected in the foreseeable future.

LSA-North Alternative. The bottom at this site drops rapidly into comparatively deep water where king crabs and Tanner crabs are more likely to be found during much of the year. Divers did not find red king crab at this site. King crab absence from dive observations may have resulted from the very limited time spent in diving this site and the limited distance covered by divers. Total effort was only two dives and transects were not completed (Appendix H). USFWS biologists also failed to collect any king crabs in a crab pot set at the site (USFWS 2004a). Diver observations of king crabs less than 200 meters away and abundant personal-use crabbing effort at and near the site indicate that the site is valuable habitat for king and Tanner crabs and that a level of diving/sampling effort commensurate with the LSA-South site would have located king crabs at this site.

Harbor construction would have little direct effect on king and Tanner crab habitat at this site. The breakwater would remove about 1.2 hectares of habitat; about 1.0 hectare of that area would be in water more than 9 meters below MLLW. All the USFWS observations of and collections of both king and Tanner crabs were in water at least 9 meters below MLLW, so the only project feature that would remove or substantially alter known habitat for these species would be the breakwater. The harbor would be open to king crabs and Tanner crabs, and they would likely continue to use it, as they are reported to use harbor habitat in Kodiak and other places in Alaska. King and Tanner crabs are generally considered to be relatively wide-ranging invertebrates, which means their exposure to contaminants in water or sediments at the harbor would be limited in time. They also are reported to be relatively resistant to damage from petroleum in marine waters.

The LSA-North alternative would cover about 0.2 hectare more king crab and Tanner crab habitat than the Combination alternative and about 0.5 hectare more than the LSA-South alternative. It would appear to have the greater potential to adversely affect king and Tanner crabs.

Summation.

Dredging, Fill, and Placement of Structures

- 1.2 hectares of habitat destroyed.

Petroleum and Vessel Traffic

- 6.4 hectares of habitat inside harbor moderately degraded
- 20 hectares of habitat surrounding harbor mildly degraded

Comparison With USFWS Conclusions. Please see discussion in the LSA-South alternative.

Combination Alternative. This alternative would replace approximately 0.7 hectare of bottom habitat more than 9 meters deep with a breakwater at the LSA-North site. Effects at the LSA-North site would be about the same as for the LSA-North alternative, but would cover less area.

Construction of the Expedition Inlet part of this alternative would alter habitat only in water less than 9 meters deep, and would therefore be unlikely to directly impact king crab or Tanner crab habitat. Petroleum effects from boats in the moorage would be similar to those identified for the LSA-North alternative.

Summation.

Dredging, Fill, and Placement of Structures

- 1.5 hectares of habitat destroyed.

Petroleum and Vessel Traffic

- 8.8 hectares of habitat inside harbor moderately degraded.
- 28 hectares of habitat surrounding harbor mildly degraded.

Comparison With USFWS Conclusions. Please see discussion in the LSA-South alternative.

LSA-South Alternative. Less than 0.4 hectare of the LSA-South alternative breakwater would be in water more than 9 meters deep. No other project construction would directly affect king crabs, Tanner crabs, or their habitat in deeper water of the project. Harbor operations would have about the same effect as those of the other alternatives.

Summation.

Dredging, Fill, and Placement of Structures

- 0.4 hectare of habitat destroyed.

Petroleum and Vessel Traffic

- 7.2 hectares of habitat inside harbor moderately degraded.
- 20 hectares of habitat surrounding harbor mildly degraded.

Comparison With USFWS Conclusions. We could find no basis in literature or on-site survey results to support the habitat values USFWS attributed to the alternative harbor sites for red king crab. The Corps is also puzzled at the choice of this species as a basis for their evaluation because so much habitat in Bristol Bay, including the Unalaska area, is suitable for king crabs and because their abundance is limited by harvest rather than by habitat.

A few king crabs were seen at or near each alternative project site, but were never observed by divers or collected in crab pots in water less than -9 meters MLLW. Crab pots set by local personal use crabbers were often observed at the LSA-South site, but always in water deeper than -9 meters MLLW. The Corps has not been able to find any sources that indicate the intertidal zone or near-shore waters less than 12.5 meters deep is particularly high value habitat for juvenile or adult king crabs. Given these discrepancies between values indicated by collections, traditional local knowledge as exhibited by fishermen, and the literature on one hand, and those proposed by USFWS on the other, the Corps believes it must dismiss the conclusions by USFWS. The Corps concludes that none of the alternatives considered in detail would substantially affect king crabs or their habitat.

7.4.4 Fish

No-Action Alternative. Conditions would remain unaffected in the short term. In the longer term, water quality may improve at Unalaska and conditions for fish may improve in the marine waters around Unalaska.

LSA-North Alternative. The majority of fish found at the LSA-North site during beach seining (USFWS 2003) were juvenile Pacific cod (40) and Pacific sand lance (21) and large numbers of walleye pollock (Robards 1999). Those species sometimes move close to shore, and during high tides they would lose the 0.11-hectare intertidal area that would be occupied by the staging area fill. Sand lance spend considerable amounts of time buried in sand in the subtidal zone and would lose any sandy habitat in the 0.39 hectare that would be dredged for the mooring basin. Altogether, about 0.5 hectare of near-shore fish habitat would be severely impacted by dredging and filling for the LSA-North alternative at this site.

Predation on pink salmon fry may increase if they are denied shallow near-shore habitat. Small numbers of pink salmon fry (7) and one Dolly Varden, a potential predator, were found at this site during one sampling event. Juvenile Pacific cod and sand lance eat mostly copepods, but larger juvenile cod will eat juvenile pink salmon. Predation by cod could increase slightly as a result of the salmon losing habitat and the steeper shoreline created by dredging. Pink salmon spawn in a greater variety of habitats than any other salmon and both juveniles and adults are extremely abundant in the area. Other juvenile salmonids using the area are larger and more mature when they migrate into salt water and are less dependant on near-shore shallow water. They would be less affected by dredging or fill for harbor construction.

Breakwater construction would cover about 1.2 hectares of bottom habitat used by a variety of fish, including salmon, sole, Pacific cod, walleye pollock, and others. This habitat would be replaced, in part, by the rubblemound breakwater, which would create about an equal surface area. There is no certainty about how well the breakwater would be colonized, so it would be reasonable to expect that breakwater placement would permanently and substantially reduce the fish habitat value of the 1.2 hectares of moderately valuable fish habitat at the breakwater site.

The blasting plan for mooring area excavation would include measures to minimize impacts, but fish in the immediate area could be injured or destroyed. Turbidity from dredging, blasting, and fill placement in the mooring and staging areas would be largely contained by silt curtains, but could affect fish in the immediate area for a short time.

The harbor would alter wave action, light dispersion, and other physical parameters, which would diminish the productivity of the benthic community and the value as fish habitat of the 6.4 hectares inside the harbor. The value of this habitat to benthic fish would be moderately to severely impacted by petroleum from vessels in the harbor. Pacific cod, rock sole, and other bottom-dwelling fish would lose habitat and their numbers would be expected to decrease in the harbor. Numbers of fish that have less affinity for benthic habitat might increase in the area enclosed by the harbor. Juvenile pink salmon in their first summer, herring, and other fish that typically occupy the middle and upper water column often are seen in great numbers in harbors in Alaska. They might become more abundant in a new harbor at the LSA-North site than they are in the existing habitat, but there is no assurance that that harbor would attract more of these fish.

Petroleum releases and other contaminants from vessels using the LSA-North alternative could adversely affect fish in the harbor. While there is little information showing direct effects of chronic petroleum releases to fish in harbors, there is ample evidence that low concentrations of some petroleum products can cause pathogenic effects to fish, particularly during critical life stages.

Additional moorage at this site could exacerbate water quality impacts to fish that use the harbor, although spill data (Section 6.2) indicate that petroleum spills are no more common in developed mooring areas than in the surrounding waters of Captains Bay, Iliuliuk Harbor, and Dutch Harbor.

While contaminants would disperse to waters outside the harbor, mixing would be comparatively rapid and effects might be difficult to discern in mobile fish like salmon, herring, and cod. There is some potential for benthic and intertidal habitat to be affected as far north as The Bridge to the Other Side and as far south as the southern end of Little South America. In this near-shore reach of shoreline outside the LSA-North alternative, the Corps estimated that as much as 20 hectares of benthic habitat outside the harbor might be noticeably affected by chronic contaminant release from a harbor at the LSA-North site. The fish associated with that habitat could be moderately impacted by loss of habitat or possibly by pathogenic effects.

The floating breakwaters on the northern and eastern perimeters of this alternative would be unlikely to affect fish movement, and harbor operations are not known to impede lateral movement of fish along the coast. The southern rubblemound breakwater would be breached so fish would not be forced to migrate into deep water along the relatively steep artificial shoreline of the breakwater. Small fish in deeper water may be more available to predators and their long-shore migratory movements may be impeded.

Summation.

Dredging, Fill, and Placement of Structures

- 0.1 hectare of intertidal habitat destroyed.
- 1.6 hectares of subtidal habitat destroyed.
- 1.0 hectare of rocky subtidal habitat created.
- 0.9 hectare of floating-concrete subtidal habitat created.

Petroleum and Vessel Traffic

- 6.4 hectares of habitat inside harbor moderately degraded.
- 20 hectares of habitat surrounding harbor mildly degraded.

Comparison With USFWS Conclusions. See discussion in the LSA-South alternative.

Combination Alternative. Fish at the Expedition Inlet site would be displaced from near-shore habitat during construction. Fill for the staging area and dredging for moorage would destroy or substantially impact 0.07 hectare of bottom habitat that reports suggest is moderately valuable as fish habitat. Flatfish, sculpins, and other species would be affected.

The majority of fish found at the Expedition Inlet site were juvenile Pacific cod (USFWS 2003), with smaller numbers of juvenile pink salmon and small numbers of Dolly Varden and other salmonids. Pink and chum salmon typically congregate in schools close inshore, while the other species tend to disperse more widely. Expedition Inlet is a blind cove that may be outside the typical out-migration path of pink salmon from nearby Unalaska Creek (figure 4-2). The few pink salmon that enter Expedition Inlet would lose the near-shore area used for staging area fill. Few predators of pink salmon fry were seen during the survey (USFWS 2003) and the slightly deeper water created by dredging probably would not substantially increase predation on pink salmon fry. The habitats used by Pacific cod are more diverse than those of pink salmon, so Pacific cod might not be adversely affected by loss of this small area. The Combination alternative would not be expected to adversely affect fish movement or migration.

Difficult seining conditions may have biased sample results in Expedition Inlet, but there is little indication that Expedition Inlet is exceptionally valuable fish habitat. This indicates that construction of the Expedition Inlet segment of the Combination alternative would moderately to severely impact about 1.1 hectares of moderately good habitat for a variety of near-shore marine fishes.

Construction, particularly blasting to construct the mooring basin, would affect fish in the immediate area. The extent of effects would be influenced by overpressure created by blasts and the species and number of fish present. Timing, contractual limits on blast strength, and air curtains or other measures to reduce the over-pressure radius could reduce effects, but might not protect all fish from blasting mortality or injury. Effects could be severe to individual fish, but timing windows and planning would prevent appreciable damage to local fish populations. A blasting plan to minimize potential damage would be developed with the contractor and coordinated with resource agencies before harbor construction.

Petroleum spills and other contamination from vessels using this alternative could increase in Expedition Inlet if a harbor was constructed there. Low levels of chronic contamination and occasional spills of larger amounts of petroleum could further impact habitat, reducing its value for fish. Chronic contamination also can cause mortality or pathological effects to fish, and may be especially damaging to juveniles. The potential for those effects would be increased throughout Expedition Inlet and might be greater there than at other sites considered in detail because the inlet would tend to retain contaminants longer.

Potential chronic contamination in the mooring area, as discussed for the LSA-North alternative, could be expected to adversely affect fish in Expedition Inlet and about the same area along the coast as would be affected by the LSA-North alternative.
A smaller area (0.9 hectare versus 1.2 hectares for the LSA-North alternative) would be directly impacted by breakwater construction for the Combination alternative at the LSA-North site. The mooring basin would be smaller, but potential for effects to fish from this part of the Combination alternative would be very similar to those of the LSA-North alternative.

Summation.

<u>Dredging, Fill, and Placement of Structures</u>
- 0.1 hectare of intertidal habitat destroyed
- 2.5 hectares of subtidal habitat destroyed or substantially reduced in value.
- 0.9 hectare of rocky subtidal habitat created.
- 1.3 hectares of floating-concrete subtidal habitat created.

<u>Petroleum and Vessel Traffic</u>
- 8.8 hectares of habitat inside harbor moderately degraded.
- 28 hectares of habitat surrounding harbor mildly degraded.

<u>Comparison With USFWS Conclusions</u>. Please see discussion in the LSA-South alternative.

LSA-South Alternative. Habitat at the LSA-South site includes a complex mix of bottom material that hosts a comparatively productive and diverse biological community.

Harbor construction would displace fish from the shoreline and the near-shore habitat during construction. Most of the existing beach would be dredged for mooring space or covered with fill to create staging areas required for harbor operation. Two beach seine hauls off the sandy beach at the LSA-South site caught 2,800 Pacific sand lance and 450 juvenile Pacific cod. Sand lance typically spend a significant amount of time buried in subtidal sand and often are abundant in and near sandy habitat. Sand lance, pink salmon juveniles, and other fish in 0.65 hectare of intertidal and 1.85 hectares of near subtidal zones that would be dredged and filled would be displaced. The filled intertidal area would become uplands and would be permanently lost as fish habitat. The dredged subtidal area would be excavated down to rock in most areas and would no longer provide sand bottom habitat for sand lance or other species that prefer the existing habitat.

Construction, particularly blasting to construct the mooring basin, would affect fish in the immediate area. Extent of effects would be determined by strength of the blasts and the species and number of fish present. Timing, contractual limits on blast strength, and air curtains or other measures to reduce the over-pressure radius could reduce effects, but might not protect all fish from blasting mortality or injury. Effects would be severe to fish present, but timing windows and planning would prevent appreciable damage to local fish populations. A blasting plan to minimize potential damage would be developed with the contractor and coordinated with resource agencies before harbor construction.

Breakwater construction would cover 0.55 hectare of mixed bottom types, including gravel, cobbles, and boulders and presumably at least a small areas of sandy habitat used by a variety of fish species, including salmon, sole, Pacific cod, sand lance, and others. This habitat would be replaced, in part, by the rubblemound breakwater, which would create about an equal area of rocky habitat. There is no certainty about how well the breakwater would be colonized, so it would be reasonable to expect that the habitat value of 0.55 hectare of fish habitat in the breakwater alignment would be substantially diminished.

Floating breakwaters for the LSA-South alternative (figures 4-7 and 4-8) would be constructed of pH neutral, textured concrete to promote colonization, and would attract fish after growths of marine algae and invertebrates are established. Approximately 4,800 square meters of habitat for colonization by marine algae and invertebrates would result from the floating breakwaters and an almost equal amount from docks and boat slips. The fish species most likely to be attracted to floating breakwaters at the LSA-South alternative would be Pacific cod.

The breakwaters would produce a more protected habitat. Numbers of fish that have less affinity for benthic habitat might increase in the harbor. Pink salmon, herring, and other fish that typically occupy the middle and upper water column might equal or exceed pre-project abundance in a new harbor at the LSA-South site, but value of habitat would be diminished for sand lance, Pacific cod, and other bottom-dwelling species.

Juvenile Pacific cod, one of the more abundant fish in collections at the site (section 6.2.3) would also lose general near-shore feeding habitat from harbor development. Juvenile cod feed extensively on copepods and other small invertebrates that occur on kelp and other substrates and that rest on and in bottom substrates. Harbor construction would reduce the availability and quality of feeding habitat at the LSA-South site. Harbor operation and the shading effects of mooring facilities would add to those effects over the life of the harbor. Pacific cod habitat would be lost or diminished in value throughout the near-shore segments of the harbor, but would be little affected in the deeper parts of the harbor basin. Altogether, direct effects would equate to several hectares of lost habitat for this abundant and wide-ranging fish.

Juvenile pink salmon seen at the LSA-South site likely originate in Iliuliuk River (figure 4-2) or one of the several small creeks in Captains Bay where pink salmon spawn. Pink salmon feed on plankton, but are poor swimmers as young juveniles in their first summer. Schooling pink salmon juveniles often balance their time between quieter inshore waters where they are less vulnerable to predators and deeper waters just off shore where they are more vulnerable, but where planktonic prey populations are denser.

Pink salmon fry are attracted to many small boat harbors in Alaska. The reason for the attraction is not certain, but the protected waters of boat harbors might have higher concentrations of prey species and fewer large predators. A harbor at the LSA-South site could offer habitat with fewer predators than might now be present at the site, but there are no quantitative data that could be applied to determine potential gain or loss of habitat value.

Sand lance habitat value would be largely lost in near-shore areas at the LSA-South alternative, but could be retained in pockets of sandy or soft-bottomed habitat in deeper parts of the harbor basin.

The floating breakwaters on the northern and eastern perimeters of this alternative would be unlikely to affect fish movement, and harbor operations are not known to prevent movement of fish along the coast. The southern rubblemound breakwater could force some fish to migrate into deep water along the relatively steep artificial shoreline of the breakwater, although the breakwater breach should allow most to pass along the relatively gently sloping shoreline.

Breakwaters may attract fish species that prey on smaller fish. Predation can also be expected as pink salmon fry move over deeper water around natural points of land and man-made breakwaters. The breakwater (figure 4-8) incorporates a breach for fish passage to reduce predation. Pink salmon fry could minimize their movement through offshore waters by using the breach, and observations at other harbors indicate juvenile salmon would likely use the breach.

Cod, pollock, and Pacific herring, when they are large enough, prey on juvenile pink salmon. These species use the existing habitat at the LSA-South site. Herring also often use harbors as habitat, and in some locations harbors may be important over-wintering habitats for local populations.

Small numbers of bottom-fish were seen at the LSA-South site during dive surveys (Section 6.3.2; USFWS 2000, 2003). Habitat in the footprints of the fill and breakwater lost to these species would be replaced by steeper, rockier habitat along the faces of the staging area fill and the breakwater. Not all species would benefit equally from habitat replacement. Benthic species including flatfish, sculpins, and blennies would lose habitat while some epibenthic fishes including cod, pollock, and greenlings might be largely unaffected or could gain habitat. The open structure of the LSA-South alternative would allow marine fishes easy movement into and out of the harbor.

Vessels using the harbor would introduce petroleum and other contaminants into the site and would diminish the productivity of the benthic community and the value of the 6.8 hectares inside the harbor as fish habitat. There is some potential for benthic and intertidal habitat to be affected as far north as The Bridge to the Other Side and as far south as the southern end of Little South America. In this near-shore reach of shoreline outside the LSA-South alternative, as much as 20 hectares of benthic habitat might be noticeably affected by chronic contaminants from the LSA-South alternative. While contaminants would disperse to waters outside the harbor, mixing would be comparatively rapid and effects might be difficult to discern in mobile fish like salmon, herring, and cod. The fish associated with benthic habitat both inside and outside the harbor could be moderately impacted by loss of habitat or possibly by pathogenic effects as are occasionally exhibited already by bottom-dwelling fish in the area.

The LSA-South alternative would significantly impact the habitat of sand lance, Pacific cod, sole, and other bottom-dwelling fish in the harbor. Impacts would be limited to the relatively small area of the harbor and the immediate area around it. Habitat for the affected fish species is abundant and widespread in Unalaska Bay, so impacts, while significant at the harbor site, would not cause any significant change in fish diversity or abundance in Unalaska Bay.

Summation.

Dredging, Fill, and Placement of Structures

- 0.8 hectare of intertidal habitat destroyed.
- 2.4 hectares of subtidal habitat destroyed.
- 0.3 hectare of rocky subtidal habitat created.
- 1.0 hectare of floating-concrete subtidal habitat created.

Petroleum and Vessel Traffic

- 7.2 hectares of habitat inside harbor moderately degraded.
- 20 hectares of habitat surrounding harbor mildly degraded.

Comparison With USFWS Conclusions. USFWS evaluated only juvenile fish, their rearing habitat, and the part of that habitat above –2.5 MLLW. Their evaluation appears to be based on the assumption that all important marine juvenile fish have the same habitat requirements and that shallow, near-shore water is universally important to juvenile fish. This is not supported by the literature, which shows that juvenile Pacific cod, walleye pollock, and sand lance also are associated with much deeper water. Pink salmon often use shallow water, but deeper water also is essential for feeding, and use of both may be related to diurnal cycles.
Values assigned that differentiate between habitats at the three sites considered in detail appear to be based primarily on very limited seining collections, which are subject to a great many variables. For example, Robards (1999) reported more fish from the LSA-North site. The Corps agrees with USFWS that the LSA-South site likely has more small fish of some species in shallow water than the other two sites, but does not accept any broader interpretation of the data.

7.4.5 Mammals

No-Action Alternative. Mammal use of the alternative sites, the lands around those sites, Unalaska Bay, and the marine waters of the Bering Sea and North Pacific Ocean would remain unaltered.

Action Alternatives.

Terrestrial Mammals. Terrestrial mammals, including shrews, voles, ground squirrels, and possibly foxes would be displaced from a maximum of about 1 hectare by on-land development of harbor facilities at any site and by quarry operations to supply rock for any project. A maximum of about 4 hectares of upland mammal habitat might be affected by project construction. Effects would be minor and localized.

Summation.

Dredging, Fill, and Placement of Structures. Up to 4 hectares of upland habitat at the quarry would be destroyed for the LSA-North alternative because of the larger volume of rock needed for construction of a breakwater in deep water at the site. Up to 2 hectares of upland habitat would potentially be destroyed at the other sites.

Petroleum and Vessel Traffic. No additional impacts

Marine Mammals. None of the action alternatives considered in detail would alter fishing or other vessel operations outside the immediate vicinity of Unalaska. Whales, porpoises, other marine mammals and their habitats in the marine waters of outer Unalaska Bay and the open Pacific and Arctic Oceans would be unaffected by the project.

Harbor seals, sea lions and sea otters at least occasionally use the harbor sites considered in detail. Each alternative would remove approximately 7 to 9 hectares of potential foraging habitat and could increase the potential that those sea mammals would be disturbed or displaced from areas they use now. Evaluation of potential project impacts to invertebrates and fish estimated that chronic low levels of petroleum from existing sources and for boats using the harbor could affect biota in additional habitat around each alternative. There are no haulouts or other essential habitats near any of the alternatives considered in detail and no habitats of especial importance would be affected.

Boats moored at either LSA site might be closer to harbor seals and sea lions than in their previous moorages, so there might be more potential for contamination from petroleum spills. Boats moor in many locations in Iliuliuk Bay, Captains Bay, and the surrounding waters, so any increase in the potential for impact from a new harbor at any of the action alternatives would cause a corresponding reduction in risk at other moorages. The disproportionately small percentage of petroleum reported spilled in the existing city small boat harbor also suggests a new harbor at LSA might reduce quantities of oil spilled.

Sea otters are occasionally seen in many Unalaska Bay areas, but there is apparently little sea otter activity at the three alternative sites considered in detail. Prey abundance and the infrequency of sightings indicate that sea otter feeding is uncommon at the LSA sites (Appendix H), so none of the alternatives considered in detail would be expected to appreciably affect food availability. Sea otters are commonly seen inside harbors in Alaska, and they would be likely to at least occasionally enter a harbor at Unalaska after construction. That use would expose them to any petroleum released by boats in the harbor. This represents a degree of threat to those otters, although mortality is uncommon even in harbors with many more boats and with more fueling and industrial use than is planned for any of the action alternatives.

Sea lions are attracted to a number of harbors along the coast of Alaska. They will take fish scraps dropped into the harbor from cleaning tables and sometimes use harbor floats as haulouts for resting, basking, and social interaction. If that use becomes well established, sea lions may aggressively defend those territories. In some harbors, this has curtailed or prevented human use of segments of the float system. Because sea lions are protected, any plans to chase them off the floats must be coordinated with NMFS.

Summation.

Dredging, Fill, and Placement of Structures

LSA- North Alternative

- 1.7 hectares of potential sea lion and sea otter foraging habitat destroyed or substantially reduced in value.
- 6.2 hectares of potential sea lion and sea otter foraging habitat reduced in value.

Combined Alternative

- 2.2 hectares of potential sea lion and sea otter foraging habitat destroyed or substantially reduced in value.
- 7.5 hectares of potential sea lion and sea otter foraging habitat reduced in value.

LSA-South Alternative

- 3.5 hectares of potential sea lion and sea otter foraging habitat destroyed or substantially. reduced in value.
- 5.8 hectares of potential sea lion and sea otter foraging habitat reduced in value.

Petroleum and Vessel Traffic

LSA- North Alternative

- 6.2 hectares moderately degraded.

Combined Alternative

- 7.5 hectares moderately degraded.

LSA-South Alternative

- 5.8 hectares moderately degraded.

7.4.6 Birds

No-Action Alternative. The No-Action alternative would not alter bird habitat or otherwise directly affect birds at Unalaska.

LSA-North Alternative.

Terrestrial Birds. Savannah sparrows and other passerine birds associated with the tall grass and tundra above the upper intertidal zones would be displaced by construction, by rock quarrying for construction, and by harbor operation. Total area lost would be a maximum of about 4 hectares, which is a very small segment of the available nesting and foraging habitat for this group on Amaknak and Unalaska islands.

Some intertidal feeding species including shorebirds, crows, ravens, and some species of passerine birds would be displaced by fill placed in the intertidal zone to construct staging areas. Intertidal fill would eliminate 0.11 hectare of potential intertidal feeding habitat.

Other species, including gulls, bald eagles, and common ravens could benefit from breakwaters and docks that provide roosting structure. A bald eagle nest is on the mountainside just across the road from the LSA-North alternative site. The nest is active and eagles nesting in it have produced broods in recent years (Appendix H). The active rock quarry a few hundred meters south and traffic on the adjacent road apparently have not displaced the nesting eagles or affected nesting viability.

Construction of the LSA-North alternative immediately adjacent to the nest and activity of people and boats using the harbor, however, might introduce enough additional activity to affect nesting and viability of hatchlings.

Summation.

Dredging, Fill, and Placement of Structures

- 75 meters of intertidal shoreline inside harbor reduced in value.

Petroleum and Vessel Traffic

- Up to 425 meters of adjacent intertidal shoreline moderately degraded.

Ducks and Seabirds. Ducks, primarily sea ducks, including Steller's eiders, long-tailed ducks, harlequin, scoters, and others would be displaced from feeding and resting habitat by harbor construction and by boats using the harbor. Greatest use by ducks and sea birds is during the winter, and prey availability generally is considered to be most important to these birds since the winter is energetically demanding. Approximately 6.4 hectares of feeding habitat for ducks and seabirds would be eliminated by construction of the LSA-North alternative. Table 7-2 shows the average numbers of ducks and other seabirds observed at the LSA-North site per survey day. These numbers include all birds observed in survey sector 6, which includes both the project footprint and habitat farther offshore. Ducks and seabirds using the LSA-North alternative site would be almost totally displaced by the harbor. Vessels entering and leaving the harbor also could be expected to affect duck and seabird resting and feeding use of deeper water east of the harbor. There is no way to predict numbers of ducks and seabirds that would remain or the relative habitat value that would be retained east of the harbor, but effects in that additional area of about 10 hectares could be substantial.

Most of the boats in the 25 to 45-meter design fleet could not pass beneath the bridge to the north, and would have to reach the harbor from the south and leave to the south. This would substantially increase boat traffic through the duck and seabird foraging and resting habitat to the south, which is the LSA-South site and the waters offshore from it. Effects of traffic to offshore birds in this area east of the LSA-South alternative would be about the same for a harbor constructed anywhere on the east coast of Little South America.

Table 7-2 shows the average numbers of ducks and seabirds commonly observed in sector 7a, which is in the LSA-South alternative and the adjacent waters offshore, and in sector 7b, which is the area just south of the LSA-South alternative. Vessels entering or leaving the LSA-North alternative would frequently travel through and disturb ducks and seabirds resting and foraging in both parts of sector 7, particularly during the busy winter fishing season. Steller's eiders and other birds that feed and rest in shallower water might be less affected than birds in deeper water, but would still be likely to flush at least occasionally. Ducks and seabirds may be especially likely to dive or flush when they are in larger or denser flocks. A few birds reacting to a passing boat or other disturbance may send a wave of flushing or diving behavior through more distant groups of birds on the water. This indicates that post-construction effects of the LSA-North site on foraging and resting seabirds and ducks would extend into the more densely used habitat to the south and could reduce duck and seabird use of that habitat.

Ducks and other sea birds displaced by the LSA-North alternative would move into other habitat. The waters around Unalaska host rich benthic invertebrate communities that are used as forage habitat by sea ducks, and sea ducks feed in many places around Unalaska. Ducks displaced from a harbor at LSA-South could forage and rest in those other habitats, but there is no certainty that they would find food or resting habitat of equal quality at those sites. The USFWS draft endangered species biological opinion for Steller's eiders (Appendix I) determined that displacement of Steller's eiders from foraging habitat would be the single greatest cause of take of that species if a harbor was constructed at the adjacent LSA-South site.

Steller's eider numbers at the LSA-South alternative are highly variable suggesting that this area serves as a portion of the total area used by these Steller's eiders for foraging. While displaced eiders and other sea ducks and seabirds would likely forage elsewhere, it is not possible to know how far they might move if displaced or to what degree their added competition would affect ducks in other areas. It is also unknown whether the habitat used by Steller's eiders in the Unalaska area is at or near its carrying capacity. If the other areas are not at their carrying capacity, the addition of up to 86 Steller's eiders may have minor effects. Those same eiders, along with seabirds and other ducks, would be displaced to a lesser extent by the LSA-North alternative and by the vessel traffic to and from that harbor. Effects of displacement by vessel traffic from the LSA-North alternative would have less effect on Steller's eiders and other ducks that feed in shallow water because fewer use the LSA-North alternative site, but potentially more effect on long-tailed ducks, scaup, and white-winged scoters that forage in deeper water.

Table 7-2. Winter site use by ducks and sea birds

Species	LSA-North average per survey day[1,2]	LSA-South average per survey day[1,2,3]	Expedition Inlet average per survey day[1,4]	Expedition Inlet and LSA-North average per survey day[1,5]	Expedition Inlet and Iliuliuk Bay average per survey day[1,6]
Steller's eider	1	29	0	1	6
Harlequin	8	33	9	17	31
Long-tailed	8	8	1	9	21
Black scoter	8	24	0	8	2
White-winged scoter	23	14	0	23	3
Cormorant species	1	2	2	3	4
Pigeon guillemot	2	4	0	2	3
Barrow's golden-eye	0	0	0	0	2
Scaup species	4	1	0	4	37
Red-breasted merganser	0	1	0	1	12
Marbled murrelet	1	1	0	1	1
Green-winged teal	0	0	0	0	1
Common eider	0	0	0	0	3
Common murre	0	1	0	0	0
Emperor goose	1	1	0	1	5
TOTAL:	57	119	12	70	131

[1] Not all observations were normally distributed. For example, 404 of the 542 total number of black scoters were observed during 1 of the 12 three-day survey periods.

[2] Based on average per season/11 surveys. 11 is more conservative given that only 11 surveys were completed in two of the three survey seasons. The other season (01-02) had 12 surveys.

[3] Includes sectors 7a and 7b.

[4] Based on the Dec 02 - Mar 03 season only since this was the only complete season with this sector (23A).

[5] Based on LSA-North average per day + Expedition Inlet average per day.

[6] Based on Expedition Inlet + Iliuliuk bay average per season/11 survey days. Also, Iliuliuk Bay survey area includes Margaret Bay. Birds in Margaret Bay would not likely be disturbed by increased vessel traffic.

Researchers have determined that long-term exposure to low concentrations of petroleum products may affect the physiology of ducks and seabirds. Thresholds for physiological effects that might reduce viability or life functions of ducks are not known for sea ducks, but it is known that enough exposure over a long enough period will affect ducks and seabirds, and that the exposure can reduce viability of affected birds.

Day et al. (2000) reported, based on U.S. Coast Guard data, that the great majority of petroleum products spilled into marine waters of the Aleutian Islands is diesel fuel, with comparatively minor amounts of gasoline, hydraulic fluid, grease, and other lubricants and fuels.

More recent Coast Guard and Alaska Department of Environmental Conservation spill data demonstrate that the principal cause of fuel spills is operator error, and the second leading cause is mechanical failure. The data also clearly show that the great majority of spill incidents and an even greater preponderance of the volumes spilled are at sites where vessels are fueled. The second greatest number and volume for spills is at industrial sites where machinery and heavy equipment operate and where vessels may be damaged at the dock while attempting to unload catches or load gear, supplies, or equipment without adequate wave protection.

Most spills that are the basis for concerns about petroleum releases at Unalaska are at marine fueling stations or industrial facilities that are not in a constructed harbor and are not related to vessel traffic or harbor operation. No fueling facilities are planned for any of the alternatives considered in detail in this report. Any future plans for fueling at any of the alternatives considered in detail would be reviewed on their own merit and would be subject to endangered species consultation. Effects of new fueling facilities at Unalaska are addressed briefly in the section 7.8 discussion of indirect effects.

Although the great majority of reported spills are from fueling or industrial sites, the USFWS draft biological opinion (Appendix I) bases calculations of potential for petroleum-caused take of Steller's eiders on regional vessel traffic rather than on local spill sources. The draft biological opinion determined that increased vessel traffic to the LSA-South alternative site would substantially increase exposure of Steller's eiders to petroleum and would cause a take of threatened Steller's eiders. Presumably, concerns related to potential project-related impacts to other ducks and seabirds in the revised draft Coordination Act Report (Appendix H) are based on the same assumption of relationship between vessel traffic and petroleum spills.

Some marine species including cormorants, and glaucous wing gulls, could benefit from floating breakwaters at the LSA-North and South alternative sites. The floating breakwaters would be used by these species mostly for resting. Cormorants need to get out of the water periodically to dry their plumage and can commonly be observed on both rock outcroppings and manmade structures.

Some species, including bald eagles, ravens, and gulls that habituate to harbor areas would be exposed to increased risk of collisions with boat rigging in a harbor. Other species including sea ducks, alcids, and petrels might be attracted to harbor lights or the lights of fishing boats in the harbor. Harbor lighting would be shielded to minimize effects, but collisions at the LSA-North alternative would still impact seabirds and ducks.

The Steller's eider draft biological opinion (Appendix I) determined that threatened Steller's eiders would be taken by "collisions with lighted vessels and harbor-related structures" at the LSA-South alternative. Although fewer Steller's eiders typically use the existing foraging and resting habitat at the LSA-North alternative site, rigging and other structures in the LSA-North alternative could be expected to at least occasionally injure Steller's eiders and other birds that use the site plus any other birds near the site that became disoriented by lights in the harbor. A Steller's eider flying at 100 km per hour (about 60 miles per hour) at the southern-most boundary of the LSA-South alternative site could fly all the way across the site and into the LSA-North alternative site in less than 15 seconds. This indicates that birds that would be attracted to or disoriented by lights in the LSA-South alternative would be at similar risk of collision caused or induced by lighting in the LSA-North alternative.

Summation.

Dredging, Fill, and Placement of Structures

- 8 hectares of foraging habitat destroyed.
- Increased risk of collision.

Petroleum and Vessel Traffic

- 30 hectares of offshore resting habitat mildly degraded.
- Increased risk of exposure to low levels of petroleum for waterfowl and seabirds near the harbor.

Comparison With USFWS Conclusions. Please see discussion in the LSA-South alternative.

Combination Alternative.

Terrestrial Birds. Effects for the LSA-North segment of this action would be the same as for the LSA-North alternative. At Expedition Inlet, Savannah sparrows and other birds would be displaced from the uplands used for staging and adjacent to project activities (less than 2 hectares). Displacement of those birds and of birds feeding in the small areas of intertidal habitat that would be filled at both the LSA-North site and at Expedition Inlet would be permanent, but with little potential to affect populations or regional distribution. The bald eagle nest at the LSA-North site would have about the same potential to be affected as with the LSA-North alternative.

Summation.

Dredging, Fill, and Placement of Structures

- 375 meters of intertidal shoreline inside harbor sites reduced in value.

Petroleum and Vessel Traffic

- Up to 775 meters of adjacent intertidal shoreline moderately degraded.

Ducks and Sea Birds. The component of the Combination alternative at the LSA-North site would have about the same effect on ducks and sea birds as the LSA-North alternative. Construction of the Expedition Inlet project component would have relatively little effect because duck and sea bird use is so light in the inlet (table 7-2). Harlequin ducks and the occasional cormorant and long-tailed duck using the site would be displaced by construction. Boats entering and leaving the moorage at Expedition Inlet, however, would have the potential to disturb more ducks and seabirds than at any other site considered in detail. The last column of table 7-2 records the numerous ducks and seabirds observed just outside Expedition Inlet that would be at least occasionally displaced by vessel traffic entering or leaving the harbor. Those same birds could be attracted to lights in the Expedition Inlet and the LSA-North components of the project.

Summation.

Dredging, Fill, and Placement of Structures

- 13 hectares of foraging habitat destroyed.
- Increased risk of collision.

Petroleum and Vessel Traffic

- 27 hectares of offshore resting habitat mildly degraded.
- Increased risk of exposure to low levels of petroleum for waterfowl and seabirds near the harbor.

Comparison With USFWS Conclusions. Please see discussion in the LSA-South alternative.

LSA-South Alternative.

Terrestrial Birds. Savannah sparrows and other upland birds would be displaced by the staging area and other upland and intertidal development. A perch in the rock face above the LSA-South breakwater alignment is used regularly by bald eagles. Construction activities for the LSA-South alternative could temporarily displace eagles from this habitat, although in the Aleutian Islands bald eagles often are extremely tolerant of humans and human activity. Construction of the in-water components of the LSA-South alternatives would be largely out of view of the eagle nest to the north, but quarrying or other construction activity could displace the eagle from its nest. Specific measures would be developed with the USFWS, if required, to protect reproductive success of the nesting eagles.

Summation.

Dredging, Fill, and Placement of Structures

- 475 meters of intertidal shoreline inside harbor sites reduced in value.

Petroleum and Vessel Traffic

- Up to 125 meters of adjacent intertidal shoreline moderately degraded.

Ducks and Sea Birds. The LSA-South site would have more adverse effect on over-wintering ducks than either of the other two potential harbor sites. Substantially more ducks were counted at the LSA-South site, and they were more consistently present during winter surveys than at the other sites (Section 6.3.5). Average numbers of ducks and sea birds observed each day during winter surveys from December 2000 to March 2003 are shown in table 7-2.

Ducks and sea birds would be directly displaced from the site that is most heavily used by Steller's eiders, harlequin ducks, and black scoters. Ducks and sea birds also would be displaced from deeper water to the east of the harbor. Vessel traffic effects on ducks and sea birds south of the project would be about the same as the LSA-North alternative. Most of the vessel traffic to and from the harbor would be to the south, so effects on ducks and sea birds north of the project would be comparatively light. Construction effects and potential for contamination by petroleum products would be about the same as for the LSA-North alternative.

The LSA-South site would be close to more ducks than any of the other alternatives considered in detail and would, therefore, appear to have more potential for taking ducks by collision than any other alternative. The USFWS draft biological opinion (Appendix I) estimated that one Steller's eider of the threatened stock would be taken by collision with boats or harbor features during the 50-year life of the project. The threatened population segment is about 4 percent of the total wintering population, so that would indicate a total take (harm or mortality) of about 25 Steller's eiders during the 50-year project life or 0.5 per year. Eiders may be more easily attracted to lights, and may be more susceptible to collision than some of the other species at the LSA-South site, but the calculations for that threatened species may serve as a useful indication of potential take by collision for other ducks and seabirds in the area.

The sectors around the LSA-South site (sectors 6, 7a, and 7b) produced an average total count of 176 birds per winter survey day, 30 of which (17 percent) were Steller's eiders. If all the birds in those sectors were equally vulnerable to collision, and take of Steller's eiders from collisions averaged 0.5 birds per year, then the project would cause an average take by collision of about three ducks or seabirds per year. The vessels in the harbor would, however, have been moved there from somewhere else in the Unalaska area, so the potential take would have been reduced by some unquantified amount at their former mooring site.

The draft biological opinion estimated that the same number of the listed Steller's eiders would be taken (harmed or killed) by petroleum contamination from the harbor. While their calculations are based on vessel traffic rather than on other more directly applicable indicators, their results may be useful as a "worst-case" indication of potential chronic impact from petroleum spills. This would indicate a potential for take of three ducks or seabirds per year from petroleum contamination related to the LSA-South alternative.

The draft biological opinion estimate that the LSA-South alternative would take (in this case "harm") four listed Steller's eiders by displacing them from foraging habitat during the life of the project. Again, assuming that the listed population segment is 4 percent of the general population of the species on the winter range, then this would average a "harm" from displacement of about two Steller's eiders per year. Steller's eiders may have more specific feeding habitat requirements than many of the other ducks and seabirds, so displacement from harbor construction and boats using the harbor might be less likely to harm other species. For analysis purposes, assuming the same effect would apply to all ducks and seabirds in the area, then about 12 ducks or sea birds per year would be "harmed" by displacement. That harm could be in the form of increased energy expenditure to reach another feeding site, increased energy expenditure to obtain food at another site, use of lower-quality food, or other factor that might lower survivability of the affected ducks or seabirds.

Summation.

Dredging, Fill, and Placement of Structures

- 8 hectares of foraging habitat destroyed.
- Increased risk of collision.

Petroleum and Vessel Traffic

- 30 hectares of offshore resting habitat reduced in value.
- Increased risk of exposure to low levels of petroleum.

Comparison With USFWS Conclusions. Corps evaluation of project effects assumes a larger area of impact than the USFWS evaluation because it considers effects on all ducks rather than limiting evaluation to smaller species. The Corps evaluation also considers the fact that traffic to the LSA-North site would disturb waterfowl resting and foraging in the LSA-South site and could expose them to low-levels of petroleum.

7.4.7 Summary of Effects

The potential for the three alternatives considered in detail to adversely affect plants, animals, and their habitats is summarized in table 7-3. An asterisk notes where evaluation of affected resources and project effects strongly indicates that one alternative would likely have a greater effect than the other two. Information about relative value of habitat, relative abundance of organisms, and/or relative density and diversity of communities is reported in the text of this section.

Table 7-3. Summary of harbor construction and operation effects on fish and wildlife habitats

Impacts of Construction and Operation on Habitat				
	Consequences of Construction Alternatives			
Resource	**No-Action**	**LSA North**	**Combined**	**LSA-South**
Intertidal and Subtidal Communities	No additional impact	0.1 ha intertidal- habitat destroyed 1.6 ha subtidal habitat destroyed or substantially reduced in value 2.0 ha rocky and floating subtidal habitat created	0.4 ha intertidal habitat reduced in value 1.8 ha subtidal habitat substantially reduced in value 2.2 ha rocky and floating subtidal habitat created	0.8 ha intertidal habitat destroyed 2.5 ha subtidal habitat destroyed or substantially reduced in value 1.3 ha rocky and floating habitat created *
Red King and Tanner Crabs	No additional impact	1.2 ha habitat destroyed	1.5 ha habitat destroyed	1.0 ha habitat destroyed
Fish	No additional impact	0.1 ha intertidal habitat destroyed 1.6 ha subtidal habitat destroyed or substantially reduced in value 1.9 ha rocky and floating subtidal habitat created	0.1 ha intertidal habitat destroyed 2.5 ha subtidal habitat destroyed or substantially reduced in value 2.2 ha rocky and floating habitat created	0.8 ha intertidal habitat destroyed 2.4 ha subtidal habitat destroyed or substantially reduced in value 1.3 ha rocky and floating subtidal habitat created *
Terrestrial Mammals	No additional impact	Up to 4.0 ha upland habitat may be destroyed *	Up to 2.0 ha upland habitat may be destroyed	Up to 2.0 ha upland habitat may be destroyed
Marine Mammals	No additional impact	Sea lions and sea otters: 1.7 ha habitat destroyed or substantially reduced in value 6.2 ha habitat moderately reduced in value	Sea lions and sea otters: 2.2 ha habitat destroyed or substantially reduced in value 7.5 ha habitat moderately reduced in value	Sea lions and sea otters: 3.5 ha destroyed or substantially reduced in value 5.8 ha habitat moderately reduced in value

Table 7-3. Summary of harbor construction and operation effects on fish and wildlife habitats (continued).

Terrestrial Birds	No additional impact	75 meters of intertidal shoreline inside harbor reduced in value Up to 4.0 ha upland habitat may be destroyed *	375 meters of intertidal shoreline inside harbor sites reduced in value Up to 2.0 ha upland habitat may be destroyed	475 meters of intertidal shoreline inside harbor sites reduced in value Up to 2.0 ha upland habitat may be destroyed
Marine Birds	No additional impact	8 ha foraging habitat destroyed Increased risk of collision	13 ha foraging habitat destroyed Increased risk of collision	7.2 ha foraging habitat destroyed Increased risk of collision *
	Consequences of Petroleum Contamination and Vessel Traffic			
	Alternatives			
Resource	**No-Action**	**LSA North**	**Combined**	**LSA-South**
Intertidal and Subtidal Communities	No additional impact	0.1 ha intertidal- habitat destroyed 1.6 ha subtidal habitat destroyed or substantially reduced in value 2.0 ha rocky and floating subtidal habitat created	0.4 ha intertidal habitat reduced in value 1.8 ha subtidal habitat substantially reduced in value 2.2 ha rocky and floating subtidal habitat created	0.8 ha intertidal habitat destroyed 2.5 ha subtidal habitat destroyed or substantially reduced in value 1.3 ha rocky and floating habitat created *
Red King and Tanner Crabs	No additional impact	1.2 ha habitat destroyed	1.5 ha habitat destroyed	1.0 ha habitat destroyed
Fish	No additional impact	0.1 ha intertidal habitat destroyed 1.6 ha subtidal habitat destroyed or substantially reduced in value 1.9 ha rocky and floating subtidal habitat created	0.1 ha intertidal habitat destroyed 2.5 ha subtidal habitat destroyed or substantially reduced in value 2.2 ha rocky and floating habitat created	0.8 ha intertidal habitat destroyed 2.4 ha subtidal habitat destroyed or substantially reduced in value 1.3 ha rocky and floating subtidal habitat created *
Terrestrial Mammals	No additional impact	No additional impact	No additional impact	No additional impact
Marine Mammals	No additional impact	6.2 ha habitat moderately degraded	7.5 ha habitat moderately degraded	5.8 ha habitat moderately degraded
Terrestrial Birds	No additional impact	Up to 425 meters of adjacent intertidal shoreline moderately degraded	Up to 775 meters of adjacent intertidal shoreline moderately degraded	475 meters of intertidal shoreline inside harbor sites reduced in value
Marine Birds	No additional impact	30 ha offshore resting habitat mildly degraded Increased risk of exposure to low levels of pollution for waterfowl and seabirds near harbor	27 ha offshore resting habitat mildly degraded Increased risk of exposure to low levels of pollution for waterfowl and seabirds near harbor	30 ha offshore resting habitat mildly degraded Increased risk of exposure to low levels of pollution for waterfowl and seabirds near harbor

7.5 Endangered Species

Consultation with the National Marine Fisheries Service (NMFS) and the USFWS determined that the following species listed as endangered or threatened could be encountered at one or more of the alternative sites considered in detail or in the marine water surrounding Unalaska Island:

Plants – None
Insects and other invertebrate – None
Fish – Chinook salmon of Pacific Northwest stocks
Birds – Short-tailed albatross
Steller's eider
Mammals – Steller sea lion
Finback whale
Humpback whale
Sei whale
Blue whale
Sperm whale
Northern right whale

USFWS in early 2004 identified northern sea otters as a candidate species for listing.

No-Action Alternative. Endangered species use of the alternative sites, the lands around those sites, Unalaska Bay, and the marine waters of the Bering Sea and North Pacific Ocean would remain unaltered by this action.

LSA-North Alternative. Informal consultation with the NMFS early in this study determined that great whales and the listed stocks of Chinook salmon that might be present in the marine waters around Unalaska would be unaffected by construction and operation of the LSA-North alternative. Informal consultation between the Corps and NMFS led to determination by NMFS that the proposed action would not adversely affect Steller sea lions or adversely modify their habitat. Informal consultation would be reinitiated for review of plans for any blasting in or near the water at this site. Potential effects to sea lions are addressed in Section 7.3. Effects to sea lions would be minimized by plans to keep fish cleaning and other activities that might generate sea lion food out of the harbor. Harbor operators would be required to coordinate with NMFS before taking any action to displace sea lions from harbor floats.

Coordination with the USFWS for project effects to northern sea otters began in 2002, when it appeared that sea otters might be listed under the Endangered Species Act. The USFWS October 2003 draft biological opinion stated that the Service believed the proposed action would not jeopardize the continued existence of the southwest Alaska distinct population segment of northern sea otters. The USFWS suggested that this consultation report could satisfy Corps requirements for endangered species Section 7 consultation if the northern sea otter is listed in the future. The 2004 USFWS draft biological opinion (Appendix I) reaffirmed their earlier determination. The USFWS consultation addressed effects of the LSA-South alternative. The LSA-North site is immediately adjacent, and the same opinion would likely apply to that site if it was selected.

The potential for short-tailed albatross to be affected was addressed in the USFWS 2004 draft biological opinion (Appendix I). The USFWS concurred with the Corps determination that the action was not likely to adversely affect short-tailed albatross. The statement addressed effects of the LSA-South alternative. The LSA-North site is immediately adjacent, and the same opinion would likely apply that site if it were selected.

USFWS determinations in the 2004 draft biological opinion (Appendix I) related to Steller's eiders also specifically addressed effects of the LSA-South alternative. Potential for take might be reduced in the LSA-North alternative because less valuable forage habitat would be denied to Steller's eiders. Other effects would be similar (Section 7.4) and are addressed in more detail in the discussion of LSA-South alternative effects to Steller's eiders, which comes later in this section.

Combination Alternative. Expedition Inlet is not used to any great extent by any of the listed or candidate species discussed in this section. Potential effects would be similar to those identified for the LSA-North alternative.

LSA-South Alternative. Endangered species consultation completed to date identifies the same issues, consequences, and degree of impact from the LSA-South alternative to listed and candidate species as were identified for the LSA-North alternative, with the exception of Steller's eiders.

The 2004 draft biological opinion (Appendix I) prepared by the USFWS determined that construction and operation of a harbor at the LSA-South site would result in an estimated take of six Steller's eiders of the listed Alaska population over the 50-year project life.

The estimated take of Alaska population Steller's eiders was itemized as follows:

Loss of habitat	4
Collisions with vessels and structures	1
Chronic exposure to petroleum	1

The draft biological opinion also estimated that the listed Alaska population would reach functional extinction in 30 years, but that the losses associated with a new harbor at the LSA-South site would not accelerate the decline of this population. The draft biological opinion concluded that the LSA-South site alternative (as generally described in this report) would not be likely "to jeopardize the continued existence of the Steller's eider, and is not likely to destroy or adversely modify designated critical habitat."

The biological opinion (Appendix I) identified a comprehensive list of mandatory terms and conditions that included timing windows and other constraints to construction; area-wide agreements to plan for and manage petroleum spills; monitoring during and after construction; collection and care for birds injured or killed by collisions; area-wide cleanup of debris; collection facilities for nets, used oil, and other waste; educational signs and printed information to educate vessel operators about Steller's eiders and how injury to the eiders can be avoided; and other measures intended to minimize and avoid impacts to Steller's eiders. The Corps and the project sponsor (City of Unalaska) have generally concurred with the terms and conditions of the draft biological opinion.

The February 2004 biological opinion did not require conservation easements, land transfer, land set asides, or other land use restrictions as measures to avoid or minimize take of Steller's eiders or to avoid jeopardy to the listed Alaska breeding population of Steller's eiders. The biological opinion also did not determine that alteration or restoration of existing habitat was necessary to avoid jeopardy or to further minimize or avoid impacts to the Alaska breeding population of Steller's eiders. In effect, the biological opinion determined that measures to avoid or minimize effects of construction and operation at or immediately adjacent to the project site were the only measures required to avoid take of the Alaska breeding distinct population segment of Steller's eiders.

The revised Coordination Act report (Appendix H) does not address project effects on resources listed pursuant to the Endangered Species Act. It advises that consideration of project effects to listed species, project effects, and measures required to avoid/minimize effects and jeopardy are addressed in the biological opinion.

Summation.

Dredging, Fill, and Placement of Structures

LSA-North
- 1.7 hectares of potential sea lion and sea otter foraging habitat destroyed.
- 6.2 hectares of potential foraging habitat reduced in value.

Combination Alternative
- 2.2 hectares of potential foraging habitat destroyed.
- 7.5 hectares of potential foraging habitat reduced in value.

LSA-South
- 3.5 hectares of potential foraging habitat destroyed.
- 5.8 hectares of potential foraging habitat reduced in value.

Petroleum and Vessel Traffic

LSA-North
- 30 hectares of offshore resting habitat reduced in value.
- Increased risk of exposure to low levels of petroleum.

Combination Alternative
- 37 hectares of offshore resting habitat reduced in value.
- Increased risk of exposure to low levels of petroleum.

LSA-South
- 30 hectares of offshore resting habitat reduced in value.
- Increased risk of exposure to low levels of petroleum.

The potential for the three alternatives considered in detail to adversely affect listed species and their habitats is summarized in table 7-4. An asterisk notes where evaluation of affected resources and project effects strongly indicates that one alternative would likely have a greater effect than the other two. Information about relative value of habitat, relative abundance of organisms, and/or relative density and diversity of communities is reported in the text of this section.

Table 7-4. Summary of harbor construction and operation effects on listed species

Impacts of Construction and Operation on Habitat				
	Consequences of Construction Alternatives			
Resource	**No Action**	**LSA North**	**Combined**	**LSA-South**
Endangered Species	No additional impact	Sea lions and sea otters: 1.7 ha habitat destroyed 6.2 ha habitat moderately reduced in value Steller's eiders: 7.9 ha habitat destroyed	Sea lions and sea otters: 2.2 ha habitat destroyed 7.5 ha habitat moderately reduced in value Steller's eiders: 7.9 ha habitat destroyed	Sea lions and sea otters: 3.5 ha destroyed 5.8 ha habitat moderately reduced in value Steller's eiders: 9.3 ha habitat destroyed *
	Consequences of Petroleum Contamination and Vessel Traffic Alternatives			
Resource	**No Action**	**LSA North**	**Combined**	**LSA-South**
Endangered Species	No additional impact	30 ha resting offshore habitat mildly degraded Increased risk of exposure to low pollution levels for listed species near project site	27 ha offshore resting habitat mildly degraded Increased risk of exposure to low pollution levels for listed species near project site	30 ha offshore resting habitat mildly degraded Increased risk of exposure to low pollution levels for listed species near project site

7.6 Essential Fish Habitat

No Action Alternative. Essential fish habitat at the alternative sites, in the waters around those sites, in Unalaska Bay, and in the marine waters of the Bering Sea and North Pacific Ocean would remain unaltered by this action.

Action Alternatives. Each site considered for harbor construction at Unalaska would affect designated essential fish habitat (Section 6.4). Essential fish habitat would be directly impacted primarily through loss and alteration of habitat. Fish would permanently lose habitat under breakwaters and filled areas and would temporarily lose habitat in dredged areas. Dredged areas would recover and would be recolonized in time by at least some of the displaced species. From 6.5 to 9.6 hectares of essential fish habitat would be directly lost or altered through construction of a harbor in Unalaska.

Harbor projects can benefit some fish species at the expense of others. Pacific sand lance, sole, blennies, gunnels, and others that typically burrow in soft bottoms would lose habitat from construction of any of the alternatives considered in detail, while fish such as cod, pollock, greenlings, and rockfish that can occupy vertical habitats, could gain habitat. Pink salmon juveniles and other fish that migrate through near-shore waters could lose habitat and could be subjected to increased predation pressures if forced to move through deeper water around breakwaters. In that regard, excavation for mooring would cause a net reduction in habitat value for those fish. On the other hand, those species often school in large numbers in the protected waters of harbors. Fish passage breaches at the near-shore ends of the breakwaters mitigate the potential predation of juvenile pink salmon as they migrate along shore.

The three alternatives considered in detail would use floating concrete breakwaters. Floating concrete breakwaters alter habitat in ways that may be beneficial. The wetted surfaces would be designed to colonize with marine algae and invertebrates, and to serve as floating artificial reefs. Experience with floating breakwaters at Kodiak Island (USACE 2002) show that the breakwaters provide prime habitat for a variety of species that would otherwise not occupy a relatively pelagic environment. Floating concrete breakwaters at Port Lions and Kodiak, Alaska, serve as models to predict the potential colonization of floating breakwaters that would be placed at Unalaska.

The undersides of the floating concrete breakwaters at Port Lions were video taped during a biological survey in 2002 (USACE 2002). The breakwaters at Port Lions were heavily colonized with marine algae and invertebrates including heavy encrustations of blue mussels, anemones, barnacles, tubeworms, and bryozoans. Mobile invertebrates composed mostly of small crustaceans including crabs, amphipods, and shrimps were seen living among the algae and invertebrate colonies attached to the floating breakwaters. Marine algae hung several meters down into the water column from the floating breakwaters at Port Lions, and small fish were seen living among the algal fronds. Larger fish including Pacific cod and greenling were relatively abundant under the floating breakwaters. The floating concrete breakwaters at Kodiak were not video taped, but they appear to provide similar essential fish habitat.

Essential fish habitat in the Unalaska area includes habitat for crustaceans of commercial value including red king crab. Crab larvae require hard surfaces on which to settle and metamorphose through the juvenile stages. Rubblemound and floating breakwaters provide large areas of hard surface suitable for settling. These structures also provide protection from predators. Rubblemound and dredging footprints may result in the loss of some spawning habitat potentially used by female red king crab, but effects to this small amount of habitat would be mitigated by the large amount of potential settling and rearing area that would be gained.

Contamination of habitat due to small petroleum releases within harbors remains a problem and the risk of chronic contamination to essential fish habitat due to small releases of petroleum might increase because of a harbor at Unalaska. The number of vessels in the Unalaska area is not expected to increase because of a harbor, but there could be a redistribution of up to 75 vessels from Iliuliuk Bay to South Channel with construction of the proposed action. Low levels of petroleum compounds currently contaminate the LSA sites, and the moorage of 75 vessels would add at least a small increment to these existing contamination levels.

Summation.

<u>Dredging, Fill, and Placement of Structures</u>

LSA-North

- 1.7 hectares of fish habitat destroyed.
- 6.2 hectares fish habitat reduced in value.

Combination Alternative

- 2.2 hectares of fish habitat destroyed.
- 7.5 hectares of fish habitat reduced in value.

LSA-South
- 3.5 hectares of fish habitat destroyed.
- 5.8 hectares of fish habitat reduced in value.

Petroleum and Other Contaminants from Vessels

LSA-North
- 6.4 hectares inside harbor moderately degraded.
- 20 hectares surrounding harbor mildly degraded.

Combination Alternative
- 8.8 hectares inside harbor moderately degraded.
- 28 hectares surrounding harbor mildly degraded.

LSA-South
- 7.2 hectares inside harbor moderately degraded.
- 20 hectares surrounding harbor mildly degraded.

The potential for the three alternatives considered in detail to adversely affect essential fish habitat is summarized in table 7-5. An asterisk notes where evaluation of affected resources and project effects strongly indicate that one alternative would likely have a greater effect than the other two. Information about relative value of habitat, relative abundance of organisms, and/or relative density and diversity of communities is reported in the text of this section.

Table 7-5. Summary of harbor construction and operation effects on essential fish habitat

Impacts of Construction and Operation on Habitat				
	Consequences of Construction			
	Alternatives			
Resource	**No Action**	**LSA North**	**Combined**	**LSA-South**
Essential Fish Habitat	No additional impact	1.7 ha EFH destroyed 6.2 ha EFH moderately reduced in value	2.2 ha EFH destroyed 6.5 ha EFH moderately reduced in value	3.5 ha EFH destroyed 5.8 ha EFH moderately reduced in value *
Definitions: Destroyed means a total or a significant loss of existing habitat. Reduced in value means that a habitat would change downward in value for use by a species or community. Created means habitat that could be used by a species or community is made available as a result o f the project. * indicated greatest potential for adverse effect based on resource values identified in the text of section 7.4-7.6.				
	Consequences of Petroleum Contamination and Vessel Traffic			
	Alternatives			
Resource	**No Action**	**LSA North**	**Combined**	**LSA-South**
Essential Fish Habitat	No additional impact	6.4 ha intertidal-subtidal habitat inside harbor moderately degraded 20 ha surrounding harbor mildly degraded	8.8 ha intertidal-subtidal habitat inside harbor moderately degraded 28 ha surrounding harbor mildly degraded	7.2 ha intertidal-subtidal habitat inside harbor moderately degraded 20 ha surrounding harbor mildly degraded

Definitions: Degraded means that habitat has become less effective for use by a species or community. * indicates greatest potential for adverse effect based on resource values identified in the text of section 7.4-7.6.

7.7 Cultural Resources

7.7.1 Effects on Traditional and Personal Use

No-Action Alternative. The community will continue to use the area for crabbing, some fishing, and plant collecting if no harbor is constructed.

LSA-North Alternative. This area is not known as a good place to collect invertebrates or to place crab pots. Some plant collecting takes place in the area of the north alternative. About 0.11 hectare of the upper intertidal zone and 0.60 hectare of vegetated uplands would be filled for a staging area, causing a loss of plants and plant collecting activity in the area. Quarry expansion could remove an additional area of up to 4 hectares from personal use plant collecting.

Combination Alternative. The effects on the LSA-North portion of this alternative would be the same as above. Like the Little South America area, water quality in the Expedition Inlet area is poor because of contamination from petroleum hydrocarbons and fish processing wastes. As a result, no traditional and personal use collection of intertidal invertebrates is known to take place in Expedition Inlet. This alternative would not have a significant effect on crabbing, fishing, or plant collecting activities. However, this alternative would cover approximately 1.3 hectares of shrubby vegetation potentially with sparse berry bearing species, 2 or more hectares of additional area from quarry expansion, and 0.2 hectare of intertidal area.

LSA-South Alternative. Use of the intertidal zone at this site was well documented in interviews and other accounts collected in the last several decades. That use has declined for a variety of reasons including water quality degradation in the area and potential for paralytic shellfish poisoning. Recent interviews (Veltre 2003) did not specifically identify anyone who still collects shellfish or other traditionally harvested invertebrates from the intertidal zone at LSA-South for human consumption. This suggests that construction of a harbor at that site would not substantially affect current personal use or subsistence practices associated with that intertidal community by any group of people in Unalaska.

Parts of the mooring basin, entrance channel, and breakwaters for this alternative would be in waters that continue to be used for personal use crab fishing, presumably by both Natives and non-Natives. That use would be displaced by harbor structures and activity. Displacement could be to adjacent waters of South Channel or to other waters around Unalaska. A number of locations in the vicinity are regularly fished by personal use crabbers. Crab pots often are set just outside harbors in other areas of Alaska, so the presence of a harbor at LSA-South would not cost crabbers much more fishing area than the harbor area itself (about 10 hectares). The number of crab buoys and buoy markings indicate that as many as four crabbers may use the area at once. The proposed action would displace a small amount of crabbing effort by a maximum of about four users from a small area that is one of many areas used for personal use crabbing in the Unalaska area.

Plants are collected for personal use throughout the Unalaska area, including on the LSA peninsula. There is no indication the water quality effects that have stopped collection of intertidal invertebrates has affected collection of plant material in this area. Quarry development and other activity have removed plants in an area of about 2 hectares adjacent to and above the LSA-South site. Luxuriant vegetation still grows on the steep hillside between the harbor site below and the quarry above. The hillside is about 15 meters wide between the quarry and the beach and runs the full length of the hillside. Quarry expansion, if the quarry is used as a rock source for the proposed action, and construction of other project features would destroy at least some of the vegetation below the quarry (about 1.5 hectares). Other project features might destroy an additional 0.5 hectare. Altogether, a maximum of about 2 hectares of vegetation of potential value for personnel use might be destroyed by the proposed action.

The LSA peninsula, an area of about 250 hectares, has been identified as a popular place to collect plants, but the plant species there are widely available in the Unalaska area. People who collect plant material from that site now might have to go a short distance farther to collect the same plants, but the nutritional losses would not be substantial and there would be no substantial disproportionate effect to any minority .

7.7.2 Effects on Cultural Values and Identity

No-Action Alternative. There would be no effect on cultural values or identity if the no action alternative was chosen.

Action Alternatives. Effects on traditional values and cultural needs with regard to subsistence cannot be quantified, but may be more important than loss of habitat. As summarized by Veltre (2003):

> "As measured only in terms of the number of residents who use LSA for subsistence purposes, the effects of the proposed harbor project will seemingly be minimal. The uniqueness of LSA lies primarily in its proximity to the city and its relatively natural, undisturbed habitat. Harbor construction there will certainly continue what is seen by some to be a long history of uncoordinated development ultimately destructive to subsistence activities and traditional Aleut values."

Many areas that were traditionally used for subsistence purposes at Unalaska are no longer used, or their use has been modified by development and by competition for limited resources. Subsistence practices have adapted to include collection of resources that were not commonly used in the past (e.g. king crab), sharing of food and materials obtained commercially, and faster travel to more distant sites for collection of subsistence foods and for enjoyment of the natural environment. There also is potential for water quality to improve to the point that marine resources not collected now could be acceptable later. Construction of any of the alternatives considered in detail would irretrievably destroy resources inside the harbor and would reduce the acceptability of resources from nearby intertidal areas.

7.7.3 Archaeological and Historical Resources

No-Action Alternative. There would be no effect on archaeological and historical resources if the no-action alternative was chosen.

Action Alternatives. All three action alternatives are within the boundaries of the Dutch Harbor Naval Operating Base and Fort Mears, U.S. Army, National Historic Landmark (NHL). There are no contributing properties to the NHL in the area that would be impacted by any alternative considered in detail. However, construction of any of the action alternatives would adversely affect the World War II landscape (as defined by Section 106 of the National Historic Preservation Act). All the action alternatives would induce additional effects to the landscape of the historic landmark by increasing traffic and development.

Effects on archeological sites and the World War II landscape, whether direct or cumulative, would be addressed in consultation with the City of Unalaska, the Qawalangin Tribe of Unalaska, the National Park Service, and the Alaska State Historic Preservation Officer as required under Section 106 of the National Historic Preservation Act.

LSA–North Alternative. The Amaknak Bridge archaeological site (UNL-000050) is on the northern edge of this alternative and would be significantly affected by this alternative. This site has been attributed to the Margaret Bay phase (Bacon 1977; Knecht and Davis 2001; McCartney 1984; Yarborough 1989) and is currently being excavated in conjunction with the realignment of the bridge. Use of the existing quarry would affect a recently reported archaeological site, as discussed for the LSA-South alternative.

Combination Alternative. No archeological sites have been reported in the immediate area of Expedition Inlet. Effects of the LSA-North portion of this alternative are the same as above. Use of the quarry could impact a recently reported archaeological site (no AHRS number) and the alternative would significantly affect the Margaret Bay archaeological site.

LSA–South Alternative. Two archeological sites have been reported near the LSA-South alternative. One site (UNL-00047) has been determined eligible for the National Register of Historic Places under Criterion D for its potential to yield information important to our understanding of history. This site is estimated to be particularly important because few sites older than 3,000 years have been excavated in the Aleutian Island chain. Construction of the LSA-South alternative would have an indirect effect on UNL-00047 due to increased traffic and development. The second archaeological site (no AHRS number) is along the edge of the quarry. It is also estimated to be more than 4,000 years old, but no determination of eligibility has been made. If the quarry was developed, the quarry development plan would address the effects or plan to avoid impacts to the site.

Several other cultural resources are in the LSA-South area. In the mid-1970s, a barge sank off the southeast shore of Little South America. The barge was determined to be not eligible for the National Register of Historic Places. Pilings from a pre-World War II herring saltery and dock (UNL-00291) are in the area of the LSA-South alternative. The pilings were documented and found to be ineligible for the National Register of Historic Places. Both cultural resources would not be significantly impacted by the LSA-South alternative because they are not eligible for the National Register and do not embody characteristics unique to the area.

7.8 Land Use

7.8.1 Current Land Use

No-Action Alternative. Land use and availability of lands for development would remain unchanged. Tidelands at Little South America and Margaret Bay and uplands adjacent to the tidelands could be developed if required to support community needs and to produce income for the community and its people.

Action Alternatives. The three action alternatives considered in detail are consistent with all current zoning and land use planning for Unalaska. They would produce local changes in traffic and could induce local changes in commercial activities, but would have little effect on overall land use practices in the Unalaska area.

7.8.2 Land Ownership

No-Action Alternative. Land ownership in Unalaska and in the Aleutian Islands would remain unchanged. Tidelands at Little South America and Margaret Bay would continue to be owned, with few realty restrictions, by the City of Unalaska and the Ounalashka Corporation. USFWS would retain rights to control development of subsurface resources at Little South America.

Action Alternatives. Land ownership would not be substantially altered by any of the alternatives considered in detail. No lands would be taken against the wishes of the owner. No Native-owned lands would be acquired for any of the alternatives, although the project sponsor expects to acquire the use of some land adjacent to the LSA-South site if a harbor is constructed there. The Ounalashka Corporation has agreed to allow the City of Unalaska to use about 0.4 hectare of land at the existing quarry to be used for facilities and access required to operate a harbor at the LSA-South alternative site.

Mitigation Alternatives. Land use restrictions as compensatory mitigation alternatives considered in Section 4.4.2 would substantially reduce landowner control and use of tidelands put into conservation easements or otherwise restricted by compensatory mitigation required for any of the action alternatives. Landowner ability to beneficially use uplands adjacent to tidelands set aside as conservation easements also would be diminished.

7.8.3 Special Designation Public Lands

No-Action Alternative. Parks, refuges, national historic landmarks, and other special designation lands of Unalaska and the Aleutian Islands would remain unchanged.

LSA-North Alternative. All the alternative sites considered in detail are in the Dutch Harbor Naval Operating Base and Fort Mears, U.S. Army, National Historic Landmark (NHL). Potential effects to those lands are addressed in Section 7.6.3.

Much of the land in the Aleutian Islands is in the Alaska Maritime National Wildlife Refuge. There are no refuge lands adjacent to or close enough to any of the alternatives considered in detail to be affected directly by a project. None of the alternatives would affect national, state, or local parks, except as stated below. No wild and scenic rivers, farmlands, estuaries, coral reefs, barrier islands, designated critical habitats, or other lands with special designation would be affected.

Combination Alternative. Public lands used as a park adjacent to Expedition Inlet would be impacted visually and by the sounds and activity of a harbor at that site. Those effects would be similar to those now experienced, but intensified by increasing the number of boats harbored there.

LSA-South Alternative. Effects would be the same as for the LSA-North alternative.

7.8.4 Coastal Management Plans

No-Action Alternative. Coastal zone planning for Unalaska and the Aleutian Islands would remain unchanged. The No-Action alternative would be consistent with existing planning.

Action Alternatives. Each alternative considered is consistent with the enforceable and administrative policies for implementation of the Coastal Management Program adopted by Aleutians West Coastal Resource Service Area (AWCRSA), in 1991 (as revised). Applicable standards related to harbor construction at the three sites considered in detail are listed in Section 6.7.5.

7.9 Cumulative Impacts

The existing, active quarry at the southern end of LSA-South can be expected to continue to operate to meet demand for rock. No other specific development plans are known for any of the sites considered in detail. The east coast of Little South America is one of relatively few coastal sites that is naturally protected from high-energy waves and that has not been developed or redeveloped since the U.S. military left almost 60 years ago. If there is no Federal action to construct a harbor on the coast of Little South America, then the landowners are likely to look for other commercial uses that would improve the economic base of the City of Unalaska and generate profits for the Ounalashka Corporation. If a harbor is constructed on the eastern coast of LSA, then land owners are likely to look for commercial uses for the remaining lands.

Construction and other actions that cause direct environmental effects or other changes also may cause, add to, or lead to other effects. These additional effects may be termed "secondary effects," and may include direct secondary effects, additive or cumulative effects, and induced or indirect effects. These secondary effects may be defined in various ways. General definitions with examples used in this FR/EIS are listed below:

- Direct secondary effects are required to make a project function. For a project at Unalaska, secondary impacts might include construction of a harbormaster's office, development of adjacent lands for operations requirements, and project maintenance.

- Additive effects usually are effects from one action added to those of other similar actions that already exist in a particular environment. Effects of any harbor project would be additive to other existing marine coastal development. Cumulative effects may also include reasonably foreseeable future effects of both a proposed action and other actions in a particular environment. Environmental effects of new navigation facilities at Unalaska, plus existing navigation and loading facilities, added to future shoreline development in the region would cumulatively affect resources that depend upon the shoreline habitat.

- Induced or indirect effects are actions that may make it more likely that other actions will occur later. These effects are said to "open the door" to other development or activity. For example, if a harbor at Unalaska would bring additional development to the project area, then the effects of that change would be called induced or indirect effects.

7.9.1 Direct Secondary Effects

No-Action Alternative. No direct secondary effect.

Action Alternatives. Construction of moorage docks and floats, staging areas, and mooring basins would not be a Federal responsibility, but would cause direct rather than secondary effects. Construction of a harbormaster's office, restrooms, parking, and access to the project, along with bringing utilities to the project could be considered secondary impacts. These secondary effects would be similar for each alternative. Areas that would be affected and precise locations of effects cannot be predicted with certainty at this stage of the project. There is enough information, however, to determine that this secondary development would (with appropriate safeguards) not cause significant impacts.

Utilities would be expected to run under or along existing roadways that are already impacted by development. Existing statutes for protection of resources would regulate construction. None of the alternatives considered in detail would be expected to require maintenance dredging during the project's economic life, so those indirect effects would be avoided. Periodic maintenance of breakwaters, floats, and other facilities would not be expected to cause significant impacts. The contractor would select the source for any rock required for project construction. The existing LSA quarry is a likely source, but there is no guarantee that the contractor would use that site or that the rock from that quarry would be acceptable for construction. The contractor would be required to provide a quarry development plan if they proposed to substantially expand an existing quarry or open a new quarry. The plan would be reviewed for coastal consistency, if necessary, and specific measures would be incorporated to mitigate impacts. Reviewing agencies and other interested parties would be asked whether additional coordination under the National Environmental Policy Act (NEPA) should be considered.

Harbor support facilities for the Combination alternative probably would be constructed in uplands and filled areas adjacent to the Expedition Inlet site and in the existing quarry site at Little South America. Support facilities for the LSA-North and LSA-South sites would likely be constructed in the areas filled with dredged material and in the existing quarry site. If the quarry was expanded by rock production, then that additional area could also be used.

Secondary impacts from quarrying could be subject to additional NEPA review. Other secondary development would be expected to cause impacts that would be local in area affected, and less than significant in the context of their contribution to both local and regional cumulative effects.

7.9.2 Additive or Cumulative Secondary Effects

No-Action Alternative. No effect.

Action Alternatives. Project effects at Unalaska would be additive to other local and regional coastal marine and shoreline development. In the Unalaska area, marine development is extensive by Alaska standards, but a relatively small area of shoreline and adjacent marine submerged lands at Unalaska are directly modified by structures. Those areas include fill and dredging for World War II and post-war construction, docks, outfalls, and other in-water structures and construction. Altogether, this construction might involve, if individual sites were added together, to less than 10 km of shoreline development and less than 2 km^2 of direct development in marine waters. A harbor at Expedition Inlet and LSA-North together would add 900 meters of shoreline development and about 9.6 hectares (about 0.1 km^2) of marine development to that total. The LSA-North development alone would add about 500 meters of shoreline development and about 8.1 hectares of marine development. The LSA-South alternative would add about 700 meters of shoreline development and about 9.3 hectares of marine development.

Effects of development are felt over larger areas than are directly disturbed by development. Seafood processing wastes and petroleum spills associated with activities in Unalaska, one of the world's great fishing ports, have degraded water quality in larger areas of Unalaska Bay and in the smaller marine water bodies that surround Unalaska and have adversely affected habitat and marine biota in those areas. Any of the harbor alternatives considered in detail would redistribute vessels mooring in the Unalaska area, but would have no net effect on seafood processing or other activities that might contribute to water quality or habitat degradation. Redistribution of moorage could reduce water quality impacts in some areas while increasing those impacts in the vicinity of a new harbor.

Regionally, the effects of shoreline and marine development would add a very small increment of development to the existing relatively minor development that affects small percentages of the shoreline and marine environment in the Aleutian Islands. The Aleutian Islands have an estimated shoreline length of about 10,000 km. Total development from current activities is confined to the communities listed in table 6-1, with a total population of less than 6,000. Altogether, the additive effects of harbor shoreline and marine development would be minor in a regional context and there would be no regional effects related to boat traffic or resource extraction.

Future development could add cumulatively to effects of existing development on Unalaska and Amaknak Islands and to effects of other development in the Aleutians. There does not seem to be much likelihood that any commercial resource extraction other than commercial fishing will be developed to a great extent at Unalaska in the foreseeable future. Major development of transportation facilities could produce cumulative impacts. Harbor and airport development at Unalaska and on other islands of the Aleutians can be expected to add an increment of development in the foreseeable future and might affect as much as several kilometers of shoreline in the foreseeable future. At Unalaska, state and federal planners are planning to relocate the Bridge-to-the-Other Side and extend the airport. Similar planning is being conducted at other sites throughout the Aleutians, and together, they could produce a cumulative impact that someday could affect several kilometers of the total shoreline length in the Aleutian Islands.

Development is likely to continue on the Little South America peninsula of Amaknak Island. The existing quarry is in a location convenient to future needs for rock and where flat land produced by quarrying would be commercially valuable. It is reasonable to expect that the quarry will expand in the foreseeable future, with or without the proposed harbor at LSA-South. Ultimately, the quarry and development on land re-contoured by quarrying could encompass a sizable part of the southern segment of Little South America. Sites at Unalaska where the shoreline can be developed are limited. This development will affect plants and animals that inhibit the uplands, cultural resources in the National Historic Landmark, and collection of plants and animals for personal use. The eastern coastline of Little South America is comparatively well protected, close to other development, and zoned for commercial and industrial use. It is likely to be developed in the reasonably foreseeable future whether or not the Federal government participates in constructing a harbor there. If a harbor is constructed at any location on the eastern shoreline of Little South America, whether by the Federal government or some other entity, the proximity of development could influence additional development in the surrounding lands and waters.

Development in the Aleutians can be expected to affect both biological and cultural resources. Upland plants and the limited upland fauna will be displaced locally, although regional abundance will be maintained by protective land status. Marine resources will be affected locally by in-water development and over wider, but still limited, areas by petroleum and processing wastes generated by in-water and shoreline development and activities. Effects will be broader than the direct effects of in-water development, but will be limited to, and localized at the few developed areas of the Aleutian Islands.

Development in the Aleutians is tied to resource extraction. Resource extraction is primarily associated with the seafood industry. Fisheries resources are exploited to capacity now and are unlikely to produce substantially more in the foreseeable future. Most new development is relatively minor and localized, and generally is for the purpose of making existing resource extraction more efficient and less costly. This is likely to limit the scale of future development and the potential for adverse effects from that cumulative development.

7.9.3 Induced or Indirect Effects

No-Action Alternative. No effect.

Action Alternatives. Construction of new moorage at the Expedition Inlet site would be relatively close to existing commercial and retail businesses. Harbor development at this site would be unlikely to induce much additional development.
Construction of a new harbor at the LSA-North or LSA-South sites would use all the land created by shoreline filling for direct support of harbor operations. The nearby quarry could be developed to provide additional services from the harbor operator and/or private enterprises. Neither LSA harbor site would be far from stores and other services, but small retail or services businesses could grow around the harbor. On the other hand, 75 boats is not a large customer base, and existing stores and other services are less than 2 km from either site.

Construction of any of the alternatives could increase the likelihood that another harbor would be constructed on adjacent tidelands at Little South America sometime in the future. Analysis of alternatives in Section 4 showed that the only economically feasible development for vessels of the 24 to 45-meter design fleet would require construction on the eastern coast of Little South America, although vessels of other lengths might be economically protected by another alternative. Constructing the recommended plan at LSA-South would leave the LSA-North site as a likely candidate for future construction. Impacts of constructing a harbor at the LSA-North site are defined in this FR/EIS. Upland development to support one harbor at Little South America could be used, at least in part, to support an adjacent harbor or a harbor expanded into adjacent waters.

Fueling facilities could be developed in any of the new harbor sites, but high-volume fueling operations already operate less than 3 km from each alternative considered in detail. More than 70 million gallons of fuel are transferred through Unalaska each year. The 75 boats in the design fleet represent a small percentage of that consumption and would provide little incentive for developing fueling facilities in any of the harbor alternatives considered in detail.

Construction of any of the alternatives considered in detail is not expected to alter fisheries, total fish catch, vessel traffic in the North Pacific Ocean and Bering Sea, or other regional resource extraction or transportation attributes. Appendix B shows that the project would provide protected moorage for vessels already present and participating in the fisheries, and that the project would not attract new vessels into resource extraction or transportation in the North Pacific Ocean or Bering Sea.

7.10 Irretrievable and Irreversible Commitment of Resources

No-Action Alternative. No effect.

Action Alternatives. Construction of any one of the alternatives considered in detail would irretrievably and irreversibly convert the following areas of marine and intertidal habitat into a harbor:

Alternatives	Hectares
LSA-North	6.5
Combination	9.6
LSA-South	9.3

The altered habitat would support a different assemblage of marine-dependant organisms. Section 7.3 discusses those alterations in habitat, the populations that would lose habitat, and the broader effects on the area around Unalaska. Those habitat alterations would last for the 50-year economic life of the project and could be expected to continue for a much longer time. Those habitat alterations should be considered permanent from a Federal decision making perspective.

Construction of any one of the alternatives considered in detail would irretrievably and irreversibly commit energy as fuel for transportation and construction of the selected project. Extraction of rock for the rubblemound breakwater, placing the rock, dredging, mobilizing equipment and materials to the site, and other activities required to construct a harbor would expend irreplaceable fossil fuels. Construction of any one of the alternatives considered in detail would use less than 4 million liters of fuel, primarily diesel fuel, and other petroleum products. Operation and maintenance of any one of the alternatives considered in detail also would expend small amounts of fuel (less than 10,000 liters per year) of both diesel and gasoline. Production of electricity for harbor operation would also use fuel, but that generation would largely replace the less efficient generation of electricity by individual vessels, so net fuel use would not be increased appreciably by harbor electrical usage.

Fuel savings would be one of the primary economic benefits that would be produced by any of the alternatives considered in detail. Vessels based out of Unalaska for seasonal fishing often return to home ports between seasons, at a substantial cost in fuel. One 40-meter fishing boat might burn more than 75,000 liters (3.78 liters per gallon) of diesel in a single round trip between Unalaska and Seattle. Over the 50-year economic life of the project, a single boat of this size making one round trip to Seattle each year would use an estimated 1.3 million liters of diesel. Many of the 75 boats that would use the harbor would be home-ported at other harbors in Alaska or the Pacific Northwest. Those boats sometimes would return to their home ports between seasons, but many would remain at Unalaska if protected moorage was available. The economics appendix (Appendix B) estimates that vessels home ported in the Pacific Northwest alone could each save $28,600 annually in fuel, lubricant, and hydraulic costs per year. Most of this expense would be for diesel at an estimated cost of about $0.44 per liter, so close to 4 million liters of diesel might be saved each year by Pacific Northwest home-ported vessels alone. Other savings would be realized by supplying moored vessels with land-based electrical generation and in reduction of fuel used to move rafted vessels.

Altogether, fuel savings every year could equal or more than equal all the fuel expended to construct a harbor with an economic life of 50 years and with a useful life of many more years. Over the 50-year economic project life, the project could allow approximately 200 million liters of diesel and other petroleum products to be saved, and a far larger amount could be saved over the useful project life.

8.0 LIST OF PREPARERS AND CONTRIBUTORS

The persons listed in this table contributed to the preparation of this draft document through planning, research, data collection, writing, editing, and reviewing this draft environmental impact statement as indicated. The U.S. Army Corps of Engineers Alaska District also acknowledges the many unnamed persons who contributed to the preparation of this draft environmental impact statement. Persons other than those listed contributed to our understanding of local traditional knowledge and customs. Others assisted with the physical labor and technical advice necessary to make the preparation of this environmental impact statement a success.

Alan Jeffries, PE. Mr. Jeffries has a Bachelor of Science degree in environmental engineering and a Master of Science degree in civil engineering. He is a professional civil engineer (PE) and has 12 years experience with the Alaska District, U.S. Army Corps of Engineers. Mr. Jeffries prepared the Hydraulics Design appendix and provided the coastal and hydraulics engineering detail necessary to produce this integrated report.

Bret Walters. Mr. Walters has a Bachelor of Science degree in physical science and 10 years work experience with the Alaska District, U.S. Army Corps of Engineers. He authored the physical environment sections in Sections 6 and 7.

Chris Hoffman. Mr. Hoffman has a Bachelor of Science degree in biology, and is currently a Master of Science candidate in biology at the University of Alaska Anchorage. Mr. Hoffman has 4 years experience as a biologist with the Alaska District, U.S. Army Corps of Engineers. Mr. Hoffman led the Steller's eiders surveys and contributed to other biological field research.

Clarke Hemphill, PE. Mr. Hemphill is a professional engineer (PE) and has a Bachelors of Science degree in civil engineering. He has 24 years experience as a professional civil engineer including 22 years with the Alaska District, U.S. Army Corps of Engineers. Mr. Hemphill is the senior planner for navigation improvements at Unalaska and for this integrated report.

David Broadfoot. Mr. Broadfoot has a Master of Science degree in ecology and is employed as a senior biologist by the consulting firm Tetra Tech, Inc. He participated in data collection and writing of Section 6.1 and in other parts of Chapter 6 related to land use, transportation and the communities of the region.

Diane Walters. Ms. Walters has a Bachelor of Arts degree in communications and has worked in the communications field 24 years including 16 years as a writer/editor with the U.S. Army Corps of Engineers Alaska District. Ms. Walters edited and organized the sections and appendixes of this report.

Elaine Sealock, PhD. Dr. Sealock holds a Bachelor of Arts degree in economics, and Master and Doctorate degrees in public administration. She has 40 years work experience in economics, statistics, and public administration including 4 years with the Alaska District, U.S. Army Corps of Engineers. Dr. Sealock contributed to the economic analysis and justification of navigation improvements at Unalaska, and wrote the economic appendix.

Estrella Campellone. Mrs. Campellone has Bachelor of Science degree in forestry/watershed management, a Master of Science degree in environmental sciences and biology, and a certificate on soil surveys using satellite imagery. She has 5 years experience working as a biologist. Mrs. Campellone characterized and evaluated impacts to vegetation, and prepared figures used in this report.

Greg Macheak. Mr. Macheak has a Master of Arts degree in English and has worked in the field of technical and expository writing for 12 years including 5 years as a writer/editor with the Alaska District U.S. Army Corps of Engineers. Mr. Macheak provided editing services for the Economics Appendix .

Guy McConnell. Mr. McConnell has a Master of Science degree in zoology. He has worked in environmental impact analysis for 32 years on a wide range of projects. He has lived and worked in Alaska for more than 26 years and has worked in the Alaska District, U.S. Army Corps of Engineers as a biologist for 25 years. Mr. McConnell was the team leader for the EIS contents and contributed to all sections.

Inocencio Roman. Mr. Roman has a Bachelor of Science degree in civil engineering and 15 years work experience including 4 years with the Alaska District, U.S. Army Corps of Engineers. Mr. Roman assisted with graphics and computer services that contributed to the writing of this integrated report.

John Burns. Mr. Burns has a Bachelors of Science degree in fisheries and has worked as a biologist in Alaska for 30 years and retired after 26 years with the Alaska District, U.S. Army Corps of Engineers. Mr. Burns assisted with Steller's eiders surveys and contributed to the sections on the existing environment.

Larry Bartlett. Mr. Bartlett has Master of Science degree in zoology and has worked as a biologist in Alaska for 32 years, including 5 years with the Alaska District, U.S. Army Corps of Engineers. Mr. Bartlett helped prepare sections on the existing environment and environmental consequences sections.

Lizette Boyer. Ms. Boyer has a Bachelor of Arts degree in anthropology and has 22 years of experience as a biologist with the Alaska District, U.S. Army Corps of Engineers. Ms. Boyer contributed to the existing environment section.

Margan Grover. Ms. Grover has a Master of Arts degree in anthropology and has 9 years experience in anthropology/archeology and 4 years experience with the Alaska District, U.S. Army Corps of Engineers. Ms. Grover contributed to the existing environment and consequences sections.

Sterlin Hill, Jr. Mr. Hill has an Associate of Arts degree in accounting and 15 years work experience including 7 years with the Alaska District, U.S. Army Corps of Engineers as a Dataflow of Alaska, Inc. contractor. Mr. Hill assisted with the production of this report by providing essential administrative services.

Wayne Crayton. Mr. Crayton has a Master of Science degree in botany. He has 26 years experience, including 8 years with the Alaska District, U.S. Army Corps of Engineers as a biologist. Mr. Crayton contributed to field research and mapped the intertidal reef habitat at the Little South America South alternative site described in the existing environment section.

William Abadie. Mr. Abadie has a Master of Science degree in biology and 17 years experience, including 12 years as a biologist with the Alaska District, U.S. Army Corps of Engineers. Mr. Abadie assisted with data collection and contributed to the existing environment section.

9.0 PUBLIC INVOLVEMENT

An agency scoping and pre-application meeting was held on June 8, 1999, at the Alaska Division of Governmental Coordination in Anchorage to discuss construction of a small boat harbor in Unalaska/Dutch Harbor. A public notice and environmental assessment, *Navigation Improvements, Unalaska, Alaska* was distributed for public review on August 4, 2000. The Federal portion of the review was completed while the State review under the Coastal Zone Management Act was stopped for additional information concerning project impacts. The Finding of No Significant Impact was not signed because further information was needed concerning subsistence, public opinion, endangered species, and secondary and cumulative impacts.

An interim government-to-government meeting with the Qawalangin Tribe was held in Unalaska on May 25, 2001, to discuss the proposed boat harbor and the effects to the tribe. The Qawalangin Tribe discussed the project with the Corps and requested to be involved in all agency and public meetings.

A public meeting was held on June 16, 2001, in the council chambers at City Hall in Unalaska. Another meeting was held on July 9, 2001, to discuss mitigation opportunities; representatives from the City of Unalaska, Ounalashka Corporation (the land owner), and an administrator from the Qawalangin Tribe attended. A formal government-to-government consultation was held on August 28, 2001, in Unalaska between the Qawalangin Tribal Council and the Alaska District Commander.

A second environmental assessment, *Navigation Improvements, Draft Feasibility Report and Environmental Assessment, Unalaska, Alaska*, was distributed in August 2001. Another public meeting/hearing was held on August 30, 2001, in Unalaska about 2 weeks after the environmental assessment was distributed for public review. The environmental assessment concluded that the proposed project could result in significant impacts and that an environmental impact statement should be prepared if the proposed action would construct a harbor at the Little South America - South site.

The Corps met with representatives of the Qawalangin Tribe of Unalaska on February 1, 2002, at the tribe's office in Unalaska. The meeting was held to solicit comments from the tribe regarding their concerns about the project and the process. On February 2, 2002, a public scooping meeting was held at the Grand Aleutian Hotel in Dutch Harbor.

Numerous agency planning meetings were held throughout the study both in Anchorage and Unalaska. Attendees included U.S. Fish and Wildlife Service, National Marine Fisheries Service, Alaska Department of Governmental Coordination, Alaska Department of Fish and Game, Qawalangin Tribe, Aleutians West Coastal Resource Service Area, and the City of Unalaska.

A Notice of Intent to prepare a draft environmental impact statement for navigation improvements at Unalaska was posted in the November 30, 2001 Federal Register (volume 66, number 231). The notice invited the public to identify concerns, issues, information, and alternatives that should be considered.

The Alaska District, on June 14, 2004, released a public notice advertising availability of the Unalaska Navigation Improvements Draft Integrated Feasibility Report and Environmental Impact Statement. The notice also gave notice of a public meeting to answer questions and hear comments. The Federal Register published a notice of availability for the draft on June 15, 2004. A public meeting was held at Unalaska on July 21, 2004. The meeting was well attended, with most questions and concerns related to potential for local use of the proposed harbor.

Dr. Douglas Veltre was contracted to describe subsistence activities, with emphasis on Native subsistence, and to scope public concerns related to the potential impact of a harbor at Little South America. Dr. Veltre interviewed both Alaska Native and non-Native individuals engaged in subsistence activity or known for their knowledge about the subject. The study identified subsistence resources and practices, as well as some individual's concerns about potential impacts from the proposed navigation improvements at Little South America. The study was not quantitative, but reflects some informant's subsistence practices rather than on subsistence as a whole.

The Qawalangin Tribe of Unalaska has been an active participant in bi-weekly meetings during preparation of the environmental impact statement/feasibility report. The meetings were held between the Corps, the stakeholders (the City of Unalaska and resource agencies), and the Qawalangin Tribe of Unalaska. During the meetings, concerns and comments from both stakeholders and the public were discussed, as were issues involved in the process of developing the environmental impact statement and feasibility report.

10.0 CONCLUSIONS AND RECOMMENDATIONS

10.1 Conclusions

The studies documented in this report indicate that the Federal construction of navigation improvements with rubblemound breakwaters, as described in the NED/recommended plan, is technically possible, economically justified, and environmentally and socially acceptable. Of the alternatives evaluated in this study, the LSA-South Mussel Bed Avoidance plan is found to maximize the net NED benefits and provide acceptable mitigation; thus, it is designated the NED/recommended plan. The City of Unalaska is willing to act as local sponsor for the project and fulfill all the necessary local cooperation requirements. Therefore, the Federal Government in cooperation with the City of Unalaska should pursue the LSA-South Mussel Bed Avoidance plan, which is the NED/recommended plan.

10.2 Recommendations

I recommend navigation improvements at Unalaska, Alaska, be constructed generally in accordance with the recommended plan herein, and with such modifications thereof as in the discretion of the Chief of Engineers may be advisable, at an estimated total Federal cost of $11,133,000 and $42,000 annually for Federal maintenance, provided that prior to construction the local sponsor agrees to the following:

a. Enter into an agreement, which provides, prior to execution of the project cooperation agreement, 25 percent of design costs;

b. Provide, during construction, any additional funds needed to cover the non-federal share of design costs;

c. Provide, during the period of construction, a cash contribution equal to the following percentages of the total cost of construction of the general navigation features (which include the construction of land-based and aquatic dredged material disposal facilities that are necessary for the disposal of dredged material required for project construction, operation, or maintenance and for which a contract for the federal facility's construction or improvement was not awarded on or before October 12, 1996;): 10 percent of the costs attributable to dredging to a depth not in excess of 20 feet; plus, 25 percent of the costs attributable to dredging to a depth in excess of 20 feet but not in excess of 45 feet; plus 50 percent of the costs attributable to dredging to a depth in excess of 45 feet;

d. Pay with interest, over a period not to exceed 30 years following completion of the period of construction of the project, up to an additional 10 percent of the total cost of construction of general navigation features. The value of lands, easements, rights-of-way, and relocations provided by the non-Federal sponsor for the general navigation features, described below, may be credited toward this required payment. If the amount of credit exceeds 10 percent of the total cost of construction of the general navigation features, the non-Federal sponsor shall not be required to make any contribution under this paragraph, nor shall it be entitled to any refund for the value of lands, easements, rights-of-way, and relocations in excess of 10 percent of the total cost of construction of the general navigation features;

e. Provide all lands, easements, and rights-of-way, and perform or ensure the performance of all relocations and deep draft utility relocations determined by the Federal Government to be necessary for the construction, operation, maintenance, repair, replacement, and rehabilitation of the general navigation features (including all lands, easements, and rights-of-way, and relocations necessary for dredged material disposal facilities);

f. Provide, operate, maintain, repair, replace, and rehabilitate, at its own expense, the local service facilities; mooring area, mooring floats, docks, and gangways in a manner compatible with the project's authorized purposes and in accordance with applicable Federal and State laws and regulations and any specific directions prescribed by the Federal Government;

g. Accomplish all removals determined necessary by the Federal Government other than those removals specifically assigned to the Federal Government;

h. Give the Federal Government a right to enter, at reasonable times and in a reasonable manner, upon property that the non-Federal sponsor owns or controls for access to the general navigation features for the purpose of inspection, and, if necessary, for the purpose of operating, maintaining, repairing, replacing, and rehabilitating the general navigation features;

i. Hold and save the United States free from all damages arising from the construction, operation, maintenance, repair, replacement, and rehabilitation of the project, any betterments, and the local service facilities, except for damages due to the fault or negligence of the United States or its contractors;

j. Keep, and maintain books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to the project, for a minimum of 3 years after completion of the accounting for which such books, records, documents, and other evidence is required, to the extent and in such detail as will properly reflect total cost of construction of the general navigation features, and in accordance with the standards for financial management systems set forth in the Uniform Administrative Requirements for Grants and Cooperative Agreements to State and local governments at 32 CFR, Section 33.20;

k. Perform, or cause to be performed, any investigations for hazardous substances as are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. 9601-9675, that may exist in, on, or under lands, easements, or rights-of-way that the Federal Government determines to be necessary for the construction, operation, maintenance, repair, replacement, or rehabilitation of the general navigation features. However, for lands that the Government determines to be subject to the navigation servitude, only the Government shall perform such investigation unless the Federal Government provides the non-Federal sponsor with prior specific written direction, in which case the non-Federal sponsor shall perform such investigations in accordance with such written direction;

l. Assume complete financial responsibility, as between the Federal Government and the non-Federal sponsor, for all necessary cleanup and response costs of any CERCLA regulated materials located in, on, or under lands, easements, or rights-of-way that the Federal Government determines to be necessary for the construction, operation, maintenance, repair, replacement, and rehabilitation of the general navigation features;

m. To the maximum extent practicable, perform its obligations in a manner that will not cause liability to arise under CERCLA;

n. Comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, as amended by Title IV of the Surface Transportation and Uniform Relocation Assistance Act of 1987, and the Uniform Regulations contained in 49 CFR Part 24, in acquiring lands, easements, and rights-of-way, required for construction, operation, maintenance, repair, replacement, and rehabilitation of the general navigation features, and inform all affected persons of applicable benefits, policies, and procedures in connection with said act;

o. Comply with all applicable Federal and State laws and regulations, including, but not limited to: Section 601 of the Civil Rights Act of 1964, Public Law 88-352 (42 U.S.C. 2000d) and Department of Defense Directive 5500.11 issued pursuant thereto; Army Regulation 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army"; and all applicable federal labor standards requirements including, but not limited to, 40 U.S.C. 3141-3148 and 40 U.S.C. 3701-3708 (revising, codifying and enacting without substantive change the provisions of the Davis-Bacon Act (formerly 40 U.S.C. 276a *et seq.*), the Contract Work Hours and Safety Standards Act (formerly 40 U.S.C. 327 *et seq.*) and the Copeland Anti-Kickback Act (formerly 40 U.S.C. 276c);

p. Provide the non-Federal share of that portion of the costs of archeological data recovery activities associated with historic preservation that are in excess of 1 percent of the total amount authorized to be appropriated for the project, in accordance with the cost sharing provisions of the agreement;

q. In the case of a deep-draft harbor, provide 50 percent of the excess cost of operations and maintenance of the project over that cost which the Secretary determines would be incurred for operation and maintenance if the project had a depth of 45 feet;

r. Do not use Federal funds to meet the non-Federal sponsor's share of total project costs unless the Federal granting agency verifies in writing that the expenditure of such funds is authorized;

s. Comply with Section 221 of Public Law 91-611, Flood Control Act of 1970, as amended (42 U.S.C. 1962d-5b), and Section 101 of the Water Resources Development Act of 1986, Public Law 99-662, as amended (33 U.S.C. 2211), which require that the Secretary of the Army not commence construction of the project, or separable element thereof, until the non-Federal sponsor enters into a written agreement to furnish its required cooperation for the project or separable element.

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

Date: 2 Sept 2004

Timothy J. Gallagher
Colonel, Corps of Engineers
District Engineer

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12.0 INDEX

APPENDIX E

CORRESPONDENCE

Unalaska Navigation Improvements

ALEUTIANS WEST
COASTAL RESOURCE SERVICE AREA

August 6, 2004

U.S. Army Engineer District, Alaska
ATTN: CEPOA-EN-CW-ER (McConnell)
P.O. Box 6898
Elmendorf AFB, AK 9950-0898

RE: Integrated Draft Feasibility Report and Draft Environmental Impact Statement for Navigation Improvements Unalaska, Alaska (Public Notice, June 14, 2004)

Dear Mr. McConnell,

This letter is written in response to the above referenced public notice. The action proposed is the construction of a rubblemound breakwater and two floating breakwaters near the southern end of Amaknak Island to create a 6.8-hectare (16.5 acre) harbor that would be configured to moor 75 boats from 80 to 150 feet long. The draft documents describe alternatives initially considered, sites evaluated in detail, alternative courses of action, environmental consequences associated with each alternative and the advantages and disadvantages of each alternative. In addition to the two aforementioned documents, the AWCRSA has also received and reviewed the revised draft of the Fish and Wildlife Coordination Act Report, April 2004. Thank you for including us in the distribution of these documents.

The public notice summarizes a proposed action plan that includes a mitigation plan developed by the Corps of Engineers and the City of Unalaska in coordination with other agencies. The mitigation plan would locate the rubblemound breakwater to avoid especially valuable intertidal habitat and to allow fish passage at most of the tide range; incorporate timing and operations constraints during construction to minimize impacts to endangered species, juvenile fish, and other important biota and habitat; modify lighting and other project features to avoid or minimize impacts to threatened and endangered species; provide for petroleum spill containment, cleanup, and planning; and compensate for impacts by removing a sunken barge to restore intertidal and subtidal habitat, constructing intertidal habitat to replace habitat values lost during harbor construction, and erecting informational signs and/or a kiosk.

As a district within the Alaska Coastal Management Program (ACMP) we evaluate projects occurring within our area that are subject to state and/or federal permitting actions during their consistency review and according to the information provided within the coastal policy questionnaire (CPQ). The AWCRSA does not initiate a review, nor do we issue permits, rather we provide comments and our enforceable policies are taken into consideration by state permitting agencies as their permit is issued. This participation is reflected in Volume 1, page xi, Coastal Zone Management Act, where you describe partial compliance and that a final consistency determination will be issued

P.O. Box 1074 • Palmer, Alaska 99645 • Phone: (907) 745-6700 • Telefax: (907) 745-6711
Toll free: (800) 207-6701 • e-mail: awcrsa@gci.net

by the ADNR after review of the final documents. AWCRSA will be an active review participant at that time.

Volume 1 of your documents, paragraph 6.7.5, Coastal Management Plans, discusses our district program and summarizes some of the principal policies and standards that have been related equally to each alternative and considered during plan development and in the final selection of a recommended plan. In review of your documents it is evident that that has been the case. AWCRSA appreciates the mitigation steps that have been considered regarding the disposal of dredged spoils, uplands development, the proximity of the project to valuable resources via the design of the "avoid mussel beds" alternative, including a fish passage breech, the incorporation of floating breakwaters into the preferred design, and the consideration of informational kiosks.

Your agency is probably aware of the changes occurring within the state ACMP. Briefly, as a result of recently passed legislation, the AWCRSA will no longer comment on air, land, and water quality issues permitted through the ADEC. In the coming year the AWCRSA will be revising their coastal management plan to remove those polices and meet the additional changes mandated by the new state regulations. Part of these changes will require the designation of recreation and subsistence use areas in order to have policies related to these subjects and the identification of historical and archeological sites that polices could address. There are other changes as well that are not clearly defined at this point but depending on the timing of the consistency review we may or may not have the policies in force that you have currently identified.

Thank you for the opportunity to review your alternative proposals for the project and your recommended course of action. We would welcome the opportunity to be included in any future discussions and continue to be an information resource for your agency. Do not hesitate to contact me if you would care to discuss any of our policies as this project moves forward.

Sincerely,

Karol Kolehmainen
Program Director

Cc: AWCRSA Board members
Anchorage OPMP

QAWALANGIN

Tribe of Unalaska

RESOLUTION 04-29

A RESOLUTION SUPPORTING THE PROPOSED BOAT HARBOR PROJECT KNOWN AS THE LITTLE SOUTH AMERICA-SOUTH MUSSEL BED AVOIDANCE PLAN.

WHEREAS, the Qawalangin Tribal Council is the duly elected governing body of the federally recognized Qawalangin Tribe of Unalaska; and

WHEREAS, the Qawalangin Tribal Council has been charged by the membership of the Tribe with the power and responsibility to promote and protect the health, education, and general welfare of the members of the Tribe; and

WHEREAS, the Qawalangin Tribal Council believes that the City of Unalaska; it's residents and the fishing fleet are in need of navigational improvements within the Unalaska harbor area; and

WHEREAS, the Qawalangin Tribe has been an active participant in bi-weekly meetings during the preparation of the Navigation Improvements Draft Integrated Feasibility Report and Environmental Impact Statement; and

WHEREAS, the Qawalangin Tribal Council believes that the harbor construction will have a positive economic impact on the community and its membership; and

WHEREAS, the Qawalangin Tribal Council supports the work that has been done in researching the alternate project sites, as well as the research on the environmental impacts.

NOW THEREFORE BE IT RESOLVED, that the Qawalangin Tribal Council of Unalaska supports the proposed boat harbor project known as the Little South American – South Mussel Bed Avoidance Plan.

We do certify that the above resolution was passed and approved at a Special Meeting of the Qawalangin Tribal Council therefore called and held the 2nd day of August, 2004, at which a quorum was present and resulted in a vote of 5 ayes, Ø nays, and Ø abstaining.

Margaret Lekanoff

Margaret Lekanoff
President

Denise Rankin

Denise Rankin
Secretary/Treasurer

P.O. Box 334, Unalaska, Alaska 99685 (907) 581-2920 FAX (907) 581-3644

OUNALASHKA
CORPORATION

May 7, 2004

Clarke Hemphill,
US Army Corps of Engineers
PO Box
Anchorage, Alaska

Subject: Little South America (LSA) Proposed Boat Harbor Mitigation issues

Dear Clarke:

The Ounalashka Corporation owns the tideland at Margaret Bay, where a mitigation project for the LSA Small Boat Harbor has been proposed.

The Ounalashka Corporation was formed under the Alaska Native Claims Settlement Act of 1971. The land and proceeds conveyed to it as a result of the Act represent the birthright of each Unalaskan Native man, woman and child born before 1971, as well as future generations, therefore it is our policy to not sell land, but to keep it for the benefit of our shareholders and future shareholders.

The Ounalashka Corporation does not intend to sell its land to be used as mitigation for the proposed harbor project, and it will not grant a permanent or long-term easement or deed restriction if such restrictions prevent development or other land use needed to benefit its shareholders.

Sincerely,
Ounalashka Corporation

Wendy Svarny-Hawthorne
Chief Executive Officer

A Real Estate and Development Company
(907) 581-1276 · FAX (907) 581-1496
P.O. Box 149 · Unalaska AK 99685-0149

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
P.O. Box 21668
Juneau, Alaska 99802-1668

August 23, 2004

Mr. Guy McConnell
U.S. Army Corps of Engineers
Alaska District
EN-CW-ER
P.O. Box 898
Anchorage, Alaska 99506-0898

Re: Unalaska Small Boat Harbor
Draft Environmental Impact
Statement - **CORRECTION**

Dear Mr. McConnell:

The National Marine Fisheries Service (NMFS) submitted a comment letter dated August 12, 2004 for the Draft Environmental Impact Statement (DEIS) for the proposed small boat harbor project located in Unalaska, Alaska. NMFS comment erroneously implied that fish cleaning stations are included as mitigation for the harbor project. The DEIS clearly states that fish cleaning stations will not be located within the harbor in order to remove any incidental attraction of endangered Steller sea lions to cleaned fish waste. NMFS agrees with the plan not to provide fish cleaning stations.

Should you have any questions regarding our comment please contact Matthew P. Eagleton in my Anchorage office at (907) 271-5006.

Sincerely,

Donald J. Berg

For James W. Balsiger
Administrator, Alaska Region

cc: ADEC, ADFG, ADGC, USFWS, EPA - Anchorage

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
P.O. Box 21668
Juneau, Alaska 99802-1668

July 28, 2004

Guy R. McConnell
Chief, Environmental Resources Section
U.S. Army Engineer District, Alaska
P.O. Box 6898
Elmendorf AFB, Alaska 99506-6898

Dear Mr. McConnell:

The National Marine Fisheries Service (NMFS) received the Endangered Species Act (ESA) Biological Assessment on the effects of the proposed small boat harbor project at Unalaska on the endangered Steller sea lion. This assessment concludes the construction and operation of this harbor will not likely adversely affect these animals, nor result in the adverse modification of sea lion critical habitat. NMFS agrees with these conclusions generally; however we believe some potential exists for sea lions to be harassed or otherwise taken should blasting be necessary for construction. The potential effects from such work would depend on the specific blasting plan and any mitigative measures that might be developed to avoid impact to sea lions. Therefore our concurrence with the Corps' assessment should be qualified such that it does extend to construction which includes blasting. Should the Corps determine to proceed with blasting operations here, further ESA consultation would be necessary.

We consider your consultation requirements under section 7(a) of the ESA to be satisfied, and no further consultation is necessary at this time. Please direct any question to Brad Smith in our Anchorage office at (907) 271-3023.

Sincerely,

James W. Balsiger
Administrator, Alaska Region

OUNALASHKA

CORPORATION

May 7, 2004

Clarke Hemphill,
US Army Corps of Engineers
PO Box
Anchorage, Alaska

Subject: Little South America (LSA) Proposed Boat Harbor Mitigation issues

Dear Clarke:

The Ounalashka Corporation owns the tideland at Margaret Bay, where a mitigation project for the LSA Small Boat Harbor has been proposed.

The Ounalashka Corporation was formed under the Alaska Native Claims Settlement Act of 1971. The land and proceeds conveyed to it as a result of the Act represent the birthright of each Unalaskan Native man, woman and child born before 1971, as well as future generations, therefore it is our policy to not sell land, but to keep it for the benefit of our shareholders and future shareholders.

The Ounalashka Corporation does not intend to sell its land to be used as mitigation for the proposed harbor project, and it will not grant a permanent or long-term easement or deed restriction if such restrictions prevent development or other land use needed to benefit its shareholders.

Sincerely,
Ounalashka Corporation

Wendy Svarny-Hawthorne
Chief Executive Officer

A Real Estate and Development Company
(907) 581-1276 · FAX (907) 581-1496
P.O. Box 149 · Unalaska AK 99685-0149

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
P.O. Box 21668
Juneau, Alaska 99802-1668

April 19, 2004

Guy R. McConnell
Environmental Resources Section
U.S. Army Engineer District, Alaska
P.O. Box 896
Anchorage, Alaska 99506

Dear Mr. McConnell:

Thank you for your letter requesting information on the occurrence of threatened or endangered species in the vicinity of the City of Unalaska. The endangered Steller sea lion is commonly found along Unalaska and Amaknak Islands. Sea lions may be present in nearshore waters, including the area of the proposed boat harbor, throughout the year. There is evidence sea lions are attracted to boat harbors, and may become nuisance animals which require actions to deter animals from float systems or to protect life and property. Sea lions may be attracted by fish cleaning/offal discharges and illegal feeding, as well as floats. It is not uncommon to see sea lions in this immediate area. The interaction of a small boat harbor and these endangered species should be considered in your evaluation.

The endangered humpback whale occurs seasonally in the central Bering Sea and may in occur near shore areas, including Unalaska Bay. Other endangered whales that may occur near these islands are the right, sperm, blue, and fin whale. These animals would be unlikely to occur within the project area.

We hope this information is useful to you in fulfilling your requirements under section 7 of the Endangered Species Act. Please direct any questions to Brad Smith in our Anchorage field office at 271-5006.

Sincerely,

Kaja A. Brix
Assistant Regional Administrator
for Protected Resources

CITY OF UNALASKA
P.O. BOX 610
UNALASKA, ALASKA 99685-0610
(907) 581-1251 FAX (907) 581-3102

March 16, 2004

Clarke Hemphill
LSA Boat Harbor Project Manager
FAO, USAED, Alaska District
P.O. Box 6898
Elmendorf AFB, AK 99506-6898

Mr. Hemphill:

As the local sponsor of the LSA Boat Harbor Project, the City of Unalaska is responsible for the non-federal portion of any project authorized and constructed by the U.S. Army Corps of Engineers as a result of Congressional action. The City of Unalaska recognizes that it is responsible for payment of 20% of the General Navigation Features and 100% of the Local Service Facilities.

The Financial components of the project are summarized as follows:

($ in Thousands)

	Total Project	Federal Share	Local Share
General Navigation Features (GNF):			
Mobilization / Demobilization	$1,357	1,221	136
Breakers and Seawalls	9,472	8,525	947
Environmental Mitigation	165	149	17
Preconstruction, Eng, and Design	900	810	90
Construction Management	1,050	945	105
LERR (GNF) Fed Admin Costs	19	17	2
Sub-Total GNF	12,963	11,667	1,297
Additional Funding Requirement:			
10% of GNF		(1,296)	1,296
GNF LERR Credit		195	(195)
Adjustment for GNF LERR Credit		(1,101)	1,101
Sub-Total of GNF Related Items	12,963	10,566	2,398
LERR (GNF) Acquisition Credit	195	0	195
Aid to Navigation	20	20	
Local Service Facilities:			
Mooring Basin and Disposal	2,566	0	2,566
Mooring Facilities	6,738	0	6,738
Boat Ramp	460	0	460
LERR (LSF)	220	0	220
Total Local Service Facilities	9,984	0	9,984
Ultimate First Cost Requirements	**$23,162**	**10,566**	**12,557**

The City of Unalaska will meet its financial commitment of $12,557,000 by utilizing General Obligation (GO) and/or Revenue bonds for $7,557,000, and a General Fund cash contribution of $5,000,000. We are in the process of determining whether to use GO or Revenue Bonds, but we anticipate no problem issuing either type.

GO Bonds: The City of Unalaska has issued GO Bonds for a number of capital projects including school construction and wastewater. The Bonds are issued through the Alaska Municipal Bond Bank Authority. The financial strength of The City of Unalaska and the Alaska Municipal Bond Bank Authority results in the issuance of Bonds favorable interest rates. The City of Unalaska's ability to successfully issue bonds for this project is further enhanced by its excellent credit rating and by the fact that it has previously retired several bond issues.

Revenue Bonds: The City of Unalaska has, in the past, issued revenue bonds that, unlike GO Bonds, are tied to revenue of fees. Based on the size and profitability of the Port, projected revenues will be sufficient to cover any Revenue Bonds required for the LSA port project. The City currently has one Revenue Bond outstanding that was issued in 1991 and scheduled for retirement in the spring of 2006.

General Fund: The City of Unalaska's City Council has already designated that $5,000,000 be set aside for the LSA Port project.

The State of Alaska has approved a debt reimbursement program that specifically lists the LSA Harbor project for up to $5,000,000. The debt reimbursement would not be additional financing to that described; rather, it demonstrates our ability to repay either GO Bonds or Revenue Bonds, and State support for the project.

Sincerely,

Chris Hladick
City Manager

In reply, refer to:
AFWFO2002026

February 6, 2004

Mr. Guy McConnell
Environmental Resources Section
U.S. Army Engineer District, Alaska
P.O. Box 898
Anchorage, Alaska 99506-0898

Re: Draft Biological Opinion on the Effects of the Construction of a Harbor at Little South America – South, Unalaska, Alaska, on the Threatened Steller's Eider (*Polysticta stelleri*) Revised February 5, 2004 (*endangered species consultation number 2002026)*

Dear Mr. McConnell

The enclosed document transmits the U.S. Fish and Wildlife Service's (Service) February 5, 2004 Draft Biological Opinion based on our review of the proposed construction of a harbor at the Little South America-South site in Unalaska and its effects on the Steller's eider (*Polysticta stelleri*) in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). This letter provides only a summary of the findings included in the Biological Opinion, where a complete discussion of the effects analysis can be found. Also considered in this Biological Opinion are the potential effects of the proposed action on the short-tailed albatross (*Phoebastria albatrus*) and the southwest Alaska population of the northern sea otter (*Enhydra lutris kenyonii*).

This Biological Opinion is based on information provided in the Biological Assessments for the proposed project (U.S. Army Corps. of Engineers (COE) 2003), Alaska Department of Environmental Conservation and U.S. Coast Guard spill data, Service and COE Steller's eider surveys at Dutch Harbor/Unalaska, the LSA Harbor Discussion Paper and appendices obtained from the City of Unalaska's web site, the draft Fish and Wildlife Coordination Act Report for the proposed project (Schroeder 2001), and recent discussions with the COE and the City of Unalaska. In addition, other sources of information were also used in formulating this Biological Opinion. The complete administrative record for this consultation is on file at the Anchorage Fish and Wildlife Field Office.

Following is a summary of the consultation history for this project:

- On September 12, 2000, we received your BA on the effects of the proposed action on the Steller's eider and your request for formal consultation.
- On October 12, 2000, we acknowledged receipt of your biological assessment and requested additional information before formal consultation could be initiated.
- On August 14, 2003, we received your Biological Assessments for potential impacts on Steller's eiders and short-tailed albatross at LSA.
- On September 5, 2003, we received your Biological Assessment on potential effects of harbor construction on the northern sea otter and your request for a conference on the sea otter.
- On September 17, 2003, we acknowledged receipt of your biological assessments and indicated that we could not concur with your determination that the construction and operation of a harbor at LSA in Unalaska Bay was not likely to adversely affect or jeopardize the Steller's eider, and that we would proceed with a formal consultation on the proposed action for the Steller's eider and short-tailed albatross, and would conduct a conference on the sea otter, a candidate species. We considered your initiation package to be complete and initiated formal consultation as of August 14, 2003. We agreed to expedite the consultation to the best of our ability, and promised a draft biological opinion for review in mid-October.
- On October 22, 2003, we provided a Draft Biological Opinion to the COE and the City of Unalaska for review.
- On October 27, 2003, we received comments from the COE on the Draft Biological Opinion requesting that modifications to the project description appear in the Biological Opinion as Terms and Conditions
- On November 6, 2003, we participated in a teleconference with the COE and the City of Unalaska in which the COE indicated that some details of the project description were incorrect.
- On November 6, 2003, we received from the COE detailed descriptions of the alternatives being considered, including information on the makeup of vessels anticipated to use the new harbor.
- On November 8, 2003, we provided to the COE, the revised Project Description and Terms and Conditions as per our November 6 teleconference.
- On November 8, 2003, we received comments from the City of Unalaska on the draft BO; of particular concern was the analysis and assumptions, and subsequent conclusion.
- On December 3, 2003, we teleconferenced with the City of Unalaska and the COE regarding concerns raised in the City's November 8 letter. As a result, we agreed to review and revise our analysis as appropriate.
- On December 10, 2003, we teleconferenced with the City of Unalaska and the COE regarding the Terms and Conditions presented in the Draft BO. We reached concurrence, with minor changes, on all Terms and Conditions. The City agreed to provide a digital

image of land ownership for delineation of the No Transit Zone. We have not received this image.

- On December 16, 2003, we provided to the COE the revised Terms and Conditions as per our December 10 teleconference.
- On December 17, 2003, we received the Draft EIS/FR for review.

The Endangered Species Act charges the Service with the difficult task of quantifying the individual and population-level effects of Federal actions on listed species. Where data gaps prevent a thorough analysis, we are compelled to use the best available scientific and commercial information and make reasonable assumptions about the potential effects of an action. A paucity of local and species-specific information in the Dutch Harbor/Unalaska area required us to use our best professional judgment in analyzing the effects of constructing a harbor at the LSA South site. Significant data gaps include: we know little about the migration of contaminants in the marine environment and the areal extent of the ecological influences of harbors, both with and without fueling facilities; very little is known about the pathways of exposure of Steller's eiders to contaminants, and even less is known about the physiological effects of that exposure; and finally, there is no data on what these physiological effects mean in terms of survival of the listed entity. Faced with these data gaps, we synthesized available information from the literature and expert opinion to facilitate formulation of the assumptions on which our analysis is based.

In qualitative terms, the potential effects of the action are apparent to us. In its August 2003 Biological Assessment on the Steller's eider, the COE acknowledges that contamination levels in sediments at the project site may increase as a result of vessel moorage at the LSA location, and that increased contamination may affect nearby food resources. In section 4.2.5, the COE writes: "Construction of a harbor at the LSA South site could increase the risk of petroleum spills in an area currently not exposed to spillage." In section 4.3.1, the COE goes on to say: "The principal indirect effect of harbor construction at the LSA site on Steller's eiders would be potential contamination of benthic food resources near the proposed harbor site." The areal extent of these affects is not delineated. A body of evidence exists documenting the direct and indirect effects of oil pollution on waterfowl, sea ducks, and seabirds from a variety of sources, including contaminated prey. Given that contamination of marine waters by vessel fuels and lubricants is likely to increase in the LSA South site and surrounding areas, and considering that these contaminants are known to have detrimental physiological affects on waterfowl, sea ducks and seabirds, it is incumbent upon us to acknowledge the probability that the proposed project will result in a non-zero take. Quantifying the anticipated effects of the proposed action is a much more difficult task.

In response to concerns raised by the City of Unalaska and the COE, we have thoroughly reviewed our analysis and underlying assumptions. Following is a summary of revisions made to the document resulting from this internal review.

- The Project Description (page 4) now reflects information provided by the COE during our November 6 teleconference and via e-mail. For our analysis, we are assuming no net increase in the number of vessels anticipated to use the Dutch Harbor/Unalaska area. Rather, the project is expected to redistribute vessels already using available moorage to an area where moorage has heretofore been unavailable. References to net increases in the number of vessels in the Dutch Harbor/Unalaska area were also removed from the Environmental Baseline (page 29) and the Effects of the Action (page 42) sections.

- The assumptions regarding the Effect of Chronic Oiling on Steller's Eiders (page 31) were simplified. We currently lack empirical evidence on the effects of chronic oiling on Steller's eiders. Given the ecological and physiological similarities between the harlequin duck and the Steller's eider, we believe it is reasonable to assume that the response of Steller's eiders to chronic oiling will be similar to those observed in harlequin ducks. Furthermore, we do not consider it unreasonable to assume that the continuing periodic release of hydrocarbons from oiled beaches in Prince William Sound over a decade after the *Exxon Valdez* oil spill is similar in effect to the periodic release of hydrocarbons from fishing vessels traversing northern Captains Bay and mooring in the new harbor. Finally, we clearly state our assumption regarding the relative toxicity of petroleum compounds found in Prince William Sound and Dutch Harbor. The hydrocarbons present in diesel are a lighter end subset of those present in crude oil; however, the more persistent components in diesel may, in fact, be similar to those remaining in Prince William Sound. We do not have data to the contrary.
- We moved our discussion of the EPA Superfund Technical Assessment data to page 38 under the Petroleum Spills subsection of the Factors Affecting Species' Environment within the Action Area section.
- After further review, we agree that any reduction in survivorship due to existing levels of contamination would contribute to an unknown degree to the observed downward trend of the population. Consequently, we clarified our assumptions used in our modeling efforts (Population Modeling, page 32) to reflect this change. We also added the assumption that increases in the amount of petroleum released into the marine environment as a result of a proposed action increase the probability of harm due to chronic oiling and that this *is additive* to the declining trend of the population. We also included a discussion of the assumptions integral to deterministic modeling.
- After further consideration, we concluded that only those birds exposed to increases in vessel traffic due to the redistribution of vessels in the area would be at increased probability of harm. (Status of the Species Within the Action Area, page 35); as a result, the population at risk was determined to be 632 rather than 1,107.
- We included additional information on hydrocarbon releases in the Petroleum Spills subsection (pages 36 – 38). Specifically, we summarized data from Day and Pritchard (2000) and DEC on bilge and waste oil releases, a source of contamination not directly attributable to refueling operations. We conducted a

similar summary of DEC data provided by the City, and incorporated into the discussion the figure depicting USCG spill data also provided by the City. We present the contaminant data summarized in the EPA Superfund Technical Assessment report, and establish our estimates of the effects of baseline chronic oiling in this section. We were unable to acknowledge improvements by the City at reducing spills in the area (as mentioned in the City's November 8, 2003 letter) because specifics as to these efforts have not been provided.

- The Environmental Baseline section summarizes the effects of past and present human and natural phenomena on the current status of the species *within the action area*. For this reason, we moved the Incidental Take From Other Federal Actions subsection to the Conclusion section (page 45) as it appeared more relevant to the jeopardy analysis.
- We revised our analysis presented in the Effects of the Action section, Acute and Chronic Exposure to Petroleum Compounds (page 42) in several ways. We acknowledged the reduced risk of bulk releases realized by the construction of safe moorage at LSA South. We modeled the potential effects of the redistribution of vessel traffic and moorage using the following assumptions: 1) the effects of baseline chronic oiling is already present in the 6.1% population decline, 2) the 47% increase in vessel traffic in northern Captains Bay resulted in a commensurate increase in the probability of harm due to chronic oiling expressed as an additive reduction in survivorship of 0.3% (instead of 0.85% as in our previous analysis), and 3) the population at risk numbered 632 birds (instead of 1,107). Finally, we moved our analysis of the population-level effects of the proposed action to the jeopardy discussion (Conclusion section, page 42).
- Although we arrived at the same conclusion as in the previous version of the BO, we reworded our finding to avoid any confusion (Conclusion section, Summary subsection, page 47, and Conclusion subsection, page 48).
- The Biological Assessment on the Steller's eider states that the footprint of the proposed harbor totals 20 acres, and that total acres of Steller's eider habitat that would be lost due to the construction of a harbor at LSA South also equals 20 acres. However, subsequent information provided by the USACOE to the Service suggests a larger area that would be directly impacted. Data provided to Mark Schroeder on November 18, 2003, suggests a total footprint of 23 acres. Based on a digital image provided to Dana Seagars on January 26, 2004, we estimate the footprint of the project to be nearly 24 acres. Using this same digital information, we estimate that approximately 17 acres of Steller's eider habitat, nearshore marine waters less than 20 meters in depth, will be permanently lost due to the construction of a new harbor at LSA South. Consequently, we revised the Description of the Proposed Action (page 4) to reflect an anticipated 24-acre project footprint, and estimate that 17 acres of Steller's eider habitat will be lost due to the project in the Effects of the Action section (page 41) and the Incidental Take Statement (page 52 and 53).

- We included one additional Conservation Recommendation. This is that the Best Management Practices Plan should include a requirement for all dead waterfowl to be retained until Service personnel may positively identify the carcasses.

After reviewing all the available information on the location, timing of construction, and facility operation, along with the anticipated effects of the proposed action and the best available information on the status, distribution, and life history of the Steller's eider, it is the Service's Biological Opinion that the action, as proposed, is not likely to jeopardize the continued existence of the species.

We estimate that the acute and chronic exposure to petroleum compounds and collisions with harbor-related facilities and vessels as a result of the construction of a new harbor at the LSA South site would be unlikely to result in a take that exceeds 134 Steller's eiders, or 6 individuals of the Alaska breeding population. This Biological Opinion includes Reasonable and Prudent Measures and Terms and Conditions that the Service believes will minimize the impacts of incidental take of Steller's eiders resulting from the proposed project. We expect that adequate spill response, natural spill dispersal and evaporation of spilled products, and proper shielding and orientation of harbor-related and vessel lighting would preclude take beyond the level anticipated by our analysis. In order to be exempt from the prohibitions of section 9 of the ESA, the ACOE must require the applicant to comply with the terms and conditions, which implement the reasonable and prudent measures.

We applaud your efforts to be proactive and to work cooperatively early in project planning by including the Biological Opinion in your draft environmental impact statement. However, as pointed out in our September 17, 2003 letter, and in previous consultations, this approach may have some pitfalls. In order for this course of action to succeed, the alternatives must not be in a state of flux and the selection of the preferred alternative must be certain. While a recommended alternative is nearing publication in a draft EIS, the planning process for a new harbor at Unalaska remains dynamic, and the specific details of the harbor's design continue to be inexact. The potential exists for the preferred alternative, which we analyzed in this Biological Opinion, to be modified as a result of internal and public review of the draft EIS; at worst, from the standpoint of adequacy and applicability of the analyses and conclusions in this Biological Opinion, a different alternative may be selected. Any changes to alternative design or the selected alternative may result in the need for a new biological assessment and reinitiation of formal consultation. When the Record of Decision is finalized we would expect to receive a comparison of the proposed action with the alternative we analyzed so we may determine if this Biological Opinion is adequate and can be confirmed as a final document.

We appreciate the continuing dialogue we have established with the COE and City of Unalaska as environmental reviews of the proposed boat harbor have progressed. If you have any questions about the Biological Opinion you can contact me at (907) 271-2787, ann_rappoport@fws.gov, or our Endangered Species Biologist for this consultation, Charla Sterne, at (907) 271-2781, charla_sterne@fws..gov. We look forward to working with you and the City as the Terms and Conditions and Conservation Recommendations included herein are implemented.

Sincerely,

Ann G. Rappoport
Field Supervisor

Enclosure

cc: Chris Hladick , City of Unalaska
Wayne Dolezal, ADFG
Jeanne Hanson, NMFS
David Kulman, EPA
Kerry Howard, ADNR, Juneau
Ed Weiss, ADNR, Anchorage

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
P.O. Box 21668
Juneau, Alaska 99802-1668

October 4, 2001

Mr. Guy McConnell
U.S. Army Corps of Engineers
Alaska District
EN-CW-ER (Burns)
P.O. Box 898
Anchorage, Alaska 99506-0898

Re: Unalaska Small Boat Harbor
Environmental Assessment

Attn: John Burns

Dear Mr. McConnell:

The National Marine Fisheries Service (NMFS) has reviewed your Environmental Assessment (EA) of August 2001 for Navigation Improvements in Unalaska, Alaska. NMFS has been involved throughout the project development process and has attended meetings which specifically discussed potential impacts the project may have on living marine resources under NMFS jurisdiction.

Essential Fish Habitat

NMFS concurs with the provided EFH assessment based on the determinations made for each EFH species and subsequent discussions with your staff. These effects were either none or minor. Therefore, additional EFH consultation is not necessary. However, should significant changes develop during the final design stages of the project, NMFS wishes to be given ample review opportunity regarding EFH resource issues.

Specific Comment

Alternative 1-C offers a change from previously reviewed design alternatives of the southern rip-rap breakwater. Alternative 1-C "doglegs" or avoids a large portion of the intertidal flat which would be covered in Alternative 1-A. This area is documented to contain barnacle, shell hash, mussels, marine vegetation, and cobble. The diverse substrate and vegetation provides excellent attachment substrate and food sources for juvenile king crab and other marine fish. Therefore, NMFS prefers Alterative 1-C.

Additionally, NMFS feels the EA adequately addresses the issues we have raised over the course of the project review. However, we are still concerned with the nearshore migration corridor for anadromous fish and settling juvenile red king crab. Therefore, NMFS recommends the western end (nearshore) of the breakwater under Alternative 1-C begin at the minus 1-meter contour and continue offshore as designed. This will maintain a nearshore corridor for marine fish. Similar breakwater designs were incorporated in the Ouzinkie and False Pass Small Boat Harbor Improvement Projects to allow for a migration corridor.

NMFS realizes the design of the breakwater is to minimize wave energy into the basin. The question is whether or not wave energy and height would be excessive if Alternative 1-C is modified to include a small breach between the edge of the breakwater and the shore. Information in the EA does not answer this question.

Mitigation

The proposed mitigation lists several recommendations and measures to offset impacts, however no firm commitments were offered. Therefore, assessing whether mitigation is adequate for the project is difficult.

Also, the proposed mitigation spanned a wide range of habitats. Several ideas offered protection of habitat from future boat-related activities or restored previously disturbed habitats from boat-related activities. Mitigation that will be included is: preparation of a Harbor Management Plan; establishment of a no-transit area; continuation of a winter survey for Steller's Eider; and timing the construction activity within a seasonal work window.

NMFS feels the Harbor Management Plan is an existing requirement and does not undertake any substantial effort to complete; the no-transit area will be difficult to enforce; and the timing window only provides protection during the construction phase.

Therefore, we believe that the included mitigation does not offset the long term effects of the project and the EA does not directly commit to the mitigation recommendations. However, should the project include several, if not all, of the recommended mitigation projects, then we are willing to change our comment for the project.

We remain willing to assist you with EFH and other living marine resource issues if needed. Should you have any questions concerning EFH requirements, please contact Matthew P. Eagleton in my Anchorage office at (907) 271-5006.

Sincerely,

Ronald J. Berg

For James W. Balsiger
Administrator, Alaska Region

cc: ADEC, ADFG, ADGC, USFWS, EPA - Anchorage

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, ALASKA
P.O. BOX 898
ANCHORAGE, ALASKA 99506-0898

REPLY TO
ATTENTION OF:

APR 13 2001

Environmental Resources Section

Ms. Judith Bittner
State Historic Preservation Officer
Office of History and Archaeology
550 West 7th Avenue, Suite 1310
Anchorage, AK 99501-3565

Dear Ms. Bittner:

On July 19, 2000, we provided your office with a copy of *Cultural Resource Impacts of Three Proposed Navigation Improvement Sites in Unalaska, Alaska,* written by Dr. Richard Knecht under a contract with the U.S. Army Corps of Engineers. Based on criteria other than historic property locations, the U.S. Army Corps of Engineers chose to construct the harbor at the Little South America site (USGS Quad Unalaska C-2, T73S, R118W Section 10, W1/2 , SM, see enclosed figure). Using Dr. Knecht's report and through consultation with Linda Cook from the National Park Service, we concluded that the construction of a harbor at Unalaska was an adverse effect to the Dutch Harbor Naval Operating Base and Fort Mears, U.S. Army National Historic Landmark (NHL; AHRS# UNL-00120). This was stated in the letter that accompanied the report.

In the July, 2000 letter, a prehistoric site (UNL-00047) was determined eligible for the National Register of Historic Places under Criterion D. It is approximately 100 meters southwest of the APE. Pilings from a saltery (UNL-00291) are present in the intertidal zone within the APE. Because the site lacks integrity of materials, workmanship, and feeling it was determined to not be eligible for the National Register of Historic Places. There are also remains of a barge near the APE, which sunk in the mid-1970s. It was determined not to be eligible for the National Register of Historic Places. Because we did not receive a letter of concurrence/non-concurrence from you, we are assuming that you agree with these conclusions and are proceeding to the next step in the Section 106 process (36 CFR 800 (c)(1)).

Dr. Knecht will be contacting your office on our behalf to begin consultation regarding the mitigation of the adverse effects, and the development of a Memorandum of Agreement. If you have additional questions about the cultural resources or the harbor project on Little South America, please call Diane Hanson (753-2631) or myself (753-2614).

Sincerely,

Guy R. McConnell
Chief, Environmental Resources Section

Enclosures

cf: Richard Knecht, Museum of the Aleutians
Linda Cook, National Park Service
Janet Clemens, National Park Service
Alan Stanfill, Advisory Council on Historic Preservation

APPENDIX H

U.S. FISH AND WILDLIFE SERVICE COORDINATION ACT REPORT

Unalaska Navigation Improvements

UNALASKA
NAVIGATION IMPROVEMENTS

REVISED DRAFT
FISH AND WILDLIFE COORDINATION ACT REPORT

SUBMITTED TO ALASKA DISTRICT
U.S. ARMY CORPS OF ENGINEERS
ANCHORAGE, ALASKA

PREPARED BY: MARK T. SCHROEDER, FISH AND WILDLIFE BIOLOGIST AND FRANCES MANN, BRANCH CHIEF, PROJECT PLANNING
APPROVED BY: ANN G. RAPPOPORT, FIELD SUPERVISOR

ANCHORAGE FISH AND WILDLIFE FIELD OFFICE
U.S. FISH AND WILDLIFE SERVICE
ANCHORAGE, ALASKA

APRIL 2004

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INTRODUCTION

This report constitutes a revised draft of the U. S. Fish and Wildlife Service's (Service) Fish and Wildlife Coordination Act Report (CAR) on the U. S. Army Corps of Engineers' (Corps) proposed construction of a boat harbor at the community of Unalaska, Alaska (Figure 1) (USACE 2003). This report provides planning information and recommendations specific to fish and wildlife resources; discusses the presence of specific fish and wildlife resources likely to be affected by construction of the boat harbor; identifies fish and wildlife issues that should be addressed; identifies potential adverse impacts to fish and wildlife resources that could result; and provides recommendations on measures for mitigating those impacts and concerns.

This report is prepared in accordance with the Fiscal Year 1999, 2000, 2003, and 2004 Scopes of Work and the Fish and Wildlife Coordination Act (48 Stat. 401, as amended: 16 U.S.C. 661 et seq.). This document constitutes the revised draft final report of the Secretary of the Interior as required by Section 2(b) of the Fish and Wildlife Coordination Act.

A previous draft of the CAR (September 2001) contained information on threatened and endangered species. The Corps requested initiation of formal Section 7 consultation under the Endangered Species Act of 1973, as amended (ESA) in a 9 September 2000 letter. Our 12 October 2000, response to that request described additional information required to complete the initiation package. That information was provided and the formal consultation process concluded with issuance of the Service's revised draft Biological Opinion of 5 February 2004, based on the local sponsor's preferred alternative and current design. That draft Biological Opinion included a list of nondiscretionary terms and conditions that are considered apart and separate from recommendations contained in this report.

This report is based on information provided by several Corps project biologists, John Burns, Bill Abadie, Lizette Boyer, Wayne Crayton, and Guy McConnell; a review of pertinent literature; discussions with local resource agency staff and residents; and several on-site evaluations over a multi-year period. Joseph Connor (Service) and Chris Hoffman (Corps) were largely responsible for conducting recent seabird surveys and provided essential logistical support to other survey activities. We also acknowledge the support from the local community in the completion of our report, particularly Ryan Burt, Forrest Bowers, and Mike Bon of the Alaska Department of Fish and Game (Unalaska); Chris Hladick and Robin Hall (City of Unalaska); Frank Walashek, Jimmer MacDonald (MAC Enterprises); the staff of the Grand Aleutian Hotel (Unisea, Inc); Richard Davis, Carl Swanson, and Wendy Hawthorne of the Ounalashka Corporation; Dan Magone of Magone Marine, Inc.; and Sharon Livingston of Qawalangin Tribe.

STUDY AREA

Unalaska has a maritime climate, characterized by high humidity, frequent precipitation and strong surface winds. The mean annual temperature is 4.8 degrees C (41 F) with mean monthly temperatures ranging from about 0 degrees C (32 F) in February to 12 C (53 F) in August. Total mean precipitation is 1475 mm (58 in). Fog occurs about 30 days per year and is more frequent in the summer than in the winter. Winds average 18 kph (11 mph) and extreme winds may reach

160 mph. Tides in the area are not great, having a maximum amplitude of near 5 feet. The mean tidal amplitude (mean high water to mean low water) is about 2.5 feet (USACE 2004).

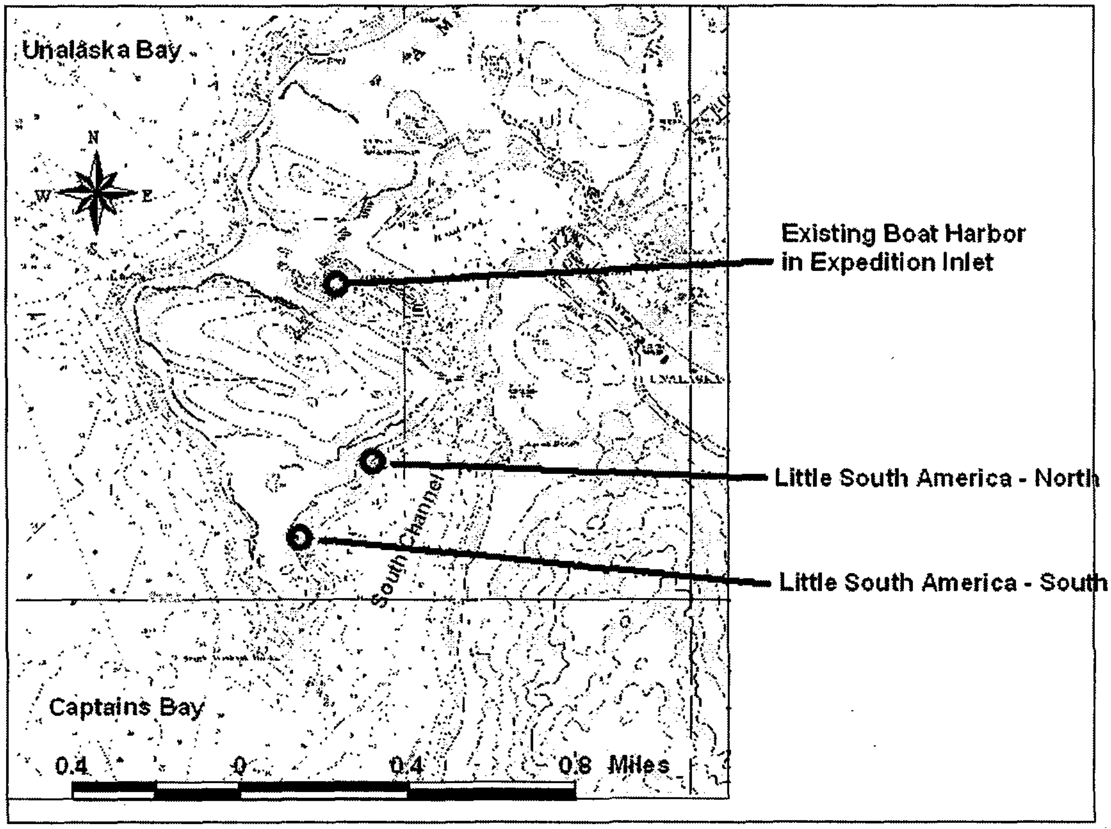


Figure 1: Alternative harbor sites around Amaknak Island, Alaska.

Unalaska is in the Aleutian Island physiographic section of the Alaska-Aleutian province. Similar to other Aleutian islands, Unalaska and adjacent Amaknak Islands resulted from the ongoing convergence of tectonic plates and are mostly volcanic in origin. The 6,680-foot tall (2,036 m) Makushin Volcano and an associated hydrothermal field are about 25 km (15.5 mile) west of the Dutch Harbor Airport on the northern part of Unalaska Island. The steep volcanic slopes are drained by swift streams, some of which run over porous rock and flow only during heavy rains. Lakes commonly occur in the ice-carved basins. The vegetation of Unalaska is characterized as either alpine tundra or moist tundra. The moist tundra occupies low elevation areas and consists of tall grass meadows, low heath shrubs, mosses, lichens, and tufted hair grass.

Unalaska has become the largest fishing port in the nation (by volume landed) and has a population of about 4,178.

DESCRIPTION OF PROJECT

The purpose of the proposed action is to prevent overcrowding and provide additional moorage space for 75 large vessels (25 to 40 m, [82 to 131 ft]) in Unalaska, Alaska (USACE 2003). The City of Unalaska requested the Corps conduct a feasibility study of navigation improvements to provide permanent mooring slips for about 50 vessels under 200 feet in length. Additional demand for vessel moorage was identified by the community as a critical issue facing them. Vessels unable to secure moorage in the existing harbor seek refuge at other ports. Some vessels that do not seek refuge at other ports occasionally have to raft several vessels deep. As a result, they may also experience some damage during periodic storms.

The intent of the harbor is for use primarily by commercial fishing vessels for moorage during closed fishing periods and for protection during adverse weather conditions. Use of the harbor by smaller fishing or recreational craft is expected to be negligible.

The purpose of the project is to provide a safe and efficient harbor in an economically and environmentally sound manner that:

1) Prevents overcrowding and damage to vessels in the existing harbors by providing a safer and more efficient moorage area for the fishing flee; and

2) Provides moorage for large commercial fishing vessels that currently return to homeports or other harbors during extended fishery closures, thereby reducing fuel, crew time, and other travel expenses.

PROJECT ALTERNATIVES

There are four alternatives: the No-Action Alternative and three build alternatives (Figure 1). Two build alternatives are described as Little South America – South (LSA–South; Alternative 1) and Little South America – North (LSA – North; Alternative 2). The LSA–South is the project sponsor's preferred plan, and this design has several design options. The LSA–North site was also evaluated as a somewhat smaller harbor in combination with a more efficient design of the existing boat harbor in Expedition Inlet (Alternative 3) as the Existing Boat Harbor /LSA–North combination.

The local project sponsor, the City of Unalaska, has indicated a need to construct a new harbormaster's building adjacent to the new harbor site as well as provide for short-term parking, a drop-off/pick-up area, and spill response equipment next to the mooring basin. Fuel services would continue to be supplied from other existing sources and are not part of the mooring basin project. Most local communities also desire large tracts of undeveloped land adjacent to new harbors for storage of fishing gear/equipment, long-term parking, and other commercial building sites (for amenities such as restaurants, laundromats, etc) and other non-water dependent activities.

NO-ACTION ALTERNATIVE

The no-action alternative would leave all the alternative sites in their present condition. The project purpose and need would not be met. Damage to vessels and docking facilities from overcrowding in other nearby ports would continue; economic benefits to the fleet from slip rental fees would not be achieved; and vessels unable to secure moorage in the existing harbor would continue seeking refuge at other ports.

The following descriptions of the three build alternatives are provided by the Corps of Engineers.

ALTERNATIVE SITE 1: LITTLE SOUTH AMERICA—SOUTH

This alternative plan would use two floating breakwaters and a rubblemound breakwater to enclose a 6.8 ha (16.8 ac) mooring basin/maneuvering area (Figure 2). The two floating breakwaters would consist of 6.4 m by 1.83 m hollow concrete box structures moored by concrete anchors and chains. The rubblemound breakwater would be placed either from a barge or from shore and would be armored with 1,500 kg rock. The breakwater would curve at the seaward end to protect the harbor entrance, but otherwise would be a straight structure with simple lines that would be comparatively easy to construct. The contractor would select the dredging method, but some form of clamshell or bucket dredge would be best adapted to the varying bottom conditions at this site. The basic concept would place dredged material in the least expensive disposal area or would use the material for an economically beneficial purpose.

A two-lane paved road connects the adjacent uplands to the community and an undeveloped parcel of private land currently used as a quarry. An existing easement allows part of the area to be used as a staging area for harbor construction.

There is currently one design modification for this plan, the "Avoid Mussel Bed" alternative, referred to as Alternative 1b (Figure 3). This modification results from avoiding placement of the southern rubblemound breakwater on top of high-value mussel bed habitats on the reef at the southern tip of Amaknak Island. It also would include a breach at the shoreward end to allow some fish passage to continue along shore. This shift necessitates moving a portion of the breakwater footprint to the north into somewhat deeper water, thereby requiring some additional fill. The Service recognizes the substantial, positive effort and cost to avoid impacting the reef's high value mussel bed habitats. Please note that throughout this CAR, potential project impacts are evaluated using Alternative 1b. Alternative 1b, with the above-mentioned design modifications, would have less impact to fish and wildlife resources than Alternative 1. The Corps has identified the modified design, "Avoid Mussel Bed" (Alternative 1b) as the tentatively recommended plan (USACE 2004).

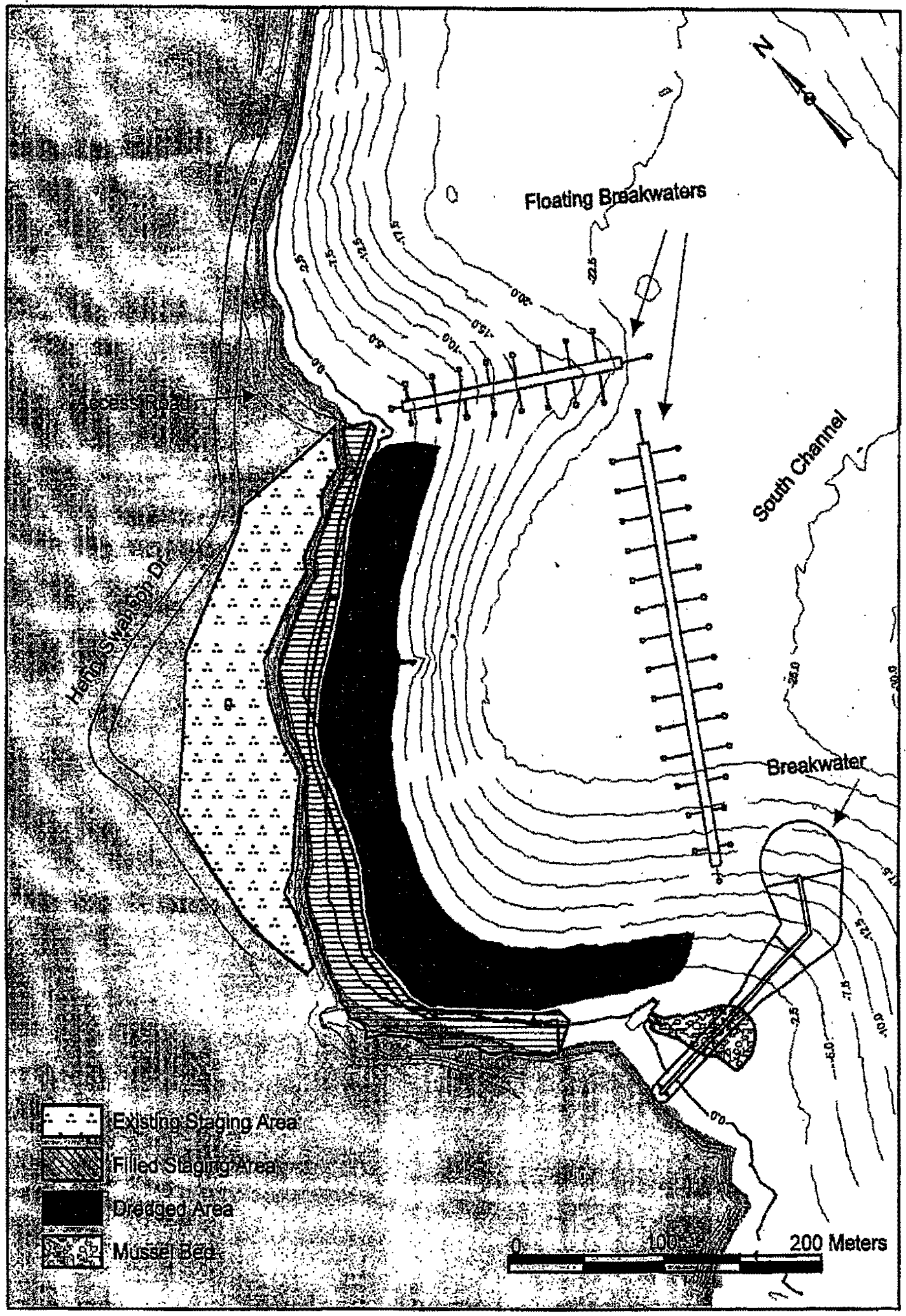


Figure 2: The basic plan for Little South America-South (Alternative 1, USACE 2004).

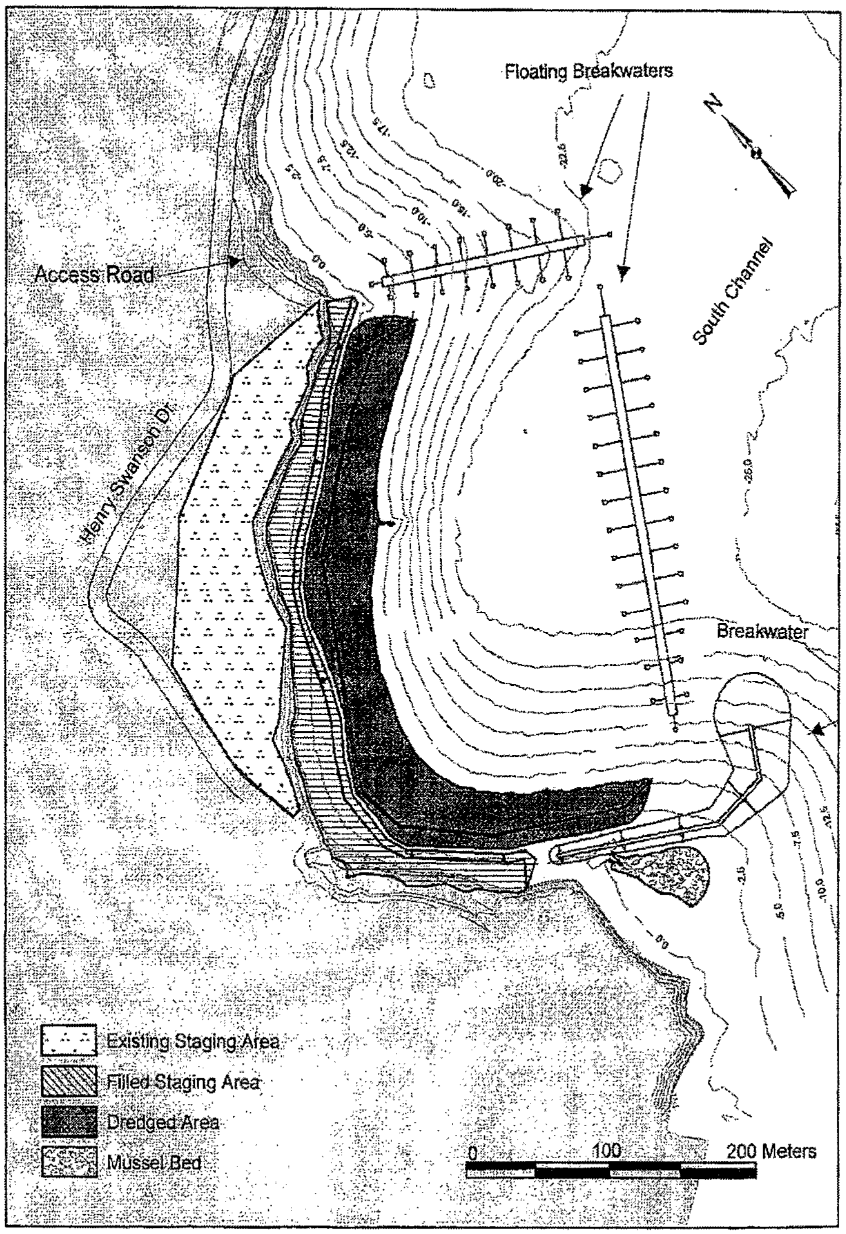


Figure 3: The "Avoid Mussel Bed" Alternative design to the basic plan for the Little South America-South harbor site (Alternative 1b). The rubblemound breakwater was shifted further north to avoid high-value mussel bed habitat and create a breach for some fish passage (USACE 2003).

ALTERNATIVE SITE 2: LITTLE SOUTH AMERICA–NORTH

Alternative 2 consists of a 200 m-long rubblemound breakwater, a 350 m-long floating breakwater on the eastern boundary, and a 120 m-long floating breakwater along the northern boundary (Figure 4). The rubblemound breakwater footprint is 1.2 ha (3 ac). The 6.8 ha (16.8 ac) combined maneuvering area and mooring basin could accommodate a fleet of 75 vessels ranging in length from 25 m (82 ft) to 40 m (131 ft), with stalls oriented in the prevailing wind direction. The primary focus is to provide permanent mooring slips for approximately 44 vessels in the largest size class.

The entrance channel would make an approach into the harbor around the floating breakwater and into the maneuvering area. An alternative entrance channel could be available for use at the northern limit of the site for access to the dock facilities in the lee of the northern floating breakwater. The entrance channel depth would remain unchanged from existing depths, as the natural depth ranges from -15 m to -22.5 m.

A portion of the harbor mooring basin would be dredged to -5.5 m. Some blasting of bedrock would likely be required. About 36,600 cubic meters of dredge spoils would be disposed of in the intertidal area to create uplands. Maintenance dredging would be expected to be minimal.

ALTERNATIVE 3: EXISTING BOAT HARBOR/LITTLE SOUTH AMERICA—NORTH COMBINATION

In evaluating alternatives, it was determined that Expedition Inlet (the existing boat harbor) could not be economically developed to moor a majority of the design fleet. It could, however, be developed to moor part of the fleet, and if another site was developed to moor the remainder of the fleet, most of the project objectives might be met. The shallower water and restricted space of Expedition Inlet would be best suited for mooring the smaller boats of the design fleet, while the LSA–North site would be constructed concurrently as a much smaller harbor than originally envisioned to moor and protect the remaining larger boats of the fleet.

The concept (Figures 4 and 5) indicates that moorage would be added along the south shore of Expedition Inlet, across from the existing moorage. The new moorage would be capable of harboring 31 boats of the design fleet that are less than 30 m (98 ft) long. Moorage for the other 44 larger boats would be protected by a smaller harbor at the LSA–North site. This use of two alternative sites would avoid, or at least reduce, some of the disadvantages associated with each site as a single alternative. Using only part of Expedition Inlet for moorage would allow the plan to minimize expensive dredging in the rocky bottom material at that site. This site is protected by surrounding lands and would require no constructed wave protection. Constructing this part of the alternative would require dredging the areas identified on Figure 5, installing a mooring system, and connecting the mooring system to a staging area on the adjacent uplands.

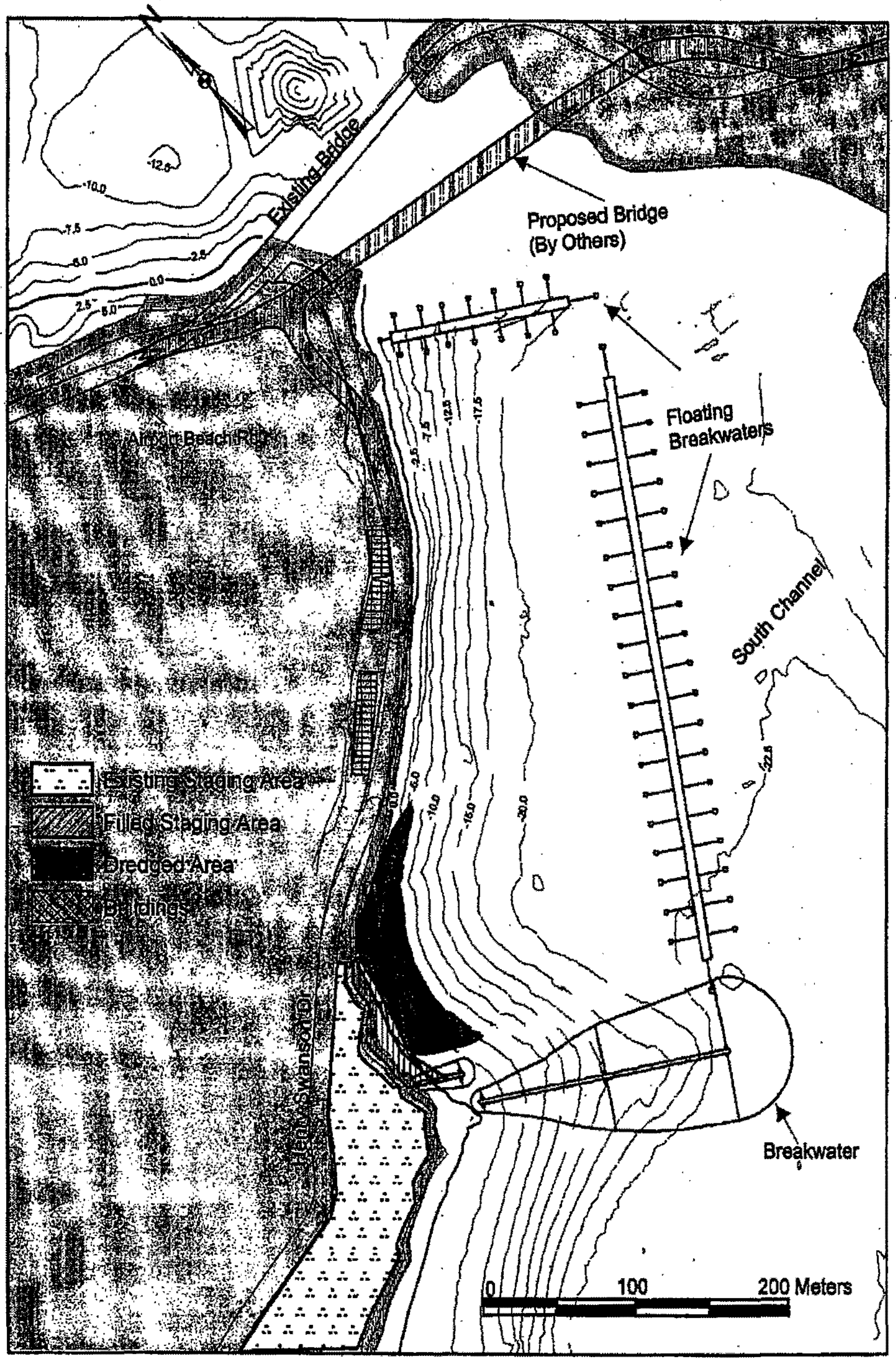


Figure 4: Basic design for the Little South America—North site (Alternative 2) (USACE 2003). Note: the bridge, to be constructed by the Alaska Department of Transportation, is not part of this project.

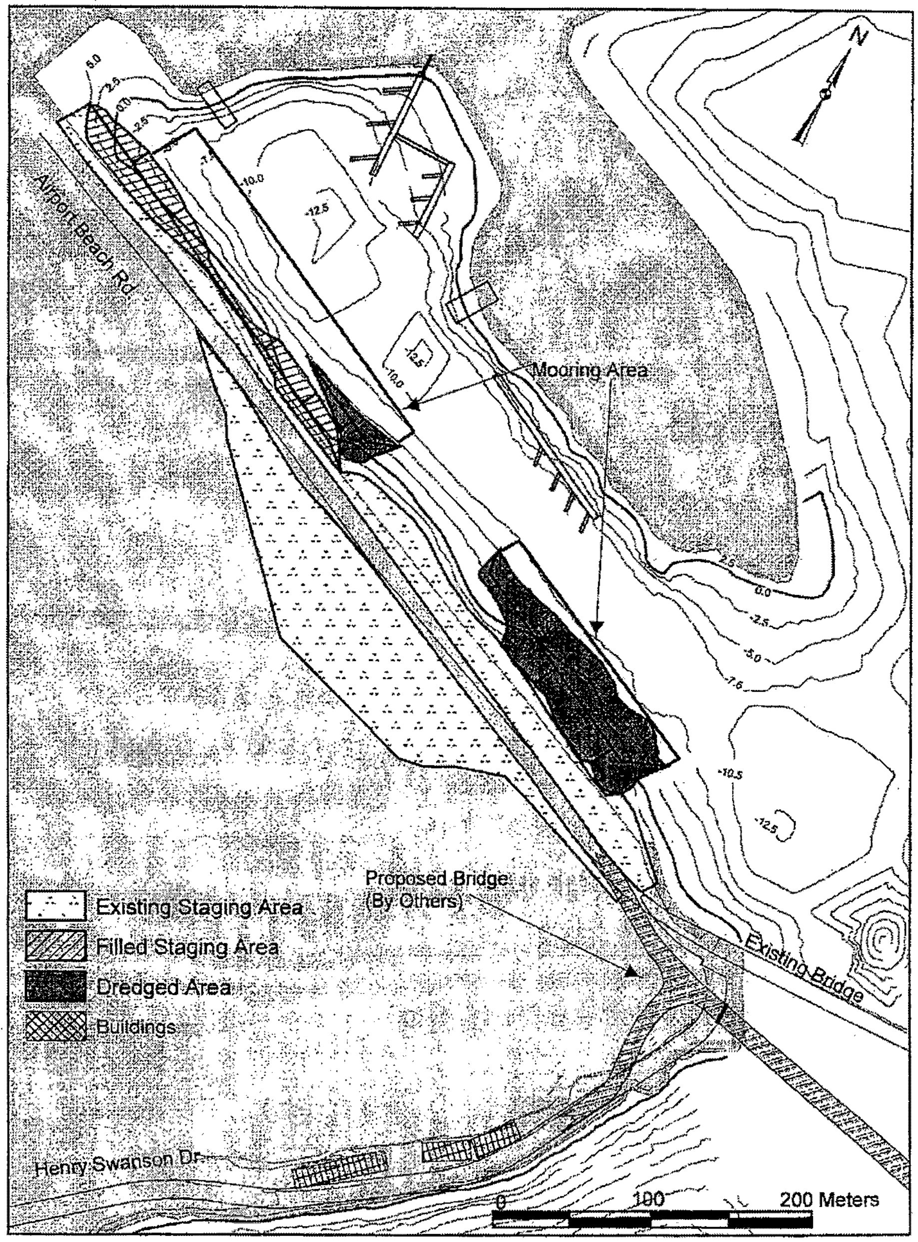


Figure 5: Basic plan for the Expedition Inlet portion of the Existing Boat Harbor/Little South America-North Combination (Alternative. 3) (USACE 2003). Note: The bridge, to be constructed by the Alaska Department of Transportation, is not part of this project.

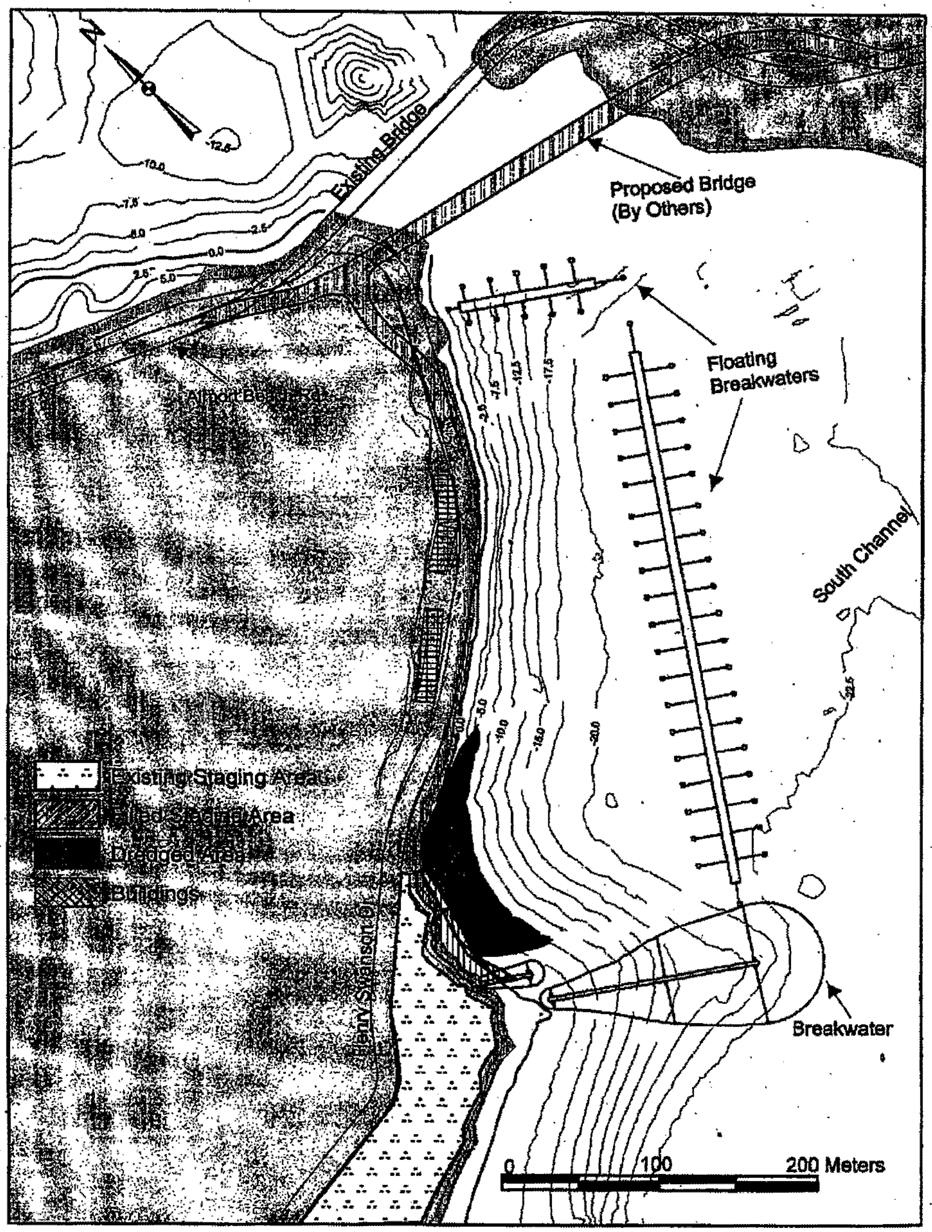


Figure 6: Basic plan for the Little South America-North portion of the Existing Boat Harbor/Little South America-North Combination (Alternative 3) (USACE 2003). Note: The bridge, to be constructed by the Alaska Department of Transportation, is not part of this project.

METHODS

Marine resources were described for three potential harbor sites (Figure 1) by completing a variety of surveys including dive surveys, pot-trapping, beach seining, and bird surveys. Sampling and direct observations were supplemented with scientific literature, reports, files, and local information, where appropriate.

DIVE SURVEYS

The Service completed dive surveys at potential harbor sites in July 1999, February and October 2001, and July 2003. Underwater footage of one of the harbor sites was videotaped opportunistically in July and October 2001.

At least two transects were completed at each alternative site by running a 100 m (328 ft) fiberglass tape from shore. Substrate, depth, plants and animals were recorded every 10 m, with some notes on organisms found between stations. Clam identifications were based on shells/siphons/entire clams observed at each sampling point. Substrates were classified according to grain size (grain size): silt , sand (1/16-2 mm), granule (2-4 mm), pebble (4-64 mm), cobble (64-256 mm), and boulder (256 mm+). Bedrock and shell hash were also noted. Sludge was used to describe black, largely unconsolidated sediments that appeared to have settled in seafloor depressions. These deposits were easily disturbed. Scientific and common names are used for clarity.

Biotic data were also recorded along the transect using a camcorder in an underwater housing. The data sheet observations were supplemented by replaying the videotape and noting the occurrence and species of plants/animals the observer may not have detected. Representative specimens of some species/habitats were later photographed from the digital video tape. The results of these transects were used, in combination with other assessment results, to determine the relative value (e.g., high, moderate, or low) for each site (Appendix 1).

POT TRAPPING

Benthic invertebrates were captured using "hair-crab" pots placed near some of the dive sites. The pot mesh was approximately 3 in (stretched). The pots were baited with three herring and were soaked near where the dive transects were to be completed. Pots were left for between 20 and 30 hours for each set. The results of pot trapping were used, in combination with other assessment results, to determine the relative habitat and ecological values for each site (Appendix 1).

FISH SURVEYS

Fish were surveyed using a 30-meter-long beach seine with a fine mesh net at the cod-end. This net was deployed from shore using a small inflatable skiff and retrieved by at least two people on shore, with the cod end coming ashore last. Fish were counted according to species and sub-samples of the catches were measured. A full description of the survey technique is described in Robards (1999). Due to the volume of some of the hauls, and our interest in returning the captured fish unharmed, we estimated the lengths of some of the catches or put them into size classes. This was particularly important where hundreds of mid-size fish could have crushed smaller fish within the net. The size classes were small (≤8 in), medium (8-12 in) and large/adult (12 in+). Beach seining results were used, in combination with other assessment results, to determine the ecological value (e.g. high, moderate, or low) for each site (Appendix 1).

BIRD SURVEYS

The primary emphasis of winter bird surveys was to document the seasonal abundance and distribution of Steller's eider, a threatened species. The Steller's eider survey data were compiled and evaluated under a Biological Assessment submitted by the Corps to the Service. The Service rendered an initial draft Biological Opinion on the local sponsor's preferred alternative (the Little South America–South harbor, Alternative 1), the alternative expected to result in the greatest adverse effect on eiders, on 10 November 2003. That draft was revised to incorporate additional information and clarifications on 5 February 2004. Please refer to those documents for specific eider information, levels of expected take of Steller's eiders for a harbor constructed/operated at this site, and mandatory terms and conditions.

Winter bird surveys in the Unalaska area were conducted by the Corps and the Service beginning in January 2000 (Hoffman 2001, 2002, 2003a, 2003b). Birds were surveyed three consecutive days approximately one month apart during December (2000-2002), January (2001-2003), February (2001-2003), and March (2001-2003) (Appendix 2). Surveys were also completed in November 2001 and April 2002, to verify that birds were arriving and departing during those months.

The Unalaska road system was used to access coastal areas. The coastal areas were broken into over 20 distinct geographic survey areas (sectors). This report only considers three of those sectors; Sectors 6, 7 and 23 (M. Schroeder, field notes; Hoffman 2002, 2003) and does not include winter survey information for bald eagles, ravens, nor gulls due to their abundance and widespread distribution throughout the Unalaska vicinity.

Sectors were initially established based on easily-recognizable landmarks, but were later sub-divided further to assess more site specific differences. For example, one sector, Sector 23, included Expedition Inlet and Iliuliuk Harbor. Once the Corps had determined that portions of Expedition Inlet could be part of a new harbor alternative, Expedition Inlet became sector 23A.

Because bird survey sectors were larger than the proposed harbor footprints, some bird species totals were adjusted to more accurately reflect bird use within the project area. For example, half of the cormorants, pigeon guillemots and murrelets counted were not included in the sector area totals in order to reflect their abundance only within the project sites. These species were evenly distributed within the sectors, and the project sites themselves were approximately ½ the size of the sector. However, 75% of white-wing scoters, long-tailed ducks, and murres were deleted from the total numbers of those species found within the survey because those species were not evenly distributed throughout the sector, rather they prefer offshore waters outside the project footprints. Survey results for all sectors were adjusted in the same manner to ensure that all sectors were treated equally.

Survey data were used to calculate average number of bird use days for each alternative, including the number of bird use days over the winter season. Bird use days are an estimate of the total number of birds multiplied by the total number of days visiting the site. A bird-use day refers to the use of the site by one bird on one day. For example, an individual bird using the site for a week would constitute seven use-days. The results of these surveys were used, in combination with other assessment results, to determine the ecological value (e.g,. high, moderate, and low) for each site (Appendix 1).

FISH AND WILDLIFE RESOURCES

ENDANGERED AND THREATENED SPECIES

The project is within the range of the Steller's eider (threatened), Steller sea lion (endangered), fin whale (endangered), and humpback whale (endangered). The Alaska breeding population of Steller's eiders was listed as a threatened species on 11 July 1997. The southwest population of the northern sea otter is proposed for listing under the ESA, and occurs in the vicinity of Unalaska. Because some of the proposed harbor sites were likely to adversely affect Steller's eiders, formal consultation under the Endangered Species Act was required. The Corps prepared a Biological Assessment and the Service rendered an initial draft Biological Opinion on 10 November 2003. Based on further project and other information from the Corps and the City of Unalaska, and several discussions with the Corps and City, the Service issued a revised draft Biological Opinion on 5 February 2004. The City and Corps have agreed to implement the non-discretionary terms and conditions in that Biological Opinion (10 December 2003 teleconference with the Corps and the City of Unalaska), however the Corps has stated that final agreement to implement the mandatory Terms and Conditions is contingent upon Congressional authorization and final decision by the City.

The Biological Opinion included a conference report that concluded that the proposed action is not likely to jeopardize the continued existence of the southwest Alaska Distinct Population Segment of the northern sea otter. Information presented in either the Corps' Biological Assessment or the Service's Biological Opinion will not be duplicated in this Coordination Act Report. Therefore, sea otters are only described in the most general sense within this report. For more detailed information on Steller's eiders and northern sea otters, please consult the Corps' Biological Assessment and the Service's Biological Opinion.

FINDINGS AT ALTERNATIVE 1: LITTLE SOUTH AMERICA SOUTH

DIVE SURVEYS

Nine dives were conducted in the vicinity of this alternative (1999-2003) (Figure 7). Seven of these were transects, with information collected every 10 m. Two other dives were free-dives, (numbers 6 and 9, Figure 7) with general information collected. Of the nine dives, seven were conducted within the project site of Alternative 1b (i.e., dives 1, 2, and 5 through 9). Dive transects 3 and 4 were conducted on the reef at the southern tip of Amaknak Island. This reef extends around the tip of Amaknak Island, and extends up into the southern portion of LSA-South. Alternative 1, as originally proposed without the design modifications described in Alternative 1b, would result in placement of the southern rubblemound breakwater on top of a portion of this reef. The observations for Little South America--South were supplemented with dive transect descriptions from previous surveys made by the National Marine Fisheries Service (NMFS; Smith 1989) and the Service (Boughton 1974).

Five marine transects were used to describe the general habitat conditions of the pocket beach/cove at LSA-South, east of the southern tip of Amaknak Island (Figure 7). The substrates of the cove consist of granular material with more cobble and gravel in shallower areas. Boulders were present in the first 20 m (65.6 ft) of the eastern part of the cove. The western part of the cove was bounded by a prominent bedrock reef and its margin transitioned from the bedrock to a mixture of boulders (underwater talus) and cobble to more cobble and granular substrate.

The beach has a shallow slope and the intertidal zone extended seaward as much as 15 m (Figure 8). Conspicuous bands of blue mussels lined the intertidal zone, primarily along the western end of the intertidal beach towards the southern tip of Amaknak Island. In March 2000, two semi-contiguous beds consisting of a mussel/*Fucus* matrix measured approximately 6 m (20 ft) deep by 60 m (200 ft) wide. Another mussel bed was established along the eastern margin of the cove and was of approximately the same size as the other two areas. The intertidal zone had patches of rockweed (*Fucus gardneri*) and sea hair (*Enteromorpha intestinalis*) attached to rocks, where present and of suitable size. Snails, limpets, and barnacles densely covered the cobble and larger boulders, where available.

Clams, hermit crabs, and a few sculpins and rock sole were observed in the intertidal zone. Juvenile pink salmon and other juvenile fish were observed in the shallows.

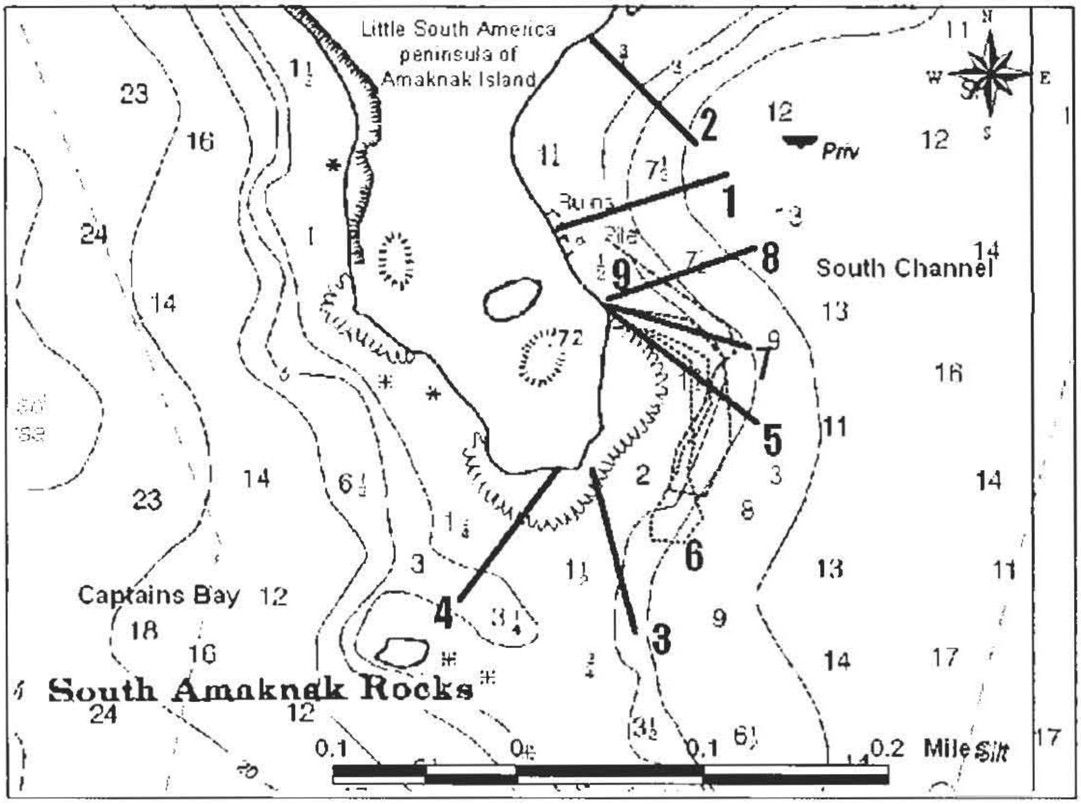


Figure 7: Dive sites at the Little South America—South alternative. Dives 1 and 2 were completed in July 1999, Dives 3 and 4 in February 2001, Dives 5 and 6 in October 2001, and Dives 7, 8 and 9 in July 2003.

Figure 8: Photograph of pocket beach in Little South America–South site (Alternative 1) (July 2003). Note substrate and width/extent of intertidal area, including mussel/*Fucus* beds.

Dives 1 and 2: Fringed sieve kelp was the dominant vegetation in subtidal habitats, being more abundant on the western portion of the cove. Green sea urchins were found along the entire length of both transects. The substrates on the western two-thirds of the cove down to approximately -12.5 m (-40 ft) were largely covered with shell hash (empty shells) representing at least eight species of clams. Clam identifications were based on shells/siphons/entire clams observed at each sampling point. These clams (in relative order of abundance) were: butter clams (*Saxidomus gigantea*), heart cockle (*Clinocardium nutalli*), truncated Mya (*Mya truncata*), false softshell (*M. psuedoarenaria*), bent-nose Macoma (*Macoma nusata*), Pacific littleneck (*Protothaca staminea*), Arctic Hiatella (*Hiatella arctica*), and rock Entodesma (*Entodesma navicula*). Clam siphons were conspicuous, with a peak density of about 12 siphons per ¼ m^2 observed. In addition to nearly continuous shell hash, a few species were observed on the surface (e.g., heart cockles). This high clam density was further supported by the abundance of sunflower stars (*Pycnopodia helanthoides*), a notorious clam predator and the abundance of pits the stars had made pursuing their prey. Clams/shells were observed beyond about -12.5 m (-40 ft), but they were less numerous and has patchy distribution.

Butter clams, shrimp, helmet crabs (*Telmessus spp.*) and juvenile red king crab were previously documented at the site by Smith (1989). Service divers documented the occurrence of several crab species down to about -14 m (-45 ft). The most numerous crabs were hermit crabs (*Pagurus* and *Ellasochiris*), but other species were conspicuous, including horse crabs, red king crabs, tanner crabs, and decorator/lyre crabs.

Dives 3 and 4: Two marine transects were surveyed off the extreme southern tip of Amaknak Island in February 2001 (Figure 7). These dives were conducted on the reef complex at the southern tip of Amaknak Island, and were not directly in the LSA-South project site. This reef complex extends up and into the southern portion of the proposed LSA-South site (the originally proposed Alternative 1 would place the rubblemound directly on high-value mussel bed habitats on this reef). The results of these transects document the high value of this reef complex to fish and wildlife resources. Because of the recognized high value and importance of this reef complex, the Corps' tentatively recommended plan is Alternative 1b, which incorporates moving the rubblemound breakwater off of the reef. While the majority of direct impacts to the reef would be avoided, it appears that the distal edge of the rubblemound breakwater would still impact the reef. Furthermore, there are also potential indirect impacts as a result of the proximity of the breakwater and alteration of currents. Data from dive transects on the reef can be found in Appendix 4.

Dives 5 and 6: Additional dive surveys were conducted in October 2001. One dive was along an established transect, the other dive was a free dive to generally survey areas beyond the reach of the 100 m (328 ft) tape. The transect dive continued to confirm that the area closer to the exposed wave-cut platform/reef had high diversity and abundance of clams, urchins, and seastars. Clam shells in this habitat were often covering the entire substrate. The number of predatory Echinoderms also indicated a large concentration of bivalves (Figure 9). As the depths along this transect did not exceed 5 m (18 ft), numerous snails, limpets, and anemones were observed. *Agarum* kelp was patchily distributed, greater than 50 m (164 ft) from shore and was associated with swarms of *Euphausiids*.

The divers descended quickly to get below a low-visibility layer at about -6 m (-20 ft). From that point they descended along the margin of the bedrock/granular interface and associated ecotonal habitats. In addition to the species previously described, divers found red king crab (*Paralithoides camtschaticus*) (harvestable adults, Figure 10), Arctic lyre crab (*Hyas coarctatus*), free-swimming scallops (*Chlamys* spp.), tanner crabs (*Chionoecetes bairdi*) (harvestable adults), sun star (*Solaster dawsonii*), blood star (*Henrecia leviuscula*), rainbow star (*Orthosterias koehleri*), black Katy chiton (*Katherina tunicata*), white Dorids (*Diaulula sandiegensis*), red Irish lord (*Hemilepidotus hemilepidotus*), fiber tube worm colonies (*Pista elongate*), and white-spotted rose anemone (*Urticina lofotensis*) with associated clown shrimp.

Figure 9: Marine substrate in the Little South America—South site. Note layering of surface with shell hash indicating the abundance of clams. A heart cockle (*Clinocardium nutalli*) is near the center of the photograph.

Dive Transects 7-9: Three more dives were conducted at this site in July 2003. The first two dives were transects, the last dive was a free dive to generally survey areas beyond the reach of the 100 m (328 ft) tape. The first dive transect achieved a depth of -7 m (-22 ft) at 100 m (328 ft) from shore. Substrates were primarily granular/cobble blends with some bedrock outcroppings. *Fucus* was the dominant kelp to -2 m (-5 ft) where *Agarum* became abundant. Clams were abundant and represented numerous species (USFWS 2003). Some empty, but still paired, clam shells bore chips along their margins that indicated predation by large crabs.

The second transect also documented abundant clams of several species to and beyond-12.5 m (-40 ft). Juvenile red king crabs were noted at this depth, as well as an increasing number of shrimp. Most fish species (including juvenile rock sole) were observed down to -7 m (-22 ft), but a few pricklebacks were noted at -14 m (-45 ft).

POT TRAPPING

Two "hair-crab" pots were placed in the small cove east of the southernmost tip of Amaknak Island for two days during the dive surveys in July 1999 and 2003. In 1999, the western pot captured 10 widehand hermit crabs (*Elassochirus tenuinamus*). The eastern pot captured a sunflower star (*Pycnopodia helianthoides*), a green sea urchin, and three Oregon triton (*Fusitron oregonensis*). These organisms were released *in situ.*

One pot set in -12.5 m (~40 ft) water depth for 19 hours in July 2003 resulted in the capture of nine female red king crabs (juveniles, 65-115 mm carapace width). This documented that the site is used for rearing by red king crabs (Figure 11). The Little South America--South site is within the distribution of red king crab, Tanner crab (*Chionoecetes bairdi*) and shrimp, including shrimp egg hatching and rearing concentrations (Resource Analysts 1990). All of these species were documented to still make use of the site.

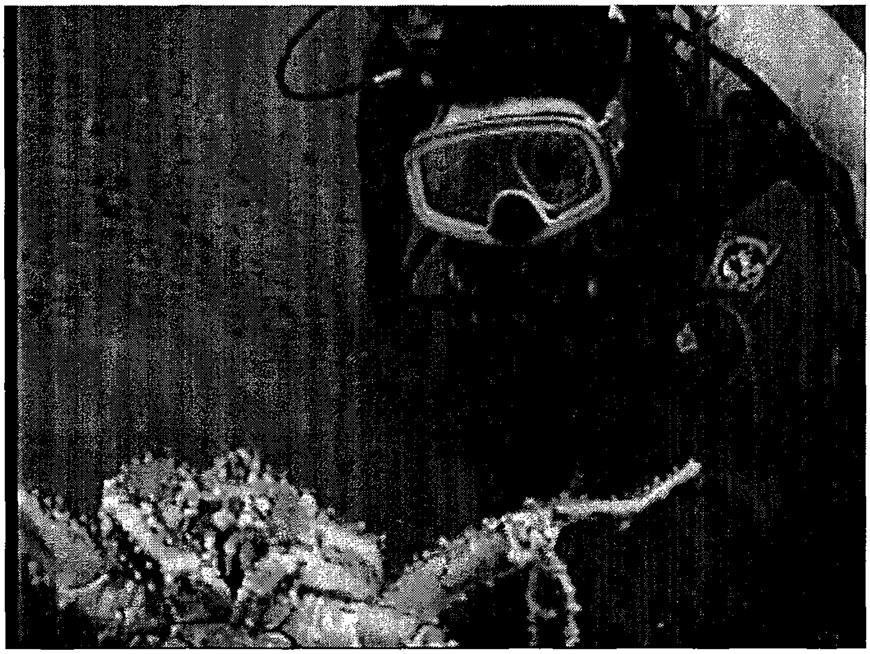


Figure 10: A Service diver locates an adult red king crab on the north side of the reef habitat in about -45 ft water depth, Dive 6.

Figure 11: Rearing juvenile red king crab found at the LSA—South site.

FISH SURVEYS

The Service completed SCUBA surveys in November 1973 along the eastern shoreline of the South Channel (Captains Bay) and documented the presence of the red Irish lord, a greenling, and a prickleback (Boughton 1974). Smith (1989) noted juvenile Pacific cod on the 1989 SCUBA surveys at this site. Resource Analysts (1990) reported that sockeye and pink salmon were harvested in Unalaska Bay, including Captains Bay. The site is within a known herring rearing and feeding area (Resource Analysts 1990).

Beach seines were used to determine the composition of the nearshore fish community at this site in 1999, 2002, and 2003 (Table 1). At least eight of these species are important to local subsistence users or the commercial fishing industry and several species were captured in large numbers (500+). The same species were generally captured at both seining locations, however Pacific sandfish, the greenlings, and sturgeon poacher were captured only at the western site where kelp was more abundant. The number of different fish species represented by large numbers of juveniles supported the perception that the Captains Bay area functions as an estuary.

Other fish species appeared out of the reach of the beach seine sampling technique. Additional sampling or sampling during different times of the year would likely yield additional species.

BIRD SURVEYS

Bald eagles: There is a bald eagle nest on the largest of the South Amaknak Rocks, offshore of the southern tip of Amaknak Island. The productivity of this nest is unknown, but adults are regularly in attendance. The nest is located near, but not in, the LSA-South project site.

Seabird Colonies: There is a seabird colony reported at the extreme southern end of Amaknak Island on a bluff over the South Channel (Nysewander *et al.* 1982, USFWS 2000). Twenty horned puffins (*Fratercula corniculata*) and an unknown number of nesting pigeon guillemots

(*Cepphus columba*) reportedly use the site. Another seabird colony exists off the southern tip of Amaknak Island on the South Amaknak Rocks. Eighteen pigeon guillemots reportedly nest there. An investigation of the site in June 2001 resulted in locating a series of overgrown burrows that may have been used by nesting puffins, but the colony has been abandoned. The reason the colony was abandoned could not be determined. The colonies are located near, but not in, the LSA-South project site.

Table 1: Results from beach seining at two sampling locations within the Little South America--South site (Alternative 1) (1999-2003). The 1999 results are from Robards (1999).

LSA -- South	July 20, 1999		July 22, 1999		July 9, 2002		July 23, 2003	
North of old pilings								
Species	Length/Age	Number	Length/Age	Number	Length/Age	Number	Length/Age	Number
Great Sculpin	all sizes	15	all sizes	3	all sizes	14	all sizes	8
Pink Salmon	juvenile	322	juvenile	481	juvenile	15	juvenile	5
Rock Sole				2	all sizes	4	all sizes	8
Dolly Varden		1			all sizes	115		
Walleye Pollock	juvenile	4	juvenile	160				
Silver-spotted Sculpin		2						
Atka Mackeral			juvenile	1				
Sandlance				1			50-70mm	1,309
Pacific Cod					juvenile	54	juvenile	263
Pacific Sandfish							~100mm	15
Sockeye salmon							smolt	1
White-spotted Greenling							160mm	1
Masked Greenling							n/a	1
Sturgeon Poacher							~250mm	1
Telmessus spp. crab		not noted		2				2
Under Quarry								
	July 20, 1999		July 22, 1999		July 9, 2002		July 23, 2003	
Species	Length/Age	Number	Length/Age	Number	Length/Age	Number	Length/Age	Number
Great Sculpin	all sizes	5	all sizes	3	all sizes	11	all sizes	3
Pink Salmon	juvenile	472	juvenile	713	juvenile	41	juvenile	3
Rock Sole					all sizes	14	all sizes	7
Dolly Varden				1	369mm	1		
Walleye Pollock	juvenile	1004		149				
Sandlance					~150mm	3	50-70mm	~1,500
Pacific Cod					juvenile	51	juvenile	185
Sockeye salmon							smolt	1
Telmessus spp. crab		not noted		2		6		1
Evasterias seastar		not noted		not noted		2		none

Winter Bird Surveys (Sector 7): Sector 7 corresponds to the Alternative 1 footprint, however it extended out to the middle of the South Channel and reef complex. Bird surveys were completed by foot and from a vehicle as road access is good and all points along the shoreline were easily observed. The entire project footprint was used by wintering birds for resting.

The bird community consisted of nearshore species that forage on large mollusks (scoters), smaller mollusks and invertebrates (harlequins, scaup, long-tailed ducks), and fish (cormorants, mergansers)(Figure 12). Not including Steller's eiders, the most numerous birds within this area during winter were harlequin ducks (120/day), black scoter (88/day), white-winged scoters (52/day), long-tailed ducks (30/day), and pigeon guillemots (15/day), with 10 other species averaging less than 5/day.

As described further in the Methods section, bird survey data were used to calculate the average number of bird use days for each alternative. On average, 331 birds used the harbor site each winter day. This consistent and high use of this site by diverse bird species is evidence of the high value habitat this area provides for foraging and resting seabirds and waterfowl in winter. During a typical winter season (i.e., Dec.-Mar.), approximately 30,747 bird-use days would accumulate within the harbor site.

Figure 12: Sea ducks using LSA-South project site.

FINDINGS AT ALTERNATIVE 2: LITTLE SOUTH AMERICA --NORTH SITE

The same general techniques were used to assess the marine resources at the Little South America—North site (Figure 13).

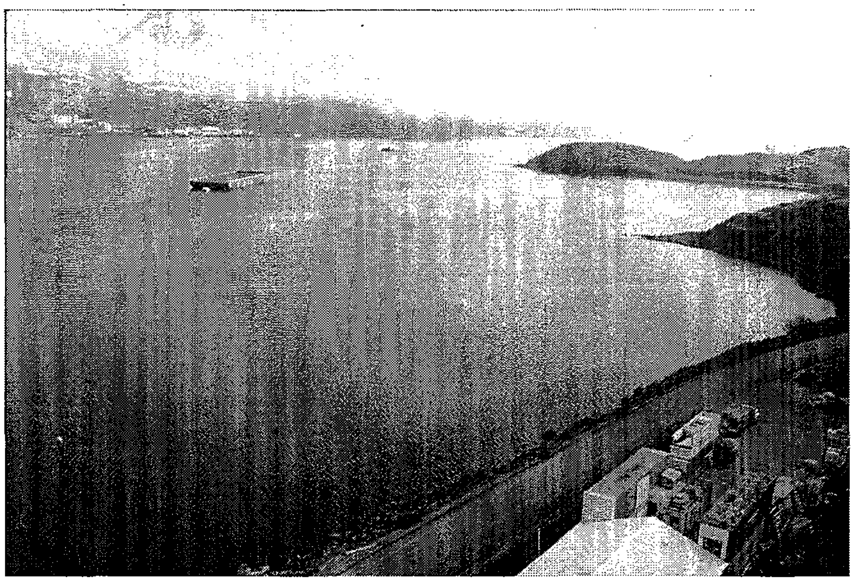


Figure 13: The Little South America—North site as viewed from above the Prime Alaska Seafood crab holding facility.

DIVE SURVEYS

The Service conducted two dives at this site in October 2001 (Figure 14). The first dive originated from the small pocket beach in the southern corner of the project area. The beach was relatively shallow with clean granular substrates and occasional boulders. *Agarum* kelp was moderately abundant down to a depth of about -12.5 m (40 ft). The intertidal zone was widest in this location and a variety of snails, hermit crabs, and urchins were abundant. Divers noted an abundance of clams representing several genera (*Mya, Protothaca*, *Clinocardium*, and *Saxidomus*) to the end of the transect at about -12.5 m. Clam density was similar to that of the nearest part of the adjacent cove of the LSA--South site, previously described.

The second dive at this site originated from between the Prime Alaska Seafoods buildings and the vacant building foundations to the north. The shoreline was steep to about -7.5 m, which made the intertidal zone quite narrow. The substrates varied down to -7.5 m, with much of the transect areas beyond that point being covered with a layer of fine sediment. These substrates continued until the end of the transect, with occasional outcroppings of bedrock about 18 m (60 ft) deep on the bottom of the channel. The sediments were not thick as there were numerous adult tanner crabs at these depths. The rock outcroppings were abundantly covered with sponges, urchins, and a few chitons. The outcroppings provided cover for some fish, such as greenlings. The dive survey ended at 80 m from shore due to harassment by six sub-adult sea lions.

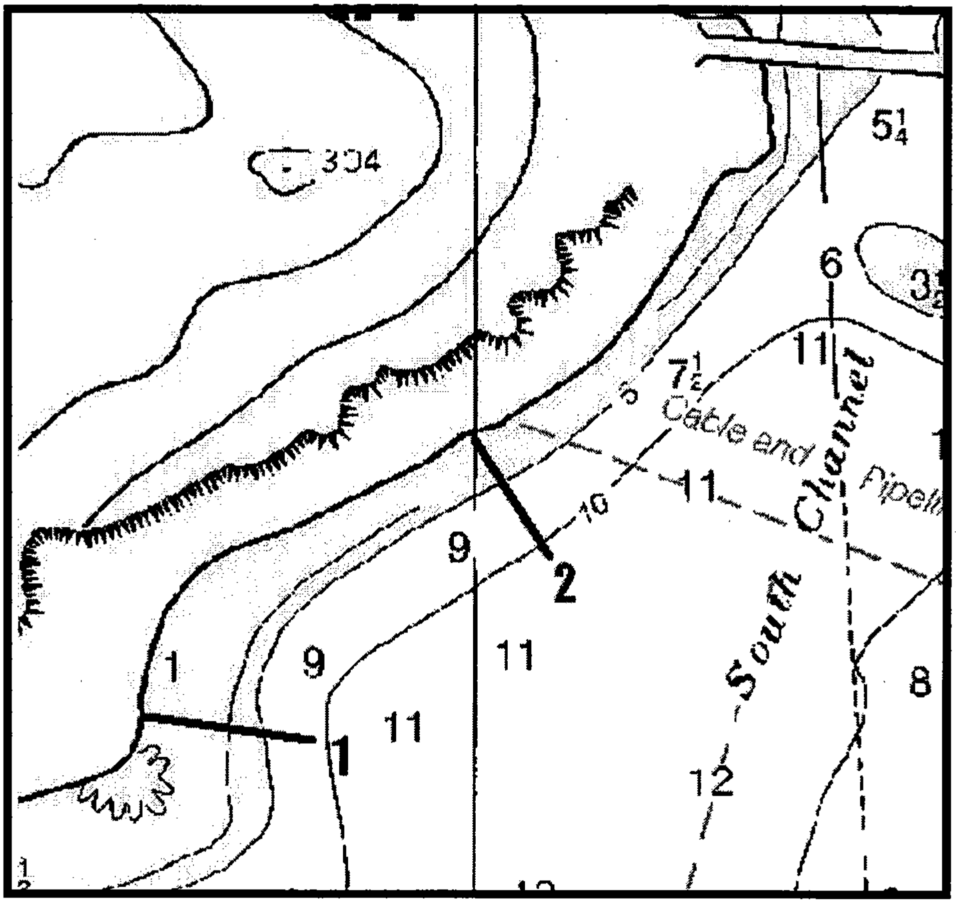


Figure 14: Dive sites within the Little South America—North site (Alternative 2), October 2001.

POT TRAPPING

A crab pot was set in about -18 m (60 ft) of water (near a concentration of about 40 other crab pots) at the LSA-North area in July 2002, but nothing was captured.

FISH SURVEYS

Beach seines were used to determine the composition of the nearshore fish community at this site in July 2002 and 2003 (Table 2). At least five of these species are important to local subsistence users and the commercial fishing industry and several species were captured in moderate numbers (150+). Perhaps the most unusual species captured at this site was the juvenile sablefish. Additional sampling or sampling during different times of the year would likely yield additional species.

Table 2: Results of beach seining at two sampling locations within the Little South America–North site (Alternative 2) (2002-2003).

Little South America–North				
	Prime Alaska			
	July 9, 2002		July 23, 2003	
Species	Length/Age	Number	Length/Age	Number
Sculpin	medium	6		
	large	1		
Pacific Cod	juvenile	252	juvenile	40
Pink Salmon	juvenile	72	large adult	3
Sandlance	~150mm	1	60-70 mm	21
Sablefish	juvenile	13		
Sturgeon Poacher	26mm	1		
Dolly Varden			large adult	1
Sockeye Salmon			juvenile 120mm	1
Crescent Gunnel				1
	Barge Landing			
	July 9, 2002		July 23, 2003	
Species	Length/Age	Number	Length/Age	Number
Pacific Cod		166		
Sandlance		172		
Sockeye Salmon	162-170mm	2	small	2
Dolly Varden	162-177mm	2	small	1
salmonid spp.	111-175mm	13		
Pink Salmon			70-74mm	6
			medium	1
Great Sculpin				1
From incomplete haul at this site				
Rock Sole			315-330mm	2
Pink salmon			120mm	1
Great Sculpin			190mm	1

Bird Surveys

Bald Eagles: There is a bald eagle nest on a bluff behind Prime Alaska Seafoods along Henry Swanson Drive. This nest produced young in 2002 and 2003. The nest is near, but not in, the project site.

Winter Bird Surveys (Sector 6): Sector 6 corresponded to the northwest shoreline from the South Channel Bridge to a reef about midway to the southern tip of Amaknak Island. This corresponds well with the project area for the Little South America—North harbor site (Alternative 2). Bird surveys were completed from a vehicle as road access is good and all points along the shoreline were easily observed.

Not including Steller's eiders, the most numerous birds within this area during winter were white-winged scoters (85/day), followed by harlequin ducks (30/day), long-tailed ducks (29/day), black scoters (28/day), scaup (13/day) and six other species averaging less than 6/day (Appendix 2). On average, over 200 birds of 11 species use the harbor site each winter day (Dec.-Mar.). While species diversity was slightly less than at the LSA–South site, abundance was about 40% less (estimate of birds using LSA-South site per day = 331; LSA-North = 200; hence, about 40% fewer birds per day use LSA-North [calculated as: 1 – [200/331]. Approximately 13,450 bird-use days would accumulate per winter season for the Alternative 2 harbor site.

FINDINGS FOR ALTERNATIVE 3: EXISTING BOAT HARBOR AND LITTLE SOUTH AMERICA–NORTH SITE

Alternative 3 is a two-part project that includes redesigning the existing boat harbor in Expedition Inlet to increase its size and provide a more efficient mooring layout. As additional moorage would be required to meet the design fleet, another, smaller harbor would be constructed along the north side of the South Channel at the LSA–North site. The new LSA–North harbor portion of Alternative 3 would be smaller than any of the other stand-alone alternatives (1, 1b, or 2)because it makes use of an existing harbor facility. Because the Little South America–North portion of this alternative was previously described, this section focuses on the Expedition Inlet portion of the alternative design (Figures 15 and 16).

DIVE SURVEYS

A snorkel survey was made at the existing small boat harbor in June 2001. This was not a systematic survey. The small boat harbor appeared to be greater than 20 feet deep at the outer end of the finger floats, decreasing to about 0.6 m (2 ft) in depth under the gangway. Water visibility was poor, less than 2 m (6 ft) around most of the harbor. Fish waste particles appeared to be suspended in the water column. The floats themselves support a dense concentration of mussels and some plumose and Christmas anemones, most of which were actively feeding.

At that time there was a sandy bottom covered with a fine layer of dark sediments under most of the harbor area. There were occasional clumps of *Fucus* near the edge of the mooring basin. A few mottled sea stars and an occasional sea urchin were observed. One crab (*Telmessus* sp.) was noted next to some rusting debris. An abundance of fishing debris and other domestic trash were observed during the snorkel survey, despite efforts by local divers to remove as much garbage as possible.

Dives 1-4: Four dive transects were completed at the existing boat harbor in July 2003 (Figure 14). Dive video was collected for transects 1-3, no video was recorded for transect 4. The Dive 1 transect originated from shore close to the north end of the main float (Figure 17). The deepest point reached was -14.5 m (-47.6 ft). The shoreline dropped off fairly steeply to a flatter slope that continued to a depression within the inlet. The intertidal area was narrow with large armor stone/fill. The subtidal area consisted of cobble with gradually increasing amounts of fine sediments until reaching about -10 m (-33 ft) where the substrate changed to a sludge composition. There were patches of *Agarum* kelp on the slope, but none on the sludge substrate. Plumose anemones were present at all depths, including over the sludge substrate (but only on persistent marine debris extended above it). A variety of clams were identified in moderate densities. There were occasional mottled and sunflower stars. Juvenile rock sole were noted near the toe of the slope. Snake pricklebacks were just about the only life-form noted in association with the sludge substrate, where they were abundant.

The Dive 2 transect originated from a small point east of the main float (fish cleaning station) and the Galaxy Dock (Figure 17). The deepest point reached was -15 m (-48 ft). The end of the transect tape coincided with the slope-break for the southern slope of the harbor. The shoreline dropped off quickly to a steeper slope that ended at sludge starting at -10 m (-33 ft). *Agarum* was patchily distributed on the steep slope. The intertidal area at this site was narrow, consisting of boulders and then shifting to a boulder/pebble, granular/pebble, then granular substrate before the sludge. A variety of clams were identified in moderate densities. There were occasional mottled and sunflower stars. Schools of juvenile cod were noted at many stops, but these may have been following the divers. As with the previous dive, snake pricklebacks were one of few life forms found in abundance on the sludge habitats.

The Dive 3 transect originated from shore at the west end of the eastern float, east of the Galaxy Dock. The deepest point reached was -12 m (-41 ft). The shoreline dropped off quickly to a steeper slope that ended at about -12 m (-40 ft). The transect continued across a sill/saddle and began rising towards the far shoreline. The divers ended at 100 m in water 5 m (15 ft) deep. The intertidal area was narrow with large armor stone/fill. The subtidal area consisted of granular substrate with gradually increasing amounts of fine sediments at -12 m (-39 ft) at a distance of 50 m (164 ft) from shore. Light silt was the predominant substrate for the next 20 m (66 ft) before returning to cobble when the divers ascended the opposite slope.

There were patches of *Agarum* kelp on both slopes. Plumose anemones were fairly common. A variety of clams were identified in moderate densities. There were occasional mottled and sunflower stars. Juvenile cod were common along the middle of the transect, stations 20-70 m, but they may have been following the divers. A few snake pricklebacks were in the channel bottom over fine sediments at lower densities than the previous two transects.

The Dive 4 transect originated from shore at the eastern end of the eastern float, east of the Galaxy Dock (Figure 17). The deepest point reached was 9 m (-31 ft). The shoreline dropped off quickly and then gradually flattened out before beginning up the opposite slope. The intertidal area was narrow and consisted of bedrock.

There were patches of *Agarum* kelp on both slopes. Plumose anemones were fairly common. A variety of clams were identified in moderate densities; butter clams were noted at every station. Mottled and sunflower stars were less common than the previous three transects. Juvenile cod were noted at one station, but crescent gunnels and great sculpins were more common than in the previous three transects. Urchins were most common at the end of the transect, in association with dense patches of *Agarum*. A pod of about 200 juvenile red king crabs was discovered and it quickly broke up, with red king crabs scattering in all directions.

The outer margin (intertidal area) of the mooring basin was lined with rip-rap and these boulders had little colonization by marine organisms (Figure 18). The length of time that the rip-rap has been in place is unknown. The basin area was impacted by a layer of sludge that did not appear capable of supporting benthic organisms. The habitat quality of Expedition Inlet improved as one moved further from the mooring area where there were cleaner substrates, more gradually sloping subtidal habitats, and less persistent marine debris from docks/vessels.

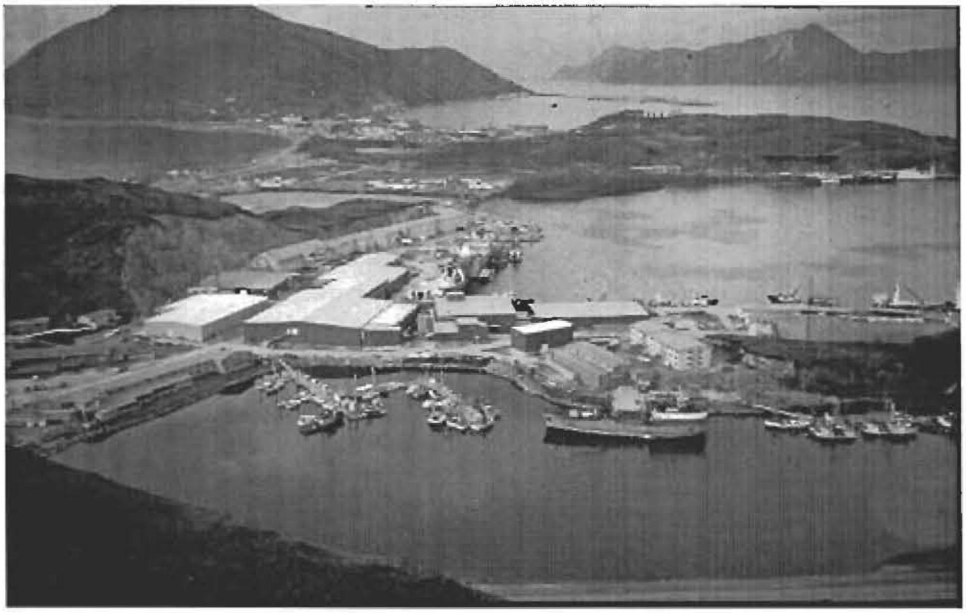


Figure 15: The existing boat harbor within inner Expedition Inlet, Amaknak Island, Alaska, 1992. Vessel near center of photograph is the 55 m (180 ft) F/V Galaxy at the Galaxy Dock.

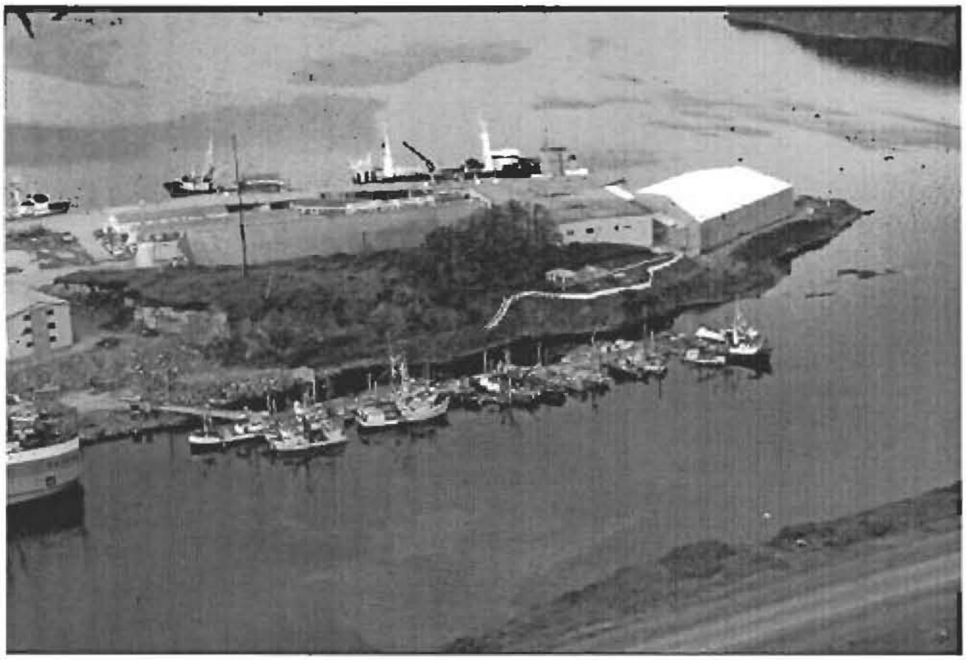


Figure 16: The eastern section of existing boat harbor along the outer portion of Expedition Inlet, Amaknak Island, Alaska, 1992. Rear of vessel on extreme left is the 55 m (180 ft) F/V Galaxy

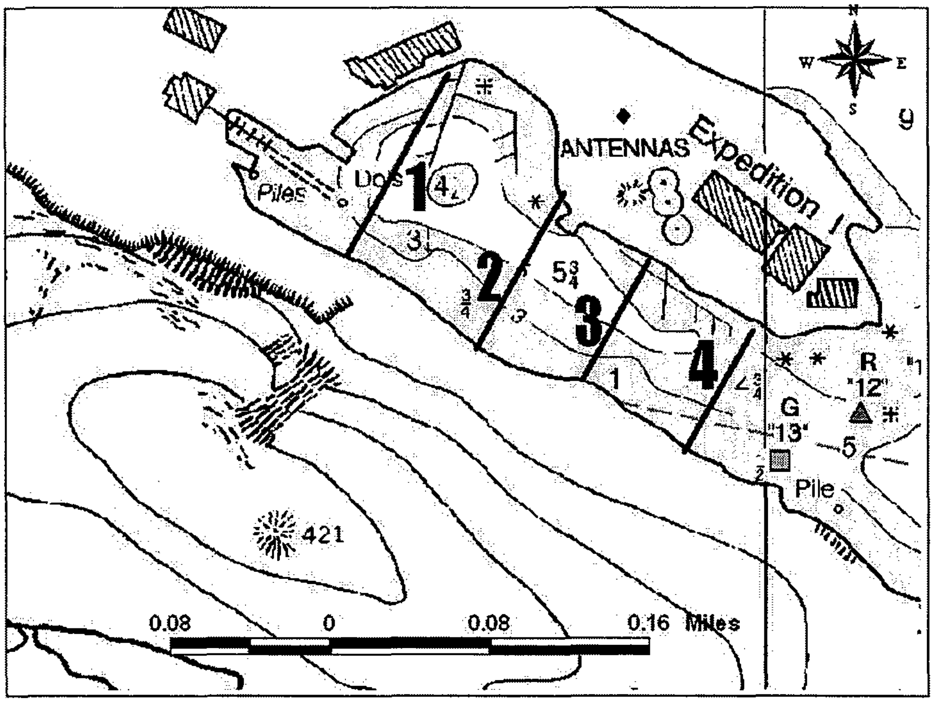


Figure 17: Dive locations within Expedition Inlet (July 2003).

FISH SURVEYS

Beach seines were used to determine the composition of the nearshore fish community at the existing boat harbor site (Figure 19). Beach seining was completed at four different sites within Expedition Inlet in July 2002 and 2003 (Table 3). Small numbers of juvenile fish were captured near the boats within the harbor, west of the main gangway. Fewer juvenile fish were captured from the rip-rap habitat across from the main floats and from between the two primary floats. Fish abundance and diversity were greatest near undisturbed habitats at the entrance to Expedition Inlet, at its confluence with Iliuliuk Harbor. The largest haul captured over 450, ~0.3-meter-long (<1ft) Dolly Varden and several adult salmon (Table 3). Fishery resources were most limited for the inner portion (western half) of Expedition Inlet. Fish abundance was greatest in relatively undisturbed habitats, especially more gently-sloping intertidal areas, within the outer portion (eastern half) of the inlet. Additional sampling or sampling during different times of the year would likely yield additional species.

POT TRAPPING

The site is within the breeding and rearing distribution of red king crab, Tanner crab (*Chionoecetes bairdi*) and shrimp, including shrimp egg hatching and rearing concentrations (Resource Analysts 1990). Two crab pots were placed in the western portion of the Existing Boat Harbor on 11 July 2002 in waters 8.1 ft and 10.2 ft deep. One pot had dozens of green sea urchins and the other contained two horse crabs, a sunflower star, and several urchins. A pot set in about 40 ft of water on 25 July 2003 did not capture anything.

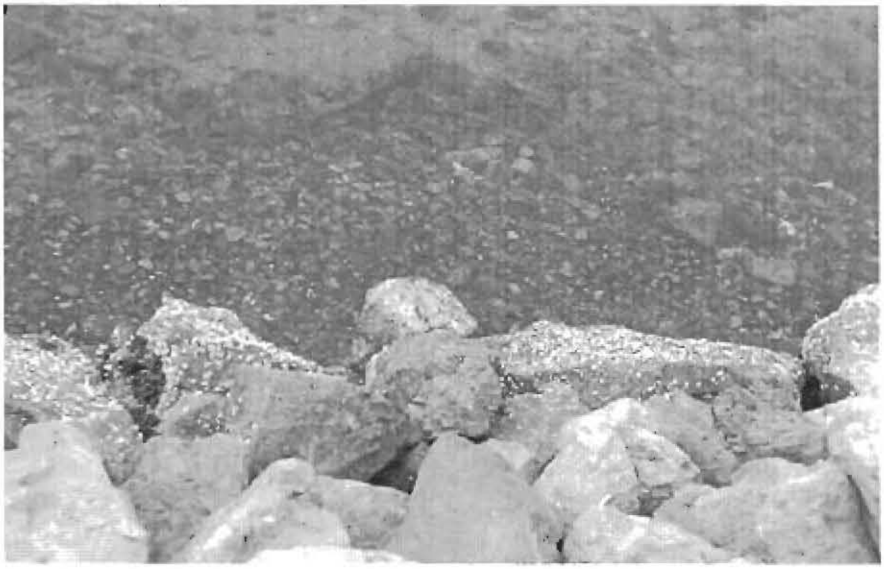


Figure 18: The intertidal zone of the existing boat harbor in Expedition Inlet consisted of rip-rap/armor stone that is poorly colonized with marine organisms.

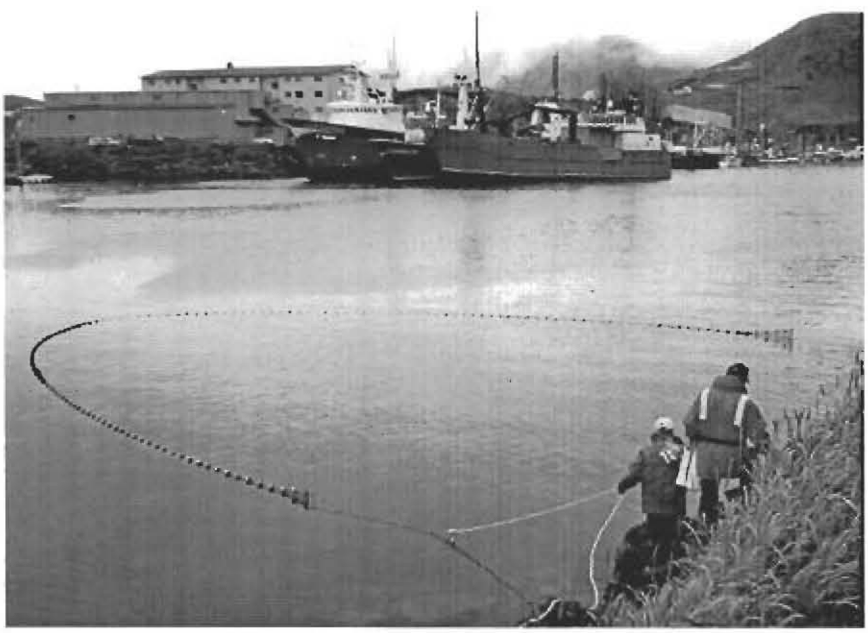


Figure 19: Beach seining within the existing boat harbor, July 2003. Red fishing vessel in background is the 50 m (164 ft) Gun-Mar.

Table 3: Results of beach seining at four sampling locations within the Existing Boat Harbor/Expedition Inlet site (part of Alternative 3) (2002-2003).

Existing Boat Harbor/Expedition Inlet				
	West of Main Float			
	July 9, 2002		July 23 2003	
Species	Length/Age	Number	Length/Age	Number
Pacific Cod	juvenile	23	juvenile	9
Pink Salmon	juvenile	24	juvenile	1
Dolly Varden	205 mm 235 mm	2		
Sockeye Salmon	90 mm- 165 mm	17	juvenile	1
	Small Boat Harbor (Rip-Rap)			
	July 9, 2002		July 25, 2003	
Species	Length/Age	Number	Length/Age	Number
Pacific Cod	juvenile	2		
Dolly Varden	large	2	300 mm	1
Pink Salmon	juvenile	2	juvenile	14
Sockeye Salmon	juvenile	3		

Table 3. cont.

	West of Galaxy Dock			
	July 9, 2002		July 24, 2003	
Species	Length/Age	Number	Length/Age	Number
Pacific Cod	juvenile	95	juvenile	76
Sandlance	~150 mm	1		1
Pink Salmon	juvenile	30		
Sockeye Salmon	90 mm-135 mm	3		

	Entrance to Expedition Inlet			
	July 9, 2002		July 23, 2003	
Species	Length/Age	Number	Length/Age	Number
Pacific Cod	juvenile	23	juvenile	237
Pink Salmon	adult	3	juvenile	39
	juvenile	1		
Dolly Varden	small	3		7
	medium	464		
	large	19		
Sockeye Salmon	adult	5	juvenile	2
	juvenile	1		
Great Sculpin		1		2
White-spotted Greenling				1
Chum Salmon			juvenile	1
Coho Salmon			juvenile	1

Bird Surveys

Bald Eagles: There is a bald eagle nest on the north side of Bunker Hill, mid-slope almost directly across from the Walashek Shipyard facility The nest was believed to have failed in 2001, however it fledged young in 2002 and 2003 (B. Lekanoff, pers. comm.).

Winter Bird Surveys (Sector 23A): Sector 23A corresponded to Expedition Inlet, from the tip of the Expedition Peninsula to the eastern abutment for the South Channel Bridge. This encompasses the project area for the Existing Boat Harbor portion of Alternative 3. Bird surveys were completed from a vehicle as road access is good and all points along the shoreline were easily observed. This area was initially surveyed with the rest of Sector 23 (Appendix 2). Sub-sector 23A was created in 2002 after the Corps found the harbor alternative feasible. It was impossible to differentiate between the birds of 23A that contributed towards the Sector 23 totals prior to 2002. It was possible, however, to describe the areas within Expedition Inlet where birds were counted and this area was considered the winter resting area.

The most numerous birds within this area during winter were harlequin ducks (16/day) with nine other species averaging less than 2/day. On average, fewer than 20 birds use Expedition Inlet each winter day (Appendix 2). Most of these birds were using less disturbed habitats near the confluence of Expedition Inlet with Iliuliuk Harbor. Bird diversity in Expedition Inlet was similar to the Little South America–North site, but had 84% less bird use. Expedition Inlet received about 93% less bird use than the Little South America–South site.

Approximately 2,113 bird-use days would accumulate per winter season for the Expedition Inlet portion of the Alternative 3 harbor design (Table 4). Evaluating bird use for Alternative 3 would necessitate adding Expedition Inlet use with that from LSA–North (Alternative 2).

COMPARISON OF BIRD USE BETWEEN ALTERNATIVES

Table 4 shows the number of bird-use days per winter for each of the alternative project sites. Other than Steller's eiders, overall bird use at the Little South America–South site was more than double the use at the adjacent LSA–North site (LSA-South bird use day = 30,747; LSA-North bird use day = 13,450; difference in bird use days: 30,747 ÷ 13,450 = 2.3). Harlequin ducks were the most abundant birds using the harbor sites. Almost four times as many harlequin ducks used the LSA–South site compared to the LSA–North site. Over three times as many black scoters used the LSA–South site compared to the LSA–North site. White-winged scoters and scaup appeared to prefer foraging and wintering habitats at the LSA–North site compared to the LSA–South site, but the opposite was true for most other species, including emperor geese.

Expedition Inlet had lower (less than 15%) overall bird use than either of the South Channel sites. While this area has a predominance of shallower foraging habitats, less bird use may be due to increased vessel/human activity, and less open water where larger flocks could congregate. Collectively, however, the impacts to birds for Alternative 3 must be added to those for Alternative 2, which would make the net impacts to birds greater for Alternative 3 than those identified for Alternative 2.

Table 4: Estimated number of bird use-days per winter (Dec.-Mar.) for each of three alternative sites around Amaknak Island, 2000-2003 (based on Hoffman 2003b). Steller's eiders are not included.

Species	Alternative 1 LSA-South	Alternative 2 LSA-North	Sector 23A Expedition Inlet[1]	Alternative 3 Expedition Inlet & LSA-North
Harlequin Duck	14387	3650	1867	5517
Long-tailed Duck	890	857	30	887
Black Scoter	10573	3347	40	3387
White-winged Scoter	1573	2560	0	2560
Cormorant spp.	347	307	113	420
Pigeon Guillemot	873	707	33	740
Emperor Goose	587	267	0	267
Scaup spp.	653	1600	13	1613
Others	(7 spp) 864	(3 spp) 247	(4 spp) 107	(4 spp) 354
Total use-days/winter	**30,747**	**13,450**	**2,113**	**15,563**

[1] Sector 23A results were based on winter 2002/2003 dataset.

GENERAL COMPARISON OF HABITAT QUALITY BETWEEN SITES

The marine topography varied between sites. The two Little South America sites were the most similar in that part of the sites consisted of a gradually-sloping beach/subtidal area, especially in the LSA—S area. The LSA—N site slope changed about a third of the way to the north to a steep incline that reached the channel bottom within 100 m of shore. These changes in bathymetry are largely responsible for the differences in substrate and the plants and animals using these habitats.

The Expedition Inlet site has a history of industrial use and use associated with WWII activities, and the shorelines are largely fill material. Historic photographs indicate the southern margin is largely fill from road construction and portions of former Expedition Island are now fill. The fill areas consist of fairly clean gravels/cobble, with rip-rap/armor stone in the intertidal zone. The deepest portion of Expedition Inlet is confined behind a shallower sill that has entrapped sediments. These sediments have very little habitat value.

Some differences in species abundance within Expedition Inlet appeared to be related to local water quality and substrate conditions. Poor circulation and poor water quality seem to have impacted the existing small boat harbor and lowered its biological productivity to minimal levels compared to the South Channel which is connected to Captains Bay/Unalaska Bay. There appears to be a gradient of habitat quality as one moves out of the head of the inlet towards the mouth. Outer portions of Expedition Inlet near its confluence with Iliuliuk Harbor showed clean substrates with greater abundance of benthic organisms. Some of the most productive beach seining was conducted at this site; e.g., over 460 Dolly Varden measuring ~20-30 cm (8-12 in) in one haul. The water surface to the north of the bridge has been described as "boiling with large schools of fish" by the beach seining crew. This is also where Service divers observed a pod of juvenile king crab.

Overall, we consider the Little South America–South site to contain the highest-value marine habitats because it had the greatest productivity in terms of intertidal area, clam biomass and use by rearing juvenile fish and red king crabs. The productivity and diversity of marine organisms at the LSA-South site was the highest of all areas surveyed by the Service in the Unalaska vicinity since 1999. This includes several sites initially considered for the boat harbor but subsequently dropped due to cost, engineering, or other considerations. Using the same parameters, the Existing Boat Harbor would be at the low end of the habitat quality gradient, with the LSA-North site being midway in between.

MARINE MAMMALS

Sea Otters - Sea otter numbers have declined by more than 80 percent in some portions of the Aleutian Islands. On 9 November 2000, the western population of the sea otter (*Enhydra lutris*) was designated a candidate species for listing under the Endangered Species Act. This population area was later expanded to include all sea otters in southwestern Alaska. On 11 February 2004, the sea otter was proposed for listing as a threatened species. A decision regarding this listing is expected within a year, following public and agency comment. Research aimed at identifying the cause of the decline is currently underway.

Sea otters feed on benthic invertebrates such as bivalves, sea urchins, and crabs. Sea otters periodically make intensive use of certain nearshore areas, feeding at a site until suitable prey organisms are below an efficient foraging threshold. As a result, macroalgae, released from sea urchin predation, flourish. The abundance of macroalgae, clams, and sea urchins within the South Channel alternative sites (LSA–North and –South) indicated sea otters are not exerting appreciable predatory effect on sea urchin populations (Estes *et al.* 1983).

In the absence of sea otter predation, the size and density of clams and other invertebrates increase. For areas of high-density sea otter populations, coastal habitats of less than 30 m in depth should be considered to be of critical importance since most reproductive activity, rearing of young, and foraging occurs in these areas (DeGange *et al.* 1990).

An aerial survey of sea otters was completed in the summer of 1991 (Evans *et al.* in lit., 1997) when 554 sea otters were counted around Unalaska/Sedanka Islands. Aerial surveys in 2000 recorded 374 sea otters around Unalaska and Sedanka islands (Doroff *et al.* 2003). Overall, by 2000, sea otters densities had declined to uniformly low levels throughout the Aleutians (ibid).

Sea otters appear to make infrequent use of the three alternative harbor locations, especially the Little South America sites as indicated by the abundance of shellfish there. The largest concentration of sea otters observed during the 2000 through 2003 winter bird surveys was on the seaward side of the Dutch Harbor spit.

For the purposes of this report, the areas being considered for harbors at Unalaska were not considered to be of critical importance to sea otters. However, if sea otter numbers were to increase or sea otters from other areas (such as from the outside of the Dutch Harbor Spit) were to move in search of productive foraging areas, they would likely find an abundance of preferred foods in the South Channel vicinity.

Steller Sea Lions - Sea lions were observed most commonly between the southern tip of Amaknak Island and the South Amaknak Rocks. Steller sea lions have been observed regularly in the South Channel at both the LSA–South and LSA–North sites. A group of six sea lions harassed divers in October 2001 at both locations (Figure 20). Two sea lions were also video–taped during a snorkel survey along the southern shoreline of Expedition Inlet between its midpoint and the South Channel Bridge. There are no sea lion haul-outs or rookeries within the study area and NMFS biologists have indicated they are not concerned about the impacts of any of the harbor alternatives on sea lions.

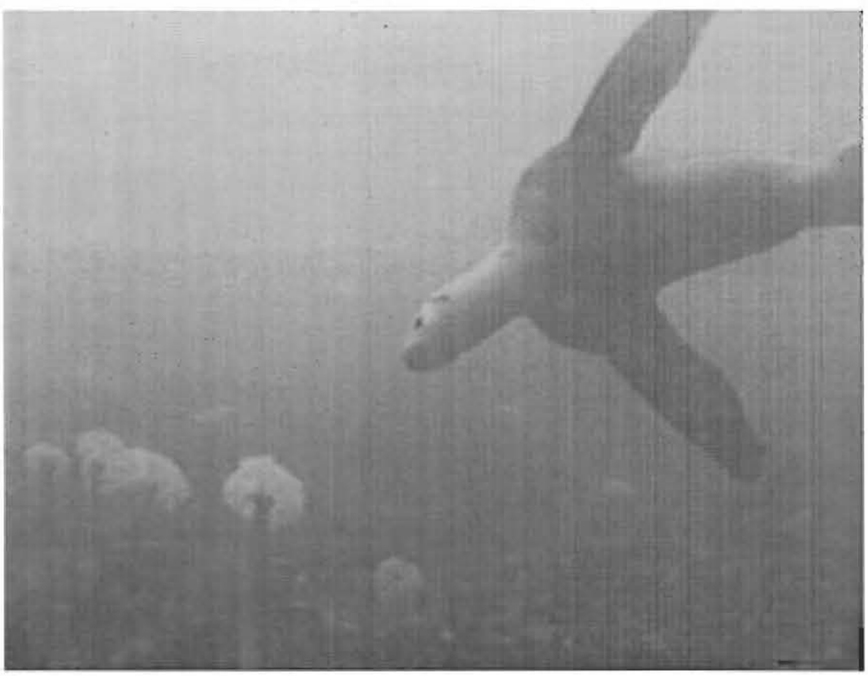


Figure 20: A sea lion encountered during dive surveys at the LSA–South site (October 2001).

Killer Whales - Killer whales (*Orcinus orca*) occasionally venture into Unalaska Bay but not often into Dutch Harbor or Captains Bay. A pod of four killer whales was observed on 13 January 2000 leaving Iliuliuk Bay between the Spithead and the Baling facility. Another pod of at least three killer whales entered Unalaska Bay on 21 February 2003, passed Hog Island and began milling at Devilfish Point (M. Schroeder, pers. obs.), although this is some distance from the project area alternatives.

Harbor Seals - Harbor seals (*Phoca vitulina*) generally require certain traditional beaches and offshore rocks for resting and pupping areas. Land areas where pups are born are particularly important to the welfare of harbor seals and disturbance of these areas should be avoided, especially during the first three weeks of June. Harbor seal observations made at nearby Akutan Island indicate that females give birth at a secluded beach and leave the pup there while returning to the ocean to feed. The Service is unaware of any harbor seal haul-outs in the Unalaska vicinity. Harbor seals are observed in low numbers in nearshore waters of the South Channel. The largest number seen at this site was three, with one seal regularly using the LSA–South site.

Harbor Porpoises - Harbor porpoises (*Phocoena phocoena*) occur in low numbers in Unalaska Bay, including a solitary animal observed on 19 March 2000, approximately 1 km southwest of the airport terminal in Unalaska Bay (M. Schroeder, pers. obs.).

SUBSISTENCE RESOURCES

The Service has a responsibility to protect subsistence resources and harvest opportunity. It has been difficult to assess current subsistence use of the alternative sites because the available assessments of subsistence use and values provide incomplete and sometimes conflicting information. The 2001 Draft CAR summarized information reported by Veltre and Veltre (1982) of resource utilization in the Unalaska area. Additional information summarized in the 2001 CAR included comments from local residents during review of an Army Corps of Engineers permit application that would have been conducted in the LSA-South project site (USACE 1990; entitled Captains Bay 20). These sources of information indicated that there was a strong subsistence tie to the LSA area. However, public comments received during meetings in June 2001 and August 2001 appeared to be divided – one group reported a strong subsistence tie, and another reported that the site has no value to them (USACE 2002).

Because the degree to which the LSA-South site is used today is not well-documented and there is apparent disagreement regarding the value of the nearshore areas to subsistence users, the Corps of Engineers commissioned a study to examine the potential impacts on subsistence activities of a proposed boat harbor on LSA (Northwind Environmental, Inc. 2002). That report concluded that "the importance of LSA to the subsistence component of the lives of some residents of Unalaska is undeniably substantial." Conversely, the City of Unalaska (letter dated March 23, 2004) and the Ounalashka Corporation (W. Hawthorne, pers. comm.) do not agree with the results of the study and do not consider the LSA site to be important for subsistence purposes.

DISCUSSION

The primary impacts of a harbor in the Unalaska vicinity include: introduction of petroleum compounds and other hazardous materials into marine waters from vessels (Water Quality Issues); direct loss of marine habitats from breakwaters and other nearshore structures or modifications (In-water Structures and other modifications); changes in fish movement or predation (In-water Structures); habitat modifications from dredging (Dredging Issues); displacement of fish or wildlife from harbor sites due to floating structures or disturbing human activities (Displacement Issues); and inducement of associated developments near the harbor site that will increase these impacts cumulatively over a larger area in the future (Cumulative Impacts). These impacts may also be considered in terms of how they result in losses of habitat quantity and quality. Assessment of these potential impacts involves consideration of two important factors: 1) the potential for increased petroleum releases into the environment; and 2) circulation patterns within Captains Bay.

Spill history for Unalaska - Evaluation of the history of petroleum spills in the Unalaska vicinity provides an indicator of the existing risk spills pose there. The Corps contracted for a compilation of hazardous spill history for 10 harbors in western Alaska during the 1990s and characterization of the potential number of spills that could be expected at these harbors into the future (Day and Pritchard 2000a, b). Unalaska is used by the greatest number of boats and accounts for the largest volume of fuel transfers of all the harbors studied. Fueling facilities are a major source of many accidental spills. The current harbor development plan does not include a fueling facility.

Findings from the Day and Pritchard studies include: (1) of the 10 existing harbors studied, Unalaska was the site for 74% of all reported petroleum compound spills; (2) an average of 64.3 petroleum compound spills were reported in Unalaska every year; (3) the average size of these spills over the 10-year period examined was 27 gallons per spill; and (4) at least 3,550 gallons of petroleum compounds were spilled in Unalaska each year. Two other conclusions related to the overall context for these findings and the future potential for spills: (1) the number of reported petroleum compound spills in Unalaska, and elsewhere, are probably less than the number of actual spills, but the extent of under-reporting is unknown; and (2) operator error was the leading cause of oil petroleum compound spills in Unalaska (Day and Pritchard 2000a, b). Mechanical failure is the second-leading cause of hazardous petroleum compound spills around Unalaska.

Additional spill history information was provided by the Corps in their evaluation of U.S. Coast Guard records for reported spills during more recent years (USACE 2003). Their report indicated a 68 % reduction in the number of spills reported from 1993 to 1995 (331 spills) to the number of spills reported from 1997 through 1999 (107 spills). However, the number of reported spills was greater (164 spills) for the period of January 2000 to October 2003 (which equates to 128 spills in a 3-year period) (USACE 2003).

The City of Unalaska, however, has put a lot of time and effort into training and education to reduce the frequency and magnitude of spills (C. Hladick, pers. comm.). These proactive actions taken by the City are promising, and are steps in the right direction. The number of spills in Unalaska and spill volumes have declined following the stationing of Coast Guard personnel in Unalaska. Nevertheless, accidents still occur, as illustrated by the recent release of approximately 600 gallons of diesel fuel by the F/V Tempest at the Unalaska City Dock (January 2004). The City, however, is also making strides to improve the timing and efficiency of their response to spills. Dan Magone, of Magone Marine, is the primary responder to oil spills in Unalaska, and was the responder on the F/V Tempest spill. While the spill almost got out of control, Magone Marine was able to get there before it got away from the dock, and recovered all but about 20 gallons of the fuel (D. Magone, pers. comm.).

Circulation Patterns within Captains Bay - The circulation patterns in Captains Bay are described in the Service's September 2001 Revised Draft Coordination Act Report. Briefly, water in Captains Bay has longer flushing times; is relatively colder, especially at depth, compared to other areas in Unalaska; has existing low dissolved oxygen concentrations on the bottom; and there is limited free exchange of water between Captains Bay and more exposed coastal waters. Additional vessels anchored in and traveling to and from a new harbor at the Little South America site could result in additional releases of petroleum compounds and other contaminants, and because of the existing circulation patterns, this may result in situations where such compounds have a longer residence time in valuable habitats.

POTENTIAL IMPACTS TO FISH AND WILDLIFE RESOURCES

The primary impacts of a harbor in the Unalaska vicinity are briefly described below, followed by a more specific discussion of the potential impacts by fish and wildlife group.

GENERAL ENVIRONMENTAL EFFECTS

Introduction of petroleum compounds and other hazardous materials into marine waters from vessels (Water Quality Issues). Construction of the harbor could introduce increased levels of petroleum hydrocarbons and other contaminants into the marine ecosystem through vessel moorings and operation and increased opportunities for spills and other accidents. These contaminants could directly impact birds, including emperor geese, scoters, harlequin ducks, long-tailed ducks, and the prey organisms and habitats on which they depend. Similarly, acute spills or chronic pollution could impact fish and crustacean species, including sensitive juvenile stages that are of importance to subsistence, recreational, and commercial users. These organisms are important components of a larger food web leading to a number of other species, including marine mammals such as sea otters, sea lions, harbor seals, harbor porpoises, etc. that occur in Unalaska Bay and surrounding waters. In addition, a rubblemound breakwater constructed at the southern tip of Amaknak Island could alter water circulation patterns that would lead to indirect impacts through stagnation or sediment deposition. If construction occurred over a long period of time, sediments settling over undisturbed marine plants or sessile invertebrates could inhibit growth or kill the organism. The loss of aquatic vegetation would impact crabs, and small fish that use the aquatic vegetation as protection from predators. Intertidal habitats at this site appear to support prey populations for important bird species.

Dredging the harbor could temporarily increase water turbidity at the project site. Even weak currents could cause any loosened fine-grained material to form a sediment plume. The volume of material to be dredged is relatively small, but suspension of fine sediments could decrease light penetration, primary productivity, and dissolved oxygen levels. Dissolved oxygen levels appear naturally low in Captains Bay and are made locally lower by seafood waste discharges.

Dredging for basin construction would likely result in water quality degradation. Dredging during construction or maintenance operations would result in suspended sediments in the water column which could spread outside the dredged area. The principal potential near-field injury is to fish gills when fishes are present in high suspended sediment concentrations. This is also common to juvenile salmon migrating in naturally turbid estuaries (Servizi 1988). Experiments have revealed obvious evidence of stress in fish at sustained levels of suspended concentrations (>500 mg l^{-1}), but what is unknown is the actual extent and duration of exposure in the natural environment. The natural behavior of fish in estuaries, much less their avoidance of dredging plumes, is poorly understood. In the case of juvenile Pacific salmon, observations indicate that chum and chinook fry tend to move in shallow waters along the shoreline, juvenile pinks occupy surface waters and may venture further out in channels during low light periods, and larger fish (sockeye, coho and chinook salmon) occur in deeper water and throughout channels (Cardwell and Koons 1981). Adult salmon do not appear to have precise migratory behavior, and their movements are highly variable. Although delays in timing of adults may impair reproductive success in some stocks, there is no evidence to indicate that turbidity will induce such a delay. The literature tends to agree that juvenile salmon migration is more vulnerable to disruption than adult migration. Juvenile salmon growth is maximized in nearshore coastal waters before salmon enter the open ocean. Impairing or influencing the rearing or migration of juvenile salmon could slow growth, decreasing survival. Larger salmon smolts experience increased survival in the open ocean

Direct and indirect loss/effect of marine habitats from breakwaters, nearshore structures, or other modifications to marine habitat (In-water Structures and Other Modifications): Rubblemound breakwaters will result in direct impacts to the existing marine habitats through burial, changing substrate, altering current patterns, etc. The constructed breakwater could function as marine habitat, but at a marginal level compared to pre-existing habitat. While some of these breakwaters could be re-colonized by marine organisms, there is little evidence to document to what degree it would occur and how long it could take. Observations of armor stone habitat placed in intertidal areas of Captains Bay/Iliuliuk Harbor indicate little use by marine organisms.

Juvenile salmon prefer shallow nearshore habitats that often contain freshwater lenses that help them transition from freshwater to salt water. Young salmon and other species of commercial or subsistence importance use these intertidal habitats because they have greater productivity and because small fish can avoid certain predators that are unwilling/unable to venture into shallow waters. The habitat productivity also makes this site an important foraging area for wintering seabirds and waterfowl.

Modification of marine habitats can occur from direct alteration of circulation patterns associated with rubblemound breakwater construction. Because breakwaters are designed to minimize wave energy from surrounding waters, the flushing function from cleaner nearby sources of water can be reduced. The impacts of reduced circulation can be further exacerbated by the types of materials that become accumulated in areas with reduced current or flushing. The long-term input of ablative bottom paints, corrosion control devices, and accidental/intentional disposal of materials would tend to degrade the marine benthic environment through settlement and contamination. These materials enter the water column or settle to the seafloor. Some seafloor sediments can be resuspended by propwash from operating vessels. Furthermore, Service dive surveys throughout Southcentral, Western, and Southeastern Alaska indicate that docks and harbors accumulate debris such as lead acid batteries, derelict fishing gear, fish waste products, and cleaning debris that also cause direct and indirect loss of marine habitat.

Changes in fish movement or predation (In-water Structures). Many juvenile fish prefer nearshore waters to forage, and use vegetated shallows for escape cover from predators. Harbors can directly impact these habitats through filling, dredging, breakwater construction, or through modifications to circulation patterns. Juvenile fish migrate along shoreline and could be blocked by breakwaters. Furthermore, juvenile fish may experience increased rates of predation if they are forced to move from shallow nearshore areas to deeper waters, where predatory fish are more abundant. Breaches in breakwaters are one way to allow these fish to move through shallow nearshore waters.

Habitat modifications from dredging (Dredging Issues). Dredging will directly impact existing marine habitat. After dredging, the dredged site could go through a successional process, with the more resilient organisms acting as the pioneer species. After construction is completed, benthic and non-motile marine organisms could be expected to re-colonize some areas. In most cases, partial recovery would occur over time (ranging from months to years). Species composition and density would not mirror pre-construction conditions because the water depth would be different and substrate could be altered. Overall, the combined effects of habitat modification and decreased water quality would lead to degradation of existing marine habitats.

Displacement of fish or wildlife from harbor sites due to floating structures or disturbing human activities (Displacement Issues). The rubble-mound and floating breakwaters and future finger floats/vessels would effectively displace birds from foraging and resting in these areas. Increased numbers of large fishing boats using a harbor constructed in certain areas could result in disturbance to those species (e.g., geese, ducks) that are sensitive to the presence of humans or vessels, forcing them to other areas where food and/or shelter are less favorable to their survival. Debris accumulation as a result of normal harbor operation could also displace wildlife using the site.

Inducement of associated developments near the harbor site that will increase these impacts cumulatively over a larger area in the future (Cumulative Impacts). Harbor construction stimulates commercial development of adjacent lands and marine areas for support services and other facilities such as parking, fuel sales, etc. These businesses benefit from servicing the nearby fleet. These developments also result in additional impacts to adjacent aquatic areas via increased runoff carrying sediment, pollutants, or untreated stormwater. These resulting developments are a predictable direct result of constructing a new harbor and should be considered when evaluating the overall impact of a harbor design or placement on the resources in the project area.

EFFECTS ON SELECT TAXONOMIC GROUPS

Harbor effects on benthic invertebrates

Each of the alternative harbor sites supports marine food resources that attract certain wildlife species. Some of the more important food resources for seabirds and waterfowl for example are molluscs and crustaceans. Mortality and sublethal effects on invertebrates, a significant component of seaduck and waterfowl diets, are caused by: smothering, contact by any life-stage (adults, juveniles, larvae) with dissolved oil or suspended oil particles, ingestion of oil or contaminated food and water, and possibly changes in the water, including oxygen depletion and pH change (Albers 1991). Kasymov and Gasanov (1987) determined that a 0.001mg/L gasoline concentration in water tends to reduce the survival rate of crustaceans other than crab. A gasoline concentration increased to 0.1 mg/L of water caused the mass elimination of shrimp and amphipods. A concentration of 20 mg/L gasoline in water was absolutely lethal for crabs (Kasymov and Gasanov 1987).

Activities that input pollutants into the aquatic environment occur to varying degrees at harbors and reasonably could be expected to occur at a new harbor constructed in Unalaska. Such activities include spills, leaks, dumping of cleaning and waste materials overboard. The effects of these inputs could adversely impact the benthic community. For example, pollution has been implicated as a primary or secondary factor in a number of large-scale perturbations to aquatic populations, including unusual phytoplankton blooms (Sarokin and Schulkin 1992). There have been a number of phytoplankton blooms documented in Unalaska Bay (Tester and Mahoney 1995), which have resulted in deaths of fish and king crabs. The fish and crab deaths were later found to be related to depressed dissolved oxygen concentrations and irritations from diatom spicules, but the cause of the low dissolved oxygen concentrations was unknown. Observations surrounding the fish and crab die-off noted by a NMFS Biologist, B. Mahoney (Mahoney 1992), included reports that boats anchored in the area dumped cleaning and waste materials overboard.

Harbor effects on fish

Fish are exposed to spilled oil through contact with dissolved petroleum compounds or particles of oil dispersed in the water column, ingestion of contaminated food or water, and through contact with surface oil. Juvenile fish are more sensitive to contamination, so mortality beyond the early juvenile stages usually requires a heavy exposure; however, fish species vary in their sensitivities to petroleum. Sublethal effects of oil on fish include changes in heart and respiratory rates, enlarged livers, reduced growth, fin erosion, a variety of biochemical and cellular changes, and behavioral responses (Albers 1991).

The literature suggests that some juvenile fish, salmon in particular, either prefer or become trapped within some harbor configurations (Cardwell and Koons 1981). Juvenile salmon may be "harbor-philic" if they seek the protective cover of the floating breakwaters, finger floats, and vessel hulls. This behavior would bring them close to sources of petroleum compounds and other contamination from vessels in the harbor, where concentrations of toxic materials would be greatest. These effects are directly related to the design of the harbor, especially the number and types of floats and vessels.

Many juvenile fish prefer nearshore waters to forage and use vegetated shallows for escape cover from predators. Harbors can directly impact these habitats through filling, dredging, breakwater construction, or modifications to circulation patterns that alter the composition of the vegetative community at the harbor site. Such community-level changes could alter the abundance or distribution of juvenile fish prey, primarily zooplankton.

Juvenile fish also migrate along shallower shorelines and could be either blocked by breakwaters or, if forced to move through deeper waters where predatory fish are more abundant, they could experience increased rates of predation. Breaches in breakwaters are one way to allow these fish to move through shallow nearshore waters.

Harbor effects on seabirds and waterfowl

Potential adverse impacts of a harbor on birds include direct and indirect impacts from chronic petroleum pollution, displacement by in-water structures, direct loss of foraging habitat, and disturbing activities associated with harbors. Seabird mortality caused by large spills from tankers or barges usually attracts public attention and official investigation, but the cumulative mortality of seabirds from small, unreported spills may often be higher (Camphuysen 1989, as cited in Burger and Fry 1993). Beached bird surveys have demonstrated that small-volume, chronic oil pollution is an ongoing source of mortality in coastal regions (Burger and Fry 1993).

Small volumes of oil may be released from leaking tanks and valves, accidents during loading and off-loading, flushing of tanks/bilges, etc.

Oil causes marked loss of insulation, waterproofing, and buoyancy in the plumage. In addition, petroleum oils contain many toxic compounds which can have fatal or debilitating effects on birds (Burger and Fry 1993). Petroleum can be ingested through feather preening, drinking, consumption of contaminated food, and inhalation of fumes from evaporating oil. Ingestion of oil is seldom lethal, but it can cause many debilitating sublethal effects that promote mortality from other causes, including starvation, disease and predation. Effects include inflammation and hemorrhaging of the digestive tract, pneumonia, organ damage, red blood cell damage, hormonal imbalance, intoxication, inhibited reproduction, retarded growth in young, and abnormal parental behavior (Albers 1991).

Some oiled birds may tolerate oil pollution during warmer ambient temperatures, but experience higher rates of mortality at colder temperatures (Bourne and Bibby 1975). Nonspecific stresses had additive negative effects on body condition. Such an inability to handle low temperatures could explain the higher death rates for oiled birds during colder months. Similarly, some birds exhibit hyperphagia to meet the increased demands of body heat loss, and would die if they are unable to meet increased nutritional or thermoregulatory demands due to impairment or environmental stresses.

Scavenging of oiled carcasses is also a major means of transfer of petroleum compounds to other bird species. Oiled gulls, eagles, falcons and other birds have been reported following major spills (Burger and Fry 1993). Stewart *et al.* (1991) concluded that secondary oiling impacts may be underestimated, because the scavengers often roost away from the beaches and may go undetected when they die. About 90% of the radio-tagged bald eagles (*Haliaeetus leucocephalus*) that died in studies following the Exxon Valdez spill were found in brush, away from the beachfront (Stewart *et al.* 1991). Because bald eagles nest in Unalaska, including near the potential harbor sites, adults could transfer oil or other contaminants to their young through contact with contaminated feathers, feet, food, or nesting materials.

During the winter, seaducks in the Unalaska vicinity are subject to a wide variety of environmental constraints. Recent studies indicate certain life-history strategies of small seaducks, coupled with environmental features in their wintering range, may make them particularly vulnerable to chronic pollution (Esler *et al.* 2000). These include the extreme cold temperatures and winds, day length, their dependence on high quality food, and need to accumulate nutrient stores in preparation for migration and breeding.

Although the impacts of chronic pollution from a harbor at Unalaska could impact a variety of species, the impacts to harlequin ducks, the most common seaduck observed during winter, are of great concern. Harlequin ducks have life history characteristics that make them vulnerable to population-level effects of spills for years following a spill event. These include high adult survival, occurrence in habitats most affected by oil spills (and which may hold residual oil indefinitely), adaptation to stable and predictable marine habitats, and high site fidelity (Esler *et al.* 2000). Chronic, low-level oil pollution would impact harlequin ducks and similar species the same way as would residual oil from a spill (Figure 17).

Goudie and Ankney (1986) described how body size affected the activity budgets and diets of sea ducks (common eiders, black scoters, long-necked ducks, and harlequin ducks) wintering in Newfoundland. The smaller species, harlequin ducks and long-tailed ducks, had diets with higher energy densities and spent more time feeding than did the larger black scoters and common eiders. The two smaller species had little flexibility in adjusting their activity budgets.

Daylight available for foraging may be particularly limiting. Harlequin ducks are visual foragers and cannot forage when it is dark. Fischer and Griffin (2000) concluded that harlequin ducks were constrained in the amount of time they must spend feeding during the winter. Behavior of harlequin ducks was the most restricted during midwinter when they spent over 80% of their time feeding in the fewest hours of daylight. Given the large amount of time spent feeding during midwinter daylight hours, harlequin ducks would not be able to extend their feeding bouts appreciably in the event of scarce food or cold temperatures. Because harlequin ducks have little flexibility for meeting increased energy demands during harsh winter conditions if additional physiological demands are placed on them from either hydrocarbon ingestion or plumage oiling, they may be unable to accommodate the effects of oil spills, even if those spills are relatively small (Esler *et al.* 2000).

Indirect effects of chronic petroleum pollution include changes in foraging behavior. Birds are predicted to allocate the greatest time in habitats with high food abundance and less in areas of low abundance. Indirect effects of oil pollution on eiders and other birds would be those primarily associated with altering the availability or suitability of various food sources at habitats having high food abundance.

Due to loss of benthic organisms from breakwater construction, pollution of the harbor vicinity, and/or changes in circulation patterns, the harbor project would eliminate most shallow feeding area within (and to a lesser extent adjacent to) the harbor and would force wildlife, particularly seaducks to forage elsewhere. Similarly, winter storms can create extreme weather conditions (wind, waves, ice, etc.) that can stress wintering seabirds and waterfowl. Birds likely move to more protected waters to avoid inclement weather that would stress them physiologically or prevent them from effectively foraging. As such, these periodic refuges from environmental extremes can be temporally and geographically important to wintering seabirds, affecting their survival.

Rubble-mound and floating breakwaters, finger floats, and vessel hulls would interfere with use of the harbor site by seabirds and waterfowl. These effects are directly related to the size of the basin and the number of vessels/floats within it.

Harbors are centers of activity that include the operation of machinery, engines, horns, etc. that can displace birds from adjacent areas. Seabirds and waterfowl can be displaced from concentration areas by frequent vessel traffic (i.e., noise, approach, vessel wake).

IMPACTS SPECIFIC TO EACH ALTERNATIVE

A detailed discussion of impacts to fish and wildlife resources from harbor activities and development in the Unalaska area was presented in the previous section. The purpose of this section is to describe and compare impacts that would be likely to affect fish and wildlife resources from each alternative. Impacts are discussed in terms of issues such as water quality, in-water structures, dredging, displacement, and cumulative effects, as well as how they affect habitat quality and quantity.

NO-ACTION ALTERNATIVE

The direct and indirect loss/degradation of habitat associated with construction and operation of a new harbor would not occur with the no-action alternative. However, without construction of a new harbor, there remains the potential for vessel collisions to occur as a result of overcrowded conditions. Such collisions increase the risk of spills of fuel or other toxic substances. Spills occurring in open areas are more difficult to contain and clean-up as opposed to a contained harbor site. There is also some potential for spills if more vessels remain in Unalaska during the off-season or fishing closures or vessels are navigating through narrows areas of restricted maneuverability such as via Iliuliuk Bay or under the South Channel bridge. These spills would most likely occur in the areas where boats currently concentrate, e.g. around Dutch Harbor.

ALTERNATIVE 1b: LITTLE SOUTH AMERICA—SOUTH

The following description of impacts specific to Alternative 1b is presented in terms of the categories previously discussed (e.g., water quality, in-water structures, etc.) Anticipated resource impacts from the LSA-South, Avoid Mussel Bed Plan, Alternative 1b, are t hen quantified in Table 5 by resource type.

Water Quality Impacts

The sources of water quality impacts have been previously described. Construction of a boat harbor at LSA–South would result in the presence of vessels in an area where they currently do not transit or moor in the South Channel area. As a result, additional contaminants would be expected to enter the marine environment, decreasing habitat values.

Dredging could have short- and long-term impacts to habitats within and adjacent to the project area.

Water quality impacts for this alternative would result in degradation of clam beds and juvenile red king crab rearing habitats.

Polluted waters could leave the harbor and reach adjacent high-value habitats where there are mussel beds and areas that support large flocks of harlequin ducks, scoters, other seaducks and emperor geese.

Harbor construction and operation would produce the same general amount of pollution sources at all proposed harbor locations. However, the extent and quality of habitats that would be directly impacted mean that this alternative, as proposed, would have the greatest level of direct and indirect water quality impacts of the three action alternatives evaluated.

In-water Structures

The construction of a rubblemound breakwater would eliminate some high quality marine habitat for juvenile fish, clams, mussel beds, rearing red king crabs, and foraging seabirds/waterfowl.

The floating breakwaters, finger floats, and vessel hulls could provide some cover for juvenile salmon and other species, however they would also bring the young fish into close proximity to sources of petroleum compounds and other contamination from vessels in the harbor.

The rubblemound breakwater, floating breakwaters, finger floats, and vessel hulls would also effectively displace many foraging birds and seabirds and waterfowl from important wintering (resting) areas.

Dredging Issues

The general types of impacts from dredging have been previously described. Impacts from dredging to design depth for this alternative would directly alter marine habitats, contributing to the overall degradation of existing habitats.

The disposal of dredge material within the intertidal zone will directly eliminate high-value habitats for rearing juvenile fish, foraging seabirds and waterfowl.

Displacement Issues

Birds currently using the marine areas of the proposed harbor site would be directly displaced by the construction of a breakwater, installation of floating breakwaters and other floating facilities and boats. Birds would not have access to marine foraging (4.6 ha, 11.4 ac) and resting (9.6 ha, 23.8 ac) habitats as they would be directly displaced by structures or vessels.

Vessel traffic to the harbor site would be expected to increase, extending further into areas currently receiving little traffic, especially if these vessels must circumnavigate Amaknak Island to reach fueling facilities. Waterfowl, including geese and sea ducks, would be disturbed and/or displaced by increased traffic to and from a mooring basin.

Certain fish and marine mammals would be expected to avoid the project site during the construction period.

Blasting of the seafloor could impact fish, marine mammals, and birds, including nesting bald eagles.

This alternative has the greatest project footprint (9.6 ha, 23.8 ac) and consequently the largest amount of displacement-related impacts to feeding and resting flocks of seabirds and waterfowl of the three action alternatives evaluated.

The direct impacts to important resources under this alternative are summarized in Table 5.

Cumulative Impacts

A new harbor would likely attract facilities to service the vessels and crews using the harbor. The site has other undeveloped parcels along an existing road. These include non-water dependent facilities such as laundromats, restaurants, stores, etc. The cost to lease private uplands immediately adjacent to the LSA—South harbor site may make intertidal fills on public land more affordable. Consequently, there is a reasonable expectation of additional requests for intertidal fills within and adjacent to the proposed harbor design in the near future. These developments could continue to alter the nearby marine environment, increasing impacts to other areas important to fish and wildlife resources.

Similarly, certain water-dependent features are already being proposed for the harbor design (e.g., small boat launch ramp) that do not relate to the need to moor 75 vessels in the design fleet

(USACE 2003). If this feature is going to become a part of the proposed project, it should be evaluated.

Upland facilities have the potential to further degrade the marine environment. These developments, if not carefully designed and operated, could result in additional impacts to adjacent aquatic areas via increased runoff carrying sediment, pollutants, or untreated stormwater.

An assessment of cumulative impacts should include the potential for expansion from LSA—South into LSA-North [as described in Seabury (2000) and Diener (2001)]. If a harbor is constructed at the LSA-South site, expected developments within the LSA-North area would alter some additional high-value fish and wildlife intertidal and marine habitats.

Table 5. Anticipated resource impacts for the Little South America – South site (the "Avoid Mussel Bed Plan", Alternative 1b). Calculations are for direct impacts to that habitat type, and do not include indirect or cumulative impacts.

Resource Type	Habitat Type	Habitat Value[1]	Size[2]	Impact Type[3,4]
Winter Seabirds& Waterfowl	Foraging Area	High	4.6 ha / 11.4 ac	Loss
	Resting Area	Moderate	9.6 ha/ 23.8 ac	Loss
Red King Crab	Juvenile Rearing Area	High	1.8 ha / 4.5 ac	Loss & Degradation
		High	0.9 ha / 2.2 ac	Loss
		High	1.8 ha / 4.5 ac	Loss & Degradation
	Adult Winter Habitat	Moderate	4.3 ha / 10.7 ac	Degradation
		Moderate	0.2 ha / 0.4 ac	Loss
Juvenile Fish	Rearing Habitat	High	2.2 ha / 5.5 ac	Degradation
Intertidal Habitats	Mussel/*Fucus* Beds	High	0.1 ha / 0.3 ac	Loss
	Other intertidal areas	Moderate	0.5 ha / 1.6 ac	Loss
Clam Beds	Dense clam beds, multiple species	High	1.6 ha / 4.1 ac	Loss & Degradation[3]
		High	0.5 ha / 1.2 ac	Loss
	Less dense clam beds, fewer species	Moderate	2.2 ha / 5.4 ac	Loss & Degradation[3]
		Moderate	0.2 ha / 0.6 ac	Loss

[1] Appendix 1 describes the method and definitions used to determine habitat values.

[2] Note that summing size of impacts by habitat type results in a number that exceeds project footprint (e.g., footprint of LSA-South = 23.8 acres; habitat that is totally lost = 40.1 acres; habitat that is degraded = 26 acres). This is due to: a) overlapping use of an area by multiple species groups; and b) differences in type of impacts (total loss of habitat vs. degradation of habitat. Figures in Appendix 5 illustrate the size and quality of the resource types.

[3] Appendix 1 defines what is meant by the terms loss and degradation for each resource type. Loss is generally considered loss of that resource group via filling, dredging, or displacement. However, for some benthic organisms, e.g., clams and crabs, proposed dredging activities will result in a direct loss of some habitat, but after construction is completed, some organisms could be expected to re-colonize the area. In most cases, partial recovery would occur over time, but species composition and density could change. Overall, the combined effects of habitat modification and decreased water quality resulted in areas not directly impacted by filling or dredging being classified as degraded.

[4] An earlier draft CAR (Feb 2004) proposed quantifying impacts based on a relative value scale (e.g., 1, 2, 3, and 0; where 3 was the lowest aquatic habitat value and 0 had no value [e.g., fill]). This resulted in certain resource types being considered the same value both before and after construction (e.g., a pre-project resource value of 3 remained as a post-project 3, hence, the impact was considered as "no change"). Nevertheless, it was acknowledged that the combined effects of habitat modification and decreased water quality would lead to degradation of existing marine

habitat, but this method resulted in the lowest relative habitat value of 3 remaining a 3. However, under the qualitative method used above, these areas are classified as degraded.

ALTERNATIVE 2: LITTLE SOUTH AMERICA—NORTH

Anticipated resource impacts from harbor construction at the LSA-North site are described below. Direct impacts are quantified by habitat type in Table 6.

Water quality issues

The sources of water quality impacts have been previously described. Construction of boat harbor at LSA–North would result in the presence of vessels in an area where they currently do not transit or moor. As a result, additional contaminants would be expected to enter the marine environment.

Dredging could have short- and long-term impacts to habitats with and adjacent to the project area

Water quality impacts for this alternative would result in degradation of high value clam beds and juvenile red king crab rearing habitats.

Polluted waters could leave the harbor and reach adjacent high-value habitats where there are mussel beds and concentration areas for large flocks of harlequin ducks, scoters, other seaducks and emperor geese, however these areas are further away from LSA–North than they are from the LSA–South site.

While construction of a harbor at this site would have the same general amount of pollution sources as the other harbor locations, the extent of habitats that would be directly impacted would result in this alternative, as proposed, having fewer direct and indirect water quality impacts than alternatives 1 and 3.

In-water Structures

The construction of a rubblemound breakwater would eliminate marine habitat for juvenile fish, rearing red king crabs, and foraging seabirds and waterfowl.

The floating breakwaters, finger floats, and vessel hulls could provide some cover for juvenile salmon and other species, however they would also bring the young fish into close proximity to sources of petroleum compounds and other contamination from vessels in the harbor.

The rubblemound breakwater, floating breakwaters, finger floats, and vessel hulls would also effectively displace many foraging birds and seabirds and waterfowl from important wintering (resting) areas.

In-water structures could prevent local residents from subsistence harvest of certain resources at this site.

Dredging Issues

The general types of impacts from dredging have been previously described (see Potential Impacts to Significant Resources). Impacts from dredging to design depth for this alternative would directly alter marine habitats, contributing to the overall degradation of existing habitats.

The disposal of dredge material within the intertidal zone will directly eliminate marine habitats for rearing juvenile fish, foraging seabirds and waterfowl.

Displacement Issues

Birds currently using the marine areas of the alternative harbor site would be directly displaced by the construction of a breakwater, installation of floating breakwaters and other floating facilities and boats. Birds would not have access to marine foraging 2.0 ha (4.9 ac) and resting 9.2 ha (22.6 ac) habitats as they would be directly displaced by structures or vessels.

Vessel traffic to the harbor site would be expected to increase, extending further into areas currently receiving little traffic, especially if these vessels must circumnavigate Amaknak Island to reach fueling facilities. Waterfowl, including geese and sea ducks, would be disturbed and/or displaced by increased traffic to and from a mooring basin.

Certain fish and marine mammals would be expected to avoid the project site during the construction period.

Blasting of the seafloor could impact fish, marine mammals, and birds, including nesting bald eagles.

Cumulative Impacts

A new harbor facility at LSA–North would likely attract facilities to service the vessels and crews using the harbor. The site has other undeveloped parcels along an existing road. These include non-water dependent facilities such as laundromats, restaurants, stores, etc. The cost to lease private uplands immediately adjacent to the LSA–North harbor site may make intertidal fills on public land more affordable, especially considering that these tidelands are shallower and more extensive than those in the LSA–South project site. Consequently, there is a reasonable expectation of additional requests for intertidal fills adjacent to the proposed harbor design in the near future.

Similarly, certain water-dependent features are already being proposed for the harbor design (e.g., small boat launch ramp) that do not relate to the need to moor 75 vessels in the design fleet (USACE 2003). The impacts from these additional features have not been evaluated.

Upland facilities have the potential to further degrade the marine environment. These developments also result in additional impacts to adjacent aquatic areas via increased runoff carrying sediment, pollutants, or untreated stormwater.

An assessment of cumulative impacts should include the potential for expansion from LSA—North into LSA—South [as described in Seabury (2000) and Diener (2001)]. If a harbor is constructed at the LSA—North site, expected developments within the LSA—South area would alter some additional high-value fish and wildlife habitats.

Table 6. Anticipated resource impacts for the Little South America – North site (Alternative 2). Calculations are for direct impacts to that habitat type, and do not include indirect or cumulative impacts.

Resource	Habitat Type	Habitat Value[1]	Size[2]	Impact Type[3,4]
Winter Seabirds/Waterfowl	Foraging Area	High	2.0 ha / 4.9 ac	Loss
	Resting Area	Moderate	9.2 ha / 22.6 ac	Loss
Red King Crab	Juvenile Rearing Area	High	1.5 ha / 3.7 ac	Degradation
		High	0.7 ha / 0.7 ac	Loss
		High	0.4 ha / 1.0 ac	Loss&Degradation
	Adult Winter Habitat	Moderate	5.6 ha / 13.8 ac	Degradation
		Moderate	1.0 ha / 2.5 ac	Loss
Juvenile Fish	Rearing Habitat	Moderate	0.3 ha / 0.8 ac	Degradation
	Rearing Habitat	Moderate	0.4 ha / 1.1 ac	Loss&Degradation
Intertidal Habitats	Other intertidal areas	Moderate	0.2 ha / 0.4 ac	Loss
		Moderate	0.1 ha / 0.3 ac	Degradation
Clam Beds	Moderate Value	Moderate	1.6 ha / 3.8 ac	Degradation
		Moderate	0.3 ha / 1 ac	Loss&Degradation
		Moderate	0.6 ha / 1.5 ac	Loss
		Moderate	0.3 ha / 0.6 ac	Loss

[1] Appendix 1 describes the method and definitions used to determine habitat values.

[2] Note that summing size of impacts by habitat type results in a number that exceeds project footprint (e.g., footprint of LSA-North = 22.6 acres; habitat that is totally lost = 34.8 acres; habitat that is degraded = 22.4 acres). This is due to: a) overlapping use of an area by multiple species groups; and b) differences in type of impacts (total loss of habitat vs. degradation of habitat. Figures in Appendix 5 illustrate the size and quality of the resource types.

[3] Appendix 1 defines what is meant by the terms loss and degradation for each resource type. Loss is generally considered loss of that resource group via filling, dredging, or displacement. However, for some benthic organisms, e.g., clams and crabs, proposed dredging activities will result in a direct loss of some habitat, but after construction is completed, some organisms could be expected to re-colonize the area. In most cases, partial recovery would occur over time, but species composition and density could change. Overall, the combined effects of habitat modification and decreased water quality resulted in areas not directly impacted by filling or dredging being classified as degraded.

[4] An earlier draft CAR (Feb 2004) proposed quantifying impacts based on a relative value scale (e.g., 1, 2, 3, and 0; where 3 was the lowest aquatic habitat value and 0 had no value [e.g., fill]). This resulted in certain resource types being considered the same value both before and after construction (e.g., a pre-project resource value of 3 remained as a post-project 3, hence, the impact was considered as "no change"). Nevertheless, it was acknowledged that the

combined effects of habitat modification and decreased water quality would lead to degradation of existing marine habitat, but this method resulted in the lowest relative habitat value of 3 remaining a 3. However, under the qualitative method used above, these areas are classified as degraded.

ALTERNATIVE 3: EXISTING BOAT HARBOR/LSA—NORTH COMBINATION

Anticipated resource impacts from harbor construction at the existing boat harbor/LSA-North sites are discussed below. The direct impacts to important resources under this alternative are summarized in Table 7.

Water Quality Issues

Water quality at the existing small boat harbor is already affected by harbor activities. There would be a net decrease in water quality if more vessels were placed in the same site or the area where the vessels were moored increased in size. Some of the higher value habitats for juvenile red king crab and clams would decrease in relative habitat value.

The same types of water quality impacts would occur at LSA–North, but there are smaller areas of important habitats that would be impacted compared to the LSA–South site.

In-water Structures

No breakwaters would appear to be required in order to improve the efficiency of the existing small boat harbor, but the increase in finger floats and vessels would displace foraging seabirds/waterfowl from open areas of Expedition Inlet.

These losses are not as great as for the other two alternatives because there is already less bird use of the Expedition Inlet portion of this site and a smaller area of LSA–North would be affected.

Dredging Issues

The impacts for the LSA–North portion of this alternative would be nearly identical to those described for Alternative 2 as the design under this alternative is essentially the same.

Some dredging may be required to accommodate larger vessels in the expansion of the existing boat harbor. The general types of impacts from dredging have been previously described (see Potential Impacts to Significant Resources). Impacts from dredging to design depth for this alternative would directly alter marine habitats, contributing to the overall degradation of existing habitats.

The disposal of dredge material within the intertidal zone will directly eliminate habitats for rearing juvenile fish, foraging seabirds and waterfowl.

Displacement Issues

Increased vessel traffic to and from the existing small boat harbor could be expected to increase, however the waters traversed closest to the harbor are not considered to be of as high-value to seabirds and waterfowl as the LSA-South site and use of Expedition Inlet by a large portion of the design fleet would result in fewer vessels having to circumnavigate Amaknak Island to reach fueling facilities.

The LSA-North area receives less foraging and seabird and waterfowl use than the LSA-South site. Displacement would occur due to increased human and vessel activity, but not to the extent it would at the LSA–South site.

Cumulative Impacts

There is some potential that additional businesses would seek to locate directly next to both components of this alternative. Existing uplands available for these kinds of activities are available at the LSA-North site as there is a direct road connection to vacant private land and the cumulative impacts at that site would be similar to those described for Alternative 2. Overall, there would be less additional development near the existing boat harbor because there are already many support facilities located there.

Table 7. Anticipated resource impacts for the Existing Boat Harbor (a portion of Alternative 3). See Table 6 for resource impacts at the LSA-North component of this alternative. Calculations are for direct impacts to that habitat type, and do not include indirect or cumulative impacts.

Resource	Habitat Type	Habitat Value[1]	Size[2]	Impact Type[3,4]
Winter Seabirds/Waterfowl	Foraging Area	Moderate	4.0 ha / 9.8 ac	Loss
	Resting Area	Moderate	4.2 ha / 10.3 ac	Loss
Red King Crab	Juvenile Rearing Area	High	5.6 ha / 13.8 ac	Degradation
		High	0.6 ha / 0.4 ac	Loss
	Adult Winter Habitat	Moderate	0.1 ha / 0.4 ac	Loss & Degradation
Juvenile Fish	Rearing Area	Moderate	0.3 ha / 0.7 ac	Loss
	Rearing Area	Moderate	0.6 ha / 1.5 ac	Degradation
	Rearing Area	Low	0.9 ha / 2.3 ac	Degradation
Intertidal Habitats	Rip-Rap	Low	0.6 ha / 1.6 ac	Degradation
Clam Beds		Moderate	5.6 ha / 13.8 ac	Degradation
		Moderate	0.6 ha / 1.4 ac	Loss & Degradation

[1] Appendix 1 describes the method and definitions used to determine habitat values.

[2] Note that summing size of impacts by habitat type results in a number that exceeds project footprint (e.g., footprint of Existing Boat Harbor = 16.7 acres; habitat that is totally lost = 23.6 acres; habitat that is degraded = 29.5 acres). This is due to: a) overlapping use of an area by multiple species groups; and b) differences in type of impacts (total loss of habitat vs. degradation of habitat. Figures in Appendix 5 illustrate the size and quality of the resource types.

[3] Appendix 1 defines what is meant by the terms loss and degradation for each resource type. Loss is generally considered loss of that resource group via filling, dredging, or displacement. However, for some benthic organisms, e.g., clams and crabs, proposed dredging activities will result in a direct loss of some habitat, but after construction is completed, some organisms could be expected to re-colonize the area. In most cases, partial recovery would occur over time, but species composition and density could change. Overall, the combined effects of habitat modification and decreased water quality resulted in areas not directly impacted by filling or dredging being classified as degraded.

[4] An earlier draft CAR (Feb 2004) proposed quantifying impacts based on a relative value scale (e.g., 1, 2, 3, and 0; where 3 was the lowest aquatic habitat value and 0 had no value [e.g., fill]). This resulted in certain resource types being considered the same value both before and after construction (e.g., a pre-project resource value of 3 remained as a post-project 3, hence, the impact was considered as "no change"). Nevertheless, it was acknowledged that the combined effects of habitat modification and decreased water quality would lead to degradation of existing marine habitat, but this method resulted in the lowest relative habitat value of 3 remaining a 3. However, under the qualitative method used above, these areas are classified as degraded.

FISH AND WILDLIFE CONSERVATION MEASURES AND RECOMMENDATIONS

The Service's mitigation goal is no net loss of habitat value while minimizing loss of in-kind habitat value. In order to meet this goal, we have the following recommendations to mitigate the potential adverse impacts of the project on fish and wildlife resources and the habitats on which they depend. The first recommendations are general in that they apply to all of the alternatives. These general recommendations are followed by specific recommendations for each alternative.

Based on the Service's analysis, Alternative 1b would have the greatest level of direct impacts to fish and wildlife resources of all alternatives evaluated (Table 8). Alternative 3 ranks next in severity of adverse impacts because it includes all impacts that would result from Alternative 2 as well as additional impacts to Expedition Inlet.

Table 8. Comparison of impacts to resources for Unalaska Harbor Alternatives 1b, 2, and 3.

	High Value Habitat		Moderate Value Habitat		Low Value Habitat	
	Loss[1]	Degradation[1]	Loss	Degradation	Loss	Degradation
Alternative 1b	21.6 ac	12.1 ac	29.1 ac	13.4 ac		
Alternative 2	6.6 ac	3.7 ac	29.7 ac	18.7 ac		
Alternative 3[2]	8 ac	17.5 ac	51.9 ac	32.4 ac		3.9 ac

[1]Note that summing size of impacts results in a number that exceeds project footprint. This is due to: a) overlapping use of an area by multiple species groups; and b) differences in type of impacts (total loss of habitat vs. degradation of habitat). Refer to Tables 5, 6, and 7 for estimated sizes of impacts by resource type, and refer to Figures in Appendix 5, which illustrate the overlapping nature of the resource types.

[2]Total impacts are a combination of both sites (i.e., LSA-North design and Expedition Inlet). Although the size of the project at the LSA-North site decreases in the Alternative 3 design, the reduced footprint occurs in habitats that are not subject to substantial influences from the harbor, and consequently it does not influence impact calculations.

GENERAL RECOMMENDATIONS FOR ALL ALTERNATIVES

In order to avoid and minimize likely project impacts to seabirds, waterfowl, juvenile fish, and benthic invertebrates, we have the following recommendations:

Adhere to Best Management Practices

Disposal of dredged spoils should occur only in uplands or be incorporated into an approved marine restoration/enhancement project. Approval of marine restoration or enhancement projects should be by the Corps of Engineers with written input from the resource agencies, including the Service.

Dredging of material between April 1 and July 31 should be prohibited to minimize potential impacts to juvenile salmonids and king crab at the harbor site, unless the activity is completely isolated from the adjacent waters.

Methods to filter or settle out silt-laden water (i.e., the use of silt curtains) should be included prior to, during, and following the removal or placement of dredged material in marine waters.

A blasting plan, approved by the appropriate agencies should be developed which includes timing restrictions and fish deterrent devices, prior to any blasting that could disturb bald eagles, marine mammals, and/or fish.

Ensure/Monitor Passage of Juvenile Fish

Rubblemound breakwaters should be designed to allow the free migration of juvenile fish during all tide stages without forcing these fish into water over one foot deep.

The effectiveness of any fish passage breaches should be assessed as part of a Monitoring Plan.

Interested resource agencies should be included in developing and implementing a Monitoring Plan prior to submission of the Chief of Engineer's Report, or 90 days prior to initiation of construction.

Mitigate Significant Adverse Impacts to Fish and Wildlife Resources

Based on the Service's evaluation, harbor construction implemented under any of the proposed build alternatives would, if not mitigated, result in significant adverse impacts to fish and wildlife resources. The Service recognizes the substantial, positive effort and cost to avoid some impacts, such as redesign of the rubblemound breakwater in the Basic Plan for Alternative 1, resulting in the Avoid Mussel Bed Plan 1b. Remaining impacts could be further reduced by additional avoidance, minimization, and compensation measures and the Service's recommendations to do so are addressed by alternative.

Appendix 3 describes ideas advanced, the anticipated resource benefits, and the status of each conceptual project. The status of each project is based on discussions among the Corps, City of Unalaska, Service and others.

We recommend a Mitigation Plan be developed for each alternative. The Mitigation Plan, following consideration/implementation of additional recommendations to avoid/minimize project impacts, should include Best Management Practices and a suite of compensatory mitigation projects to be completed, consistent with the goal of fully offsetting the adverse impacts identified for the alternative.

There are presently six options that are tentatively viable for continuing consideration, and could be completed to help mitigate significant fish and wildlife impacts to a negligible level. Each of these projects is discussed below and resource benefits are summarized in Table 9.

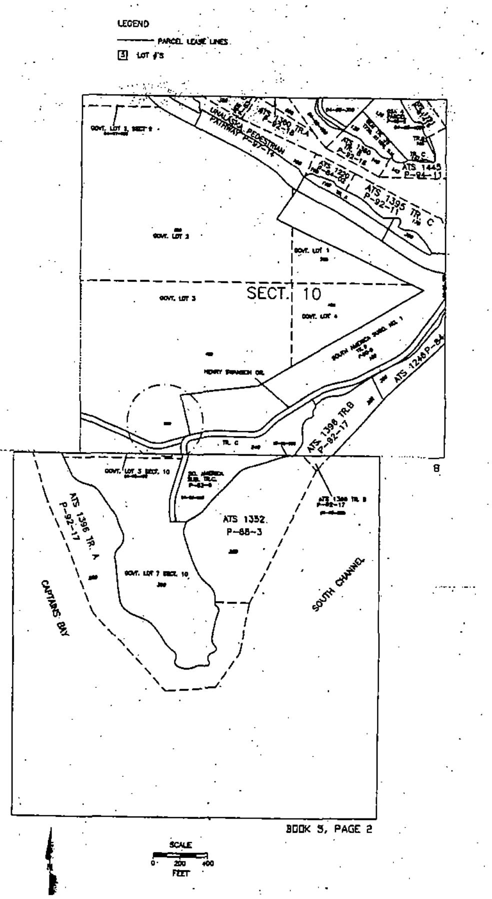
Furthermore, additional projects suggested as a result of the public comment process could be identified, evaluated, and selected prior to submission of the final Chief of Engineer's Report.

This page was revised 8/23/04.

Mitigation Project 1: Establish Tidelands Conservation Easement.

- If the locally preferred harbor site of LSA–South is selected for development, then tideland habitats at the LSA-North site should be protected by establishing a Conservation Easement.
- Alternatively, should LSA–North (Alternative 2 or 3) be selected for development, then tideland habitats at the LSA–South site should be protected by establishing a Conservation Easement.

Either of these easements would provide long-term protection of intertidal and subtidal habitats, seabird/waterfowl habitats, and juvenile fish migration paths. The Service's mitigation policy [Federal Register Vol. 46(15):7656-7663] provides our guidance for evaluating the potential impacts of the project and the adequacy of the overall mitigation package. The Service's mitigation policy states "in the interest of serving the public, it is the policy of the Service to seek to mitigate losses of fish, wildlife, their habitats, and uses thereof from land and water developments." For the type of habitat that would be affected by the proposed harbor project, the Service's mitigation goal is no net-loss of in-kind habitat value. The difficulty of locating potential in-kind, viable mitigation projects in the Unalaska area has resulted in ranking this project as our first priority because it provides a mechanism for in-kind mitigation. The terms and conditions of a conservation easement are flexible and have not been identified, and would be negotiated with all parties. Certain types of tideland development would be compatible within a conservation easement. Although specific language and details of any potential conservation easement have not been discussed, the City has indicated they are opposed to this mitigation measure.

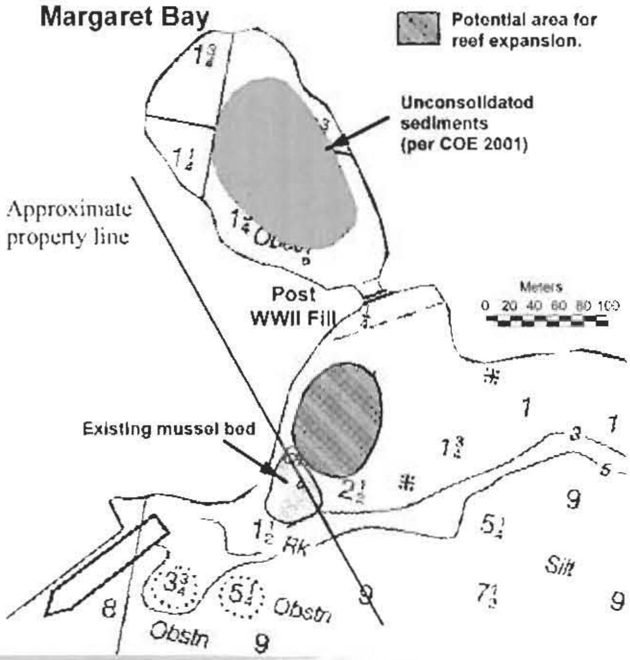


If LSA–North is the selected harbor site, tidelands adjacent to the LSA–South site (tract ATS-1352) owned by the City of Unalaska (or conveyed from Ounalashka Corporation) would be protected from future development via a conservation easement.

If LSA–South is the selected harbor site, habitats at the LSA–North site (tract ATS-1396, TR. B and tract ATS 1246) owned by the City of Unalaska (or conveyed from Ounalashka Corporation) would be protected from future development via a Conservation Easement.

Note: Information on tax parcels/ownership is from Map Grid for Unalaska, Sheet 2, Books 1-7, January 2001 and from a, memorandum from S. Diener, Director of Planning, to S. Seabury, City Manager regarding Ounalashka Corporation/City Land Exchange, dated 1 June 2001.

Mitigation Project 2: Create intertidal habitat (mussel beds): Iliuliuk Harbor.



Existing mussel bed

Creation of a nearshore intertidal area just south of the entrance to Margaret Bay would provide a substrate for a variety of organisms, primarily blue mussels, and improve water quality (filtering function). Increased habitat diversity would benefit fish and wildlife that would prey on the resources found there, resulting in increased ecological values at this site. Materials used to create this substrate should be free of contaminants and of an appropriate size, similar to the mussel bed south of the entrance to Margaret Bay. Size of a created mussel bed is variable and would depend upon the amount of material available and site selection. Material could be obtained from dredging for harbor construction, or from material excavated to create an intertidal area on north side of Margaret Bay (see Mitigation Project 3). Landownership issues need to be discussed further. The OC is the landowner of tidelands near the mouth, and the City is the owner of tidelands south of the mouth. Implementation would include:

- Resolution of land ownership issues; i.e., ownership/permission needed for project. We believe creation of mussel beds at the site indicated above would be on tidelands owned by OC;

- Evaluation of other potential sites for creating mussel beds - the Service has surveyed the proposed mussel bed site depicted above, and reported to the Corps that mussel bed creation would be an improvement at this site. Other tideland sites that OC or the City may own, such as Tract F, may also be potential creation sites. Feasibility would entail a survey of the sites for existing aquatic value and to determine existing elevations and needed material quantities;

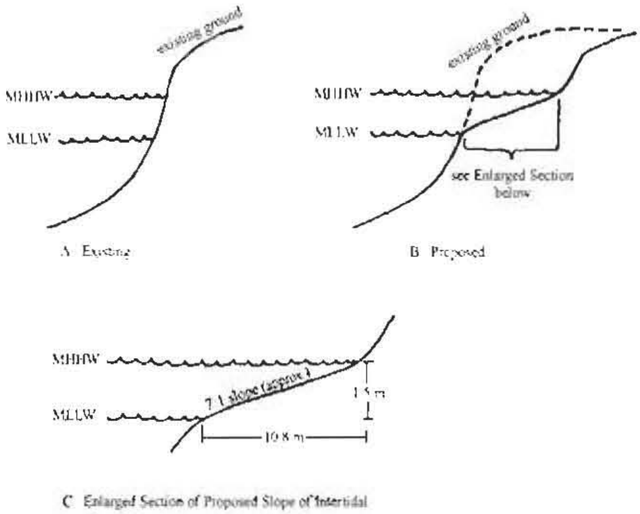
- Potential beneficial use of material from shoreline excavation of Margaret Bay (see Mitigation Project 3), or from dredged material from harbor construction;

- Monitoring of project effectiveness by pre- and post-project habitat mapping via transects and surveys of the quantity and diversity of organisms present.

A concern has been expressed by the Corps and the City that this mitigation project would require construction of a 150-foot-long access road in intertidal habitats. Given the proximity of the existing mussel bed to the existing shoreline (see photos above), it is unlikely that a new road would be needed, and we envision that shore-based equipment could accomplish this task.

An additional concern expressed by the Corps (USACE 2004) is that a mussel bed created at this site would be subject to contamination similar to mussels located on floats in Expedition Inlet. The potentially contaminated mussels in Expedition Inlet are on the floats of the mooring facility where they are in immediate contact with sources of chronic pollution. The existing and proposed mussel beds in Iliuliuk Harbor would be further removed from similar sources of contamination.

Mitigation Project 3: Enhance intertidal habitats: Margaret Bay

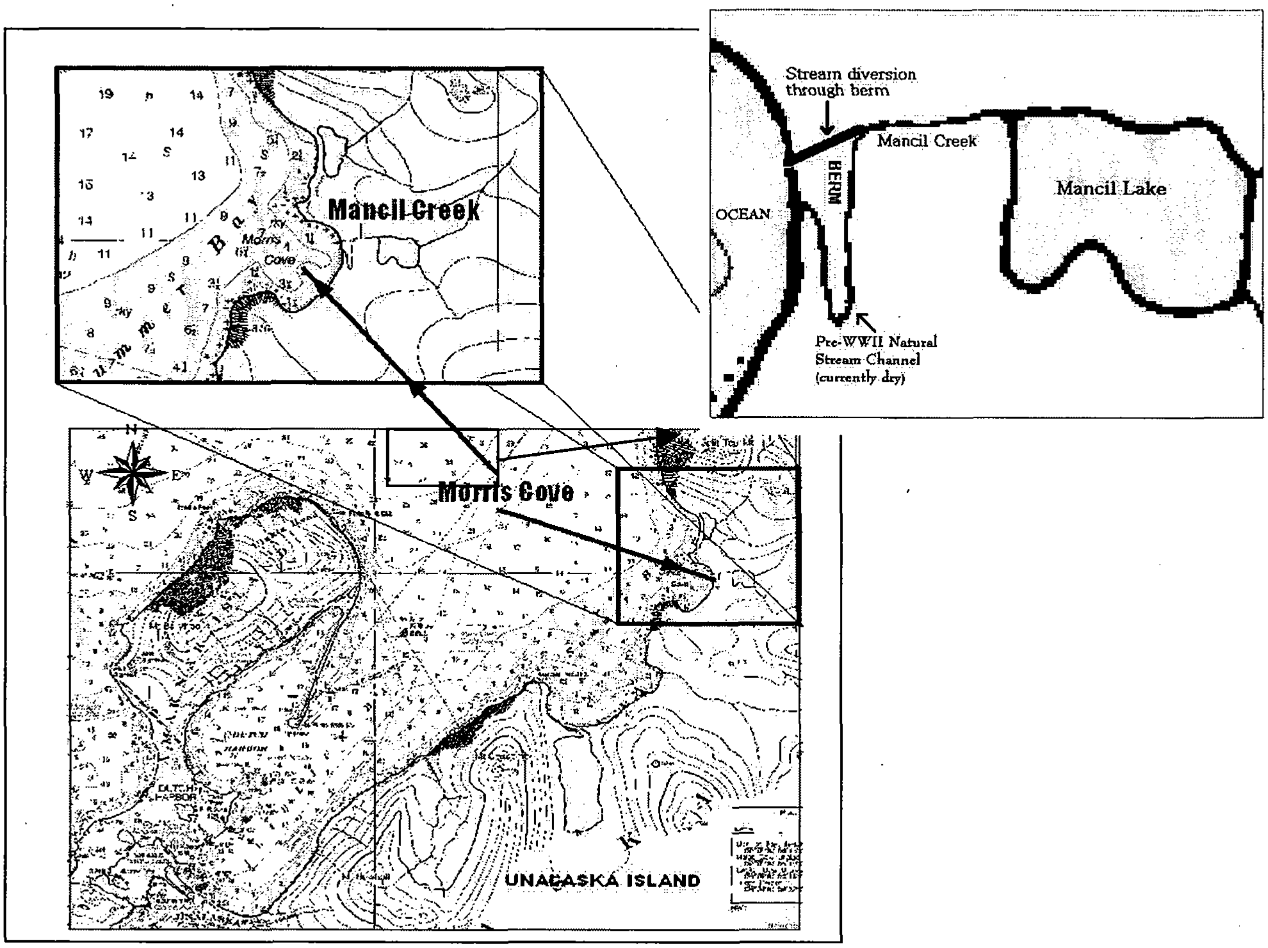


Existing south shoreline of Margaret Bay shown here is similar to north shoreline. This mitigation measure proposes to improve intertidal habitats along the north shoreline.

The historical shoreline and bottom of Margaret Bay have been altered/degraded by past activities, resulting in steep side slopes with minimal intertidal habitat. Restoration of a shallow intertidal shelf would improve this area for fish, wildlife and subsistence use. The area currently has no buildings or structures, and existing fill could be excavated from the shoreline at a slope of approximately 7:1 to create an intertidal area. This would affect a narrow strip of land along the northern shore of Margaret Bay (approximately 700 ft x 30 ft). Implementation would include:

- Landowner approval;
- Estimate of the amount of material to be removed, final side slopes to be achieved, identification of disposal site (although material could be beneficially used during construction of mussel bed as described in mitigation project 2);
- Following BMPs to prevent potential adverse impacts from the excavation;
- Testing of fill material for presence of contaminants. However, as per information received from ADEC (John Halverson, pers. comm.), the Corps tested soils in this vicinity (via soil borings and groundwater monitoring wells) in the mid-90s. A report of the test results, by Jacobs Engineering (1996-1998), should be reviewed by the Corps to assess the potential that contaminants are/are not present, and whether or not additional testing is needed.

Mitigation Project 4: Re-establish Morris Cove Creek (aka Mancil Creek) to its natural channel.

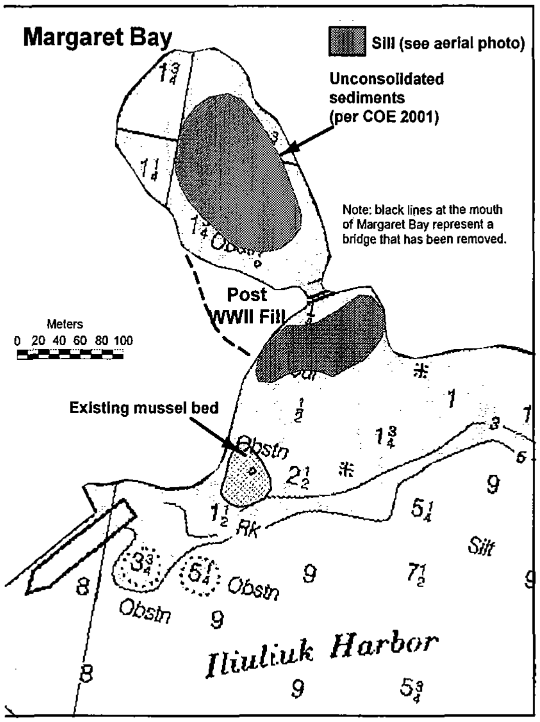


This project would involve restoring the creek alignment believed to have been cut off by the military during WWII. Restoring the historic flow would change the existing year-round, low flow connection between the lake and the ocean to become self-regulating. Returning adult salmon must currently navigate artificially low flows or they cannot access spawning areas. The project would also lengthen the stream channel, creating additional high-value habitat and enhancing anadromous fish access to the lake. Following restoration, the channel would function similar to an estuary during the late spring run-off and early fall rainy periods. Ocean-created berms would likely impound the outlet channel, ponding the stream until the elevation reached the point of breaching the berm and releasing salmon smolts and providing enhanced flows for returning adults. While the Service's documentation of juvenile sockeye salmon in Mancil Lake indicates that an unknown number of adult sockeye salmon are reaching the lake under existing conditions, it is likely that more adults could predictably reach the lake under a naturally-regulated flow regime. The berm could be restored using nearby material, or by beneficially using excavated material from dredging elsewhere (see Mitigation Project 3). Implementation of this project would include:

- A survey of elevations at the berm area to determine needed material quantities. Preliminary survey data and elevations of the creek were collected by the Service. Additional surveys may be needed;
- Resolution of land ownership issues, i.e., ownership/permission needed for project;
- Monitor project effectiveness by pre- and post-project habitat mapping/fish surveys.

Consideration of comments received on the March 30, 2004, revised draft CAR resulted in an improvement to the following mitigation projects (identified here as projects 5 and 6).

Mitigation Project 5: Enhance benthic substrates in Margaret Bay by removing flocculated sediments.



Flocculated sediments cover approximately one-third of the bottom of Margaret Bay. We had previously recommended that passive flushing of this material be accomplished by dredging a channel through a sill outside the mouth. However, because dredging would impact a sewer line located approximately 5' below the Bay bottom at the mouth, we recommend that removal be accomplished by mechanical means, i.e., a bucket dredge or suction dredge. However, unanswered questions remain regarding whether the sediment is contaminated or not, and if so, with what. The Corps sampled the sediments in 2001, but lab results were not comprehensive enough to determine with certainty what contaminant(s) may be present. Initial results prompted the Corps to consider the material could be fish oil. Based on recent discussion with the Alaska Department of Environmental Conservation (E. Crapps, pers. comm.), it appears to be a hydrocarbon based oil. However, additional sampling is needed to determine whether the sediments contain a fish oil, diesel or something else, and whether the sediments require treatment or could be discharged into Iliuliuk Harbor or elsewhere. If the sediments contain a seafood processing waste, fish oil, or similar substance(s), ADEC has indicated they would likely not have a problem with discharging it into the surrounding waters (J. Halverson, pers. comm.). A cursory evaluation indicates that a suction dredge with a substantial length of hose may be an efficient and cost-effective way to accomplish this task, provided that ADEC approves.

- Conduct additional sampling of the flocculated sediments and comprehensive lab analyses to determine what the material is;

- Upon receiving lab results, consult with ADEC regarding disposal and/or treatment options;

- Evaluate the feasibility of removal by mechanical means, i.e., a bucket dredge or suction dredge;

- Any subsequent removal plan should utilize BMPs to minimize siltation, turbidity, or other adverse impacts.

Mitigation Project 6: Remove sediment delta from inlet to Unalaska Lake.

Sedimentation along the east shore and part of the south shore of Unalaska Lake has filled in areas previously used for spawning by sockeye salmon. The project was previously identified as a potential project, but deleted from further consideration because it appeared that poor land development practices being utilized adjacent to Unalaska Creek would simply result in a reappeareance of the sedimentation problem. However, recent conversation with Alaska Department of Fish and Game (ADFG) biologists indicate they believe that this is still a viable project because upstream land management practices have improved. ADFG requested that the Service include this project in our list of viable mitigation projects. However, implementation of this project would include:

- Evaluate the area for its value as sockeye spawning habitat, and evaluate the feasibility of improving the habitat;
- Identify the upstream sources of the sedimentation and ensure they have been adequately reduced or eliminated;
- Sample/survey the sediment layer to determine its depth, composition, and quantity;
- Evaluate methods and feasibility of removing the sediment. ADFG suggests a small suction dredge would be possible, coupled with the use of something to contain the dredged material such as coir logs.

Table 9. Anticipated resource benefits for potentially viable mitigation projects.

Project		Size	Habitat Benefits
Conservation Easement	If LSA-North selected Tract ATS 1352	13.42 ac	Either of these tideland easements would provide long-term protection of intertidal and subtidal habitats, seabird/waterfowl habitats, and juvenile fish migration paths.
	If LSA-South selected Tract ATS 1246 Tract ATS 1396	2.8 ac 4.8 ac	
Create Mussel Beds: Iliuliuk Harbor		1 ac (200 ft x 200 ft)	Enlarge/create high value mussel beds
Enhance nearshore habitats: Margaret Bay		0.5 ac (700 ft x 30 ft)	Provide intertidal habitats, fish rearing area, bird foraging/resting area
Restore alignment: Morris Cove Creek:		0.5 ac (1500 ft x 15 ft)	Provide juvenile fish rearing areas
Restore benthic habitats: Margaret Bay		2.8 ac (0.3 x 8.5 ac)[1]	Provide bird foraging/resting area; Red King crab rearing area
Remove sediment delta from inlet to Unalaska Lake.		Unknown	Restore spawning beds for sockeye salmon.

[1] Size of Margaret Bay estimated by Burns (2001) to be 8.5 acres. Soft sediments were estimated to cover 1/3 of bay bottom.

SPECIFIC MITIGATION RECOMMENDATIONS FOR ALTERNATIVE 1B

The habitats which could be impacted by the tentatively recommended project [Alternative 1, LSA–South (Plan 1b, Figure 3)] are of high value for foraging and resting seabirds and waterfowl during winter, for juvenile fish, and benthic invertebrates (clams and red king crabs). Based on our evaluation, a harbor at Little South America–South (Alternative 1, Plan 1b) would, if not mitigated, have significant adverse impacts to fish and wildlife habitats. The Service recognizes the substantial, positive efforts and costs to avoid some impacts that have incorporated into this project to date. These include a redesign of the rubblemound breakwater in the Basic Plan for Alternative 1, resulting in the Avoid Mussel Bed Plan 1b.

AVOID UNNECESSARY DESTRUCTION OF HIGH-VALUE INTERTIDAL HABITATS

The LSA–South design would involve filling of intertidal habitats, including mussel/*Fucus* beds and other high-value areas in order to construct uplands for a new harbormasters office, a drop-off/pick-up area, storage of spill response equipment, and for short-term parking. The size of the needed area has not been described nor quantified. While it may be more economical to dispose of dredged material on-site, it would be less environmentally impacting to use the dredged material for an environmentally-beneficial use (i.e., in recommended mitigation projects) or to cap the local landfill.

The Service recommends that:

- the Corps/local sponsor identify the minimal amount of adjacent uplands needed for short-term parking, spill response equipment, and a drop-off/pick-up area;
- the harbormaster's office be constructed at a nearby site, perhaps on vacant land overlooking the harbor (see Figure 8), or on the adjacent shoreline at LSA-North;
- dredged material be used for environmentally-beneficial purposes or be transported to an approved upland site for disposal.

COMPENSATION FOR REMAINING ADVERSE IMPACTS TO FISH AND WILDLIFE RESOURCES

Table 5 summarizes the Service's analysis of the primary resource impacts associated with this alternative.

Table 9 lists the tentatively viable compensatory mitigation projects. The Service considers the following projects, in priority order, necessary to offset anticipated unavoidable adverse impacts from implementation of this alternative.

<u>Project title</u>

Conservation Easement: LSA—North

Create Mussel Beds: Iliuliuk Harbor

Enhance Nearshore Habitats: Margaret Bay

Restore Stream Alignment: Morris Cove Creek

The Service believes that additional mitigation would be required to fully compensate for unavoidable adverse impacts with implementation of this alternative. Two additional projects that may accomplish this include Mitigation Project 5 (Restore benthic habitat in Margaret Bay; assuming potential contaminant issues are resolved through further testing) and Mitigation Project 6 (Remove sediment delta from inlet to Unalaska Lake). In addition, other potential mitigation projects may be identified by the Corps, resource agencies, private citizens or groups, or the City of Unalaska.

SPECIFIC RECOMMENDATION FOR ALTERNATIVE 2

Based on our evaluation, a harbor at Little South America–North (Alternative 2) would, if not mitigated, have significant adverse impacts to fish and wildlife habitats.

COMPENSATION FOR REMAINING ADVERSE IMPACTS TO FISH AND WILDLIFE RESOURCES

Table 6 summarizes the extent of the primary resource impacts associated with this alternative.

Table 9 lists the practicable compensatory mitigation projects. The Service considers the following projects, in priority order, necessary to offset anticipated unavoidable adverse impacts to fish and wildlife resources that would result from implementation of this alternative.

Project title

Conservation Easement: LSA—North

Create Mussel Beds: Iliuliuk Harbor

Enhance Nearshore Habitats: Margaret Bay

Restore Stream Alignment: Morris Cove Creek

SPECIFIC RECOMMENDATION FOR ALTERNATIVE 3

Based on our evaluation, a harbor located at the existing boat harbor and the Little South America—North site would, if not mitigated, have significant adverse impacts to fish and wildlife resources, nearly as great as those for Alternative 1b (Table 8).

COMPENSATION FOR REMAINING ADVERSE IMPACTS TO FISH AND WILDLIFE RESOURCES

Table 7 summarizes the extent of the primary resource impacts associated with this alternative.

Table 9 lists practicable compensatory mitigation projects. The Service considers the following projects, in priority order, necessary to offset anticipated unavoidable adverse impacts that would result from implementation of Alternative 3.

Project title

Conservation Easement: LSA—South

Create Mussel Beds: Iliuliuk Harbor

Enhance Nearshore Habitats: Margaret Bay

Restore Stream Alignment: Morris Cove Creek

As with Alternative 1, the Service believes that additional mitigation would be required to fully compensate for unavoidable adverse impacts with implementation of this alternative. Two additional projects that may accomplish this task include Mitigation Project 5 (Restore benthic habitat in Margaret Bay; assuming potential contaminant issues are resolved through further testing) and Mitigation Project 6 (Remove sediment delta from inlet to Unalaska Lake). Additional mitigation could include recommendation from the Corps, resource agencies; private citizens or groups, or the City of Unalaska.

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APPENDIX 1

The five primary habitat types were studied rearing juvenile fish, red king crabs, wintering seabirds and waterfowl, clams, and a general category for intertidal habitats. Each of these habitats served different functions for the species/groups

After construction is completed, benthic and non-motile marine organisms could be expected to re-colonize some area. In most cases, partial recovery would occur over time (ranging from months to years). Species composition and density would not mirror pre-construction conditions because the water depth would be different and substrate could be altered. Overall, the combined effects of habitat modification and decreased water quality would lead to degradation of existing marine habitats.

INTERTIDAL HABITATS

Intertidal habitats were defined as marine areas between 1.55 m and 0.0 m MLLW. Ecological values were defined as:

High Value	Mussel/*Fucus* beds present
Moderate Value	Other types of intertidal habitats present
Low Value	Rip-rap or steep slope, with little colonization

Impacts to this habitat were defined as:

Total loss	area is directly lost via filling or dredging
Degradation	area is degraded via harbor-based water quality alterations

RED KING CRAB HABITATS

Two habitats were defined, based on actual observations during dive surveys and from pot-trapping.

High Value	Juvenile Rearing Area, Marine areas between 0.00 & -12.5 m (-40 ft)
Moderate Value	Adult Winter Habitat, Project footprint below -12.5 m (-40 ft)

Impacts to this habitat were defined as:

Total loss	area is directly lost via filling or dredging
Degradation	area is degraded as a result of harbor-based water quality alterations

FISH REARING HABITATS

Fish rearing habitat was defined as nearshore marine areas between 1.5 m and -2.5 m (-8 ft) deep. These areas were typically within the effective sampling reach of the seining net. eEcological values were defined as:

High Value - An area where 1) there were more than six juvenile fish species of commercial/subsistence use present 2) at least one of these species had numbers greater than 200 individuals during any one haul and 3) one juvenile fish species had numbers greater than 1000 individuals during any one haul.

Moderate Value- An area where 1) there were more than six juvenile fish species of commercial/subsistence use and 2) at least one of these species had numbers greater than 200 individuals during any one haul.

Low Value An area where there were low (<100) numbers of fewer than three species of commercial/subsistence use present.

Impacts to this habitat were defined as:

Total loss area is directly lost via filling dredging, or structures

Degradation area is degraded via harbor-based water quality and habitat alterations (dredging)

WINTER SEABIRD/WATERFOWL HABITATS

Defined as areas where seabirds/waterfowl concentrated for foraging and resting. Bird foraging habitats were defined as marine areas between 1.5 m and -10 m (-33 ft). Seabird/waterfowl wintering areas were defined by bird density during the winter period. Foraging use was valued more than wintering. Winter use was based on actual observed use (surveys).

HighValue - Winter seabird/waterfowl foraging habitats were defined as marine areas between 1.5 m and -10 m (-33 ft). This definition favors smaller ducks which are dependent upon energy-rich foods found in shallower depths. Some birds, such as the long-tailed duck, can forage in waters up to 200 ft.

Moderate Value - Winter seabird/waterfowl resting habitats where birds were observed in densities averaging more than 50/day.

Low Value - Winter seabirds/waterfowl habitats where birds were not observed or were observed in densities of fewer than 50/day.

Impacts to this habitat were defined as:

Total loss habitat is directly loss via placement of fill, or birds would not have access to foraging or resting areas because they would be directly displaced by structure

Degradation area is degraded via harbor-based water quality and habitat alterations (dredging), but birds could still utilize the area for activities, primarily resting

CLAM BED HABITATS

Clam habitats was defined as subtidal marine waters up to -12.5 m (-40 ft) deep.

High Value	Marine areas where clam diversity greater than 5 species and typical density greater than ~4 clams/0.25 m^2.
Moderate Value	Marine areas where clam diversity less than 5 species and clam density less abundant or patchily distributed.

Impacts to this habitat were defined as:

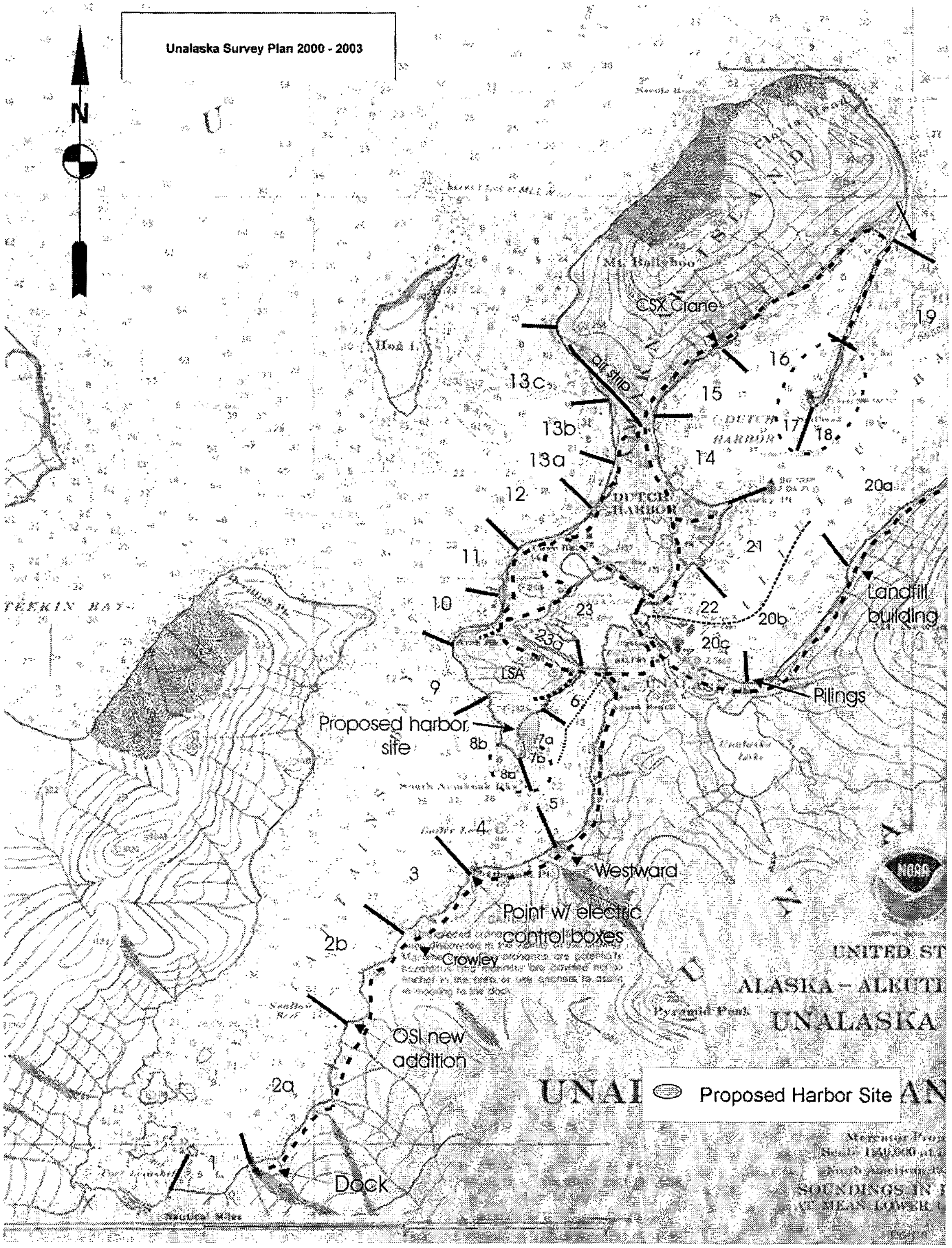
Total loss	area is directly lost via filing or dredging
Degradation	area is degraded via harbor-based water quality alterations

APPENDIX 2

BIRD SURVEY DATA:

(FOLLOWING THREE PAGES):

Appendix 2 (following three pages): Map showing sector locations for all winter bird surveys. Number of birds observed in three survey areas corresponding to Unalaska Harbor alternative sites (Sector 6 = Alternative 2, Sector 7A/B = Alternative 1, Sector 23 (part 23A) = portion of Alternative 3), winter 2000/2001, 2001/2002, and 2002/2003.



Unalaska, Alaska 2000 – 2003 Survey Plan

Figure 21. Map showing locations of bird survey sectors.

2000/2001[1]						2001/2002							2002/2003[1]					
	Dec	Jan	Feb	Mar			Nov	Dec	Jan	Feb	Mar			Dec	Jan	Feb	Mar	
Harlequin Duck																		
Sectors[2]					**Total**	Sectors						**Total**	Sectors					**Total**
6	22	21	42	39	124	**6**	7	17	12	20	35	91	**6**	6	32	11	10	59
7A	40	19	41	46	146	**7A**	24	19	15	17	43	118	**7A**	72	53	45	15	185
7B	25	42	89	67	223	**7B**	17	19	54	89	67	246	**7B**	19	62	72	49	202
23	59	114	74	108	355	**23**	23	33	58	54	123	291	**23**	32	93	45	60	230
23A						**23A**				23	19	42	**23A**	8	55	28	7	98
Oldsquaw Duck																		
Sectors					**Total**	Sectors						**Total**	Sectors					**Total**
6	23	64	21	3	111	**6**	18	32	7	9	0	66	**6**	16	36	26	20	98
7A	100	24	0	0	124	**7A**	2	36	0	0	0	38	**7A**	77	2	0	8	87
7B	0	4	4	0	8	**7B**	39	0	2	0	0	41	**7B**	5	0	0	5	10
23	49	19	141	0	209	**23**	0	40	28	10	14	92	**23**	32	34	0	13	79
23A						**23A**				0	0	0	**23A**	0	9	0	0	9
Black Scoter																		
Sectors					**Total**	Sectors						**Total**	Sectors					**Total**
6	129	46	33	29	237	**6**	0	0	0	12	0	12	**6**	0	0	0	2	2
7A	19	75	19	26	139	**7A**	0	0	10	8	0	18	**7A**	2	89	0	4	95
7B	5	9	33	9	56	**7B**	1	0	22	29	0	52	**7B**	0	404	0	30	434
23	0	36	3	20	59	**23**	0	0	0	7	10	17	**23**	2	0	0	0	2
23A						**23A**				3	0	3	**23A**	0	0	0	0	0
White-winged Scoter																		
Sectors					**Total**	Sectors						**Total**	Sectors					**Total**
6	78	146	51	121	396	**6**	18	53	21	26	1	119	**6**	4	70	133	64	271
7A	27	22	4	34	87	**7A**	0	79	23	10	0	112	**7A**	4	92	83	67	246
7B	0	0	2	0	2	**7B**	0	10	9	2	0	21	**7B**	3	0	0	1	4
23	0	17	10	0	27	**23**	0	0	0	32	13	45	**23**	0	5	5	1	11
23A						**23A**				0	0	0		0	0	0	0	0
Cormorant sp.																		
Sectors					**Total**	Sectors						**Total**	Sectors					**Total**
6	12	12	4	0	28	**6**	0	1	0	1	0	2	**6**	12	3	1	0	16
7A	25	0	0	1	26	**7A**	0	0	0	1	1	2	**7A**	1	3	3	0	7
7B	0	0	1	2	3	**7B**	0	3	0	0	4	7	**7B**	0	6	1	0	7
23	14	11	2	9	36	**23**	16	12	4	4	8	44	**23**	8	31	6	6	51
23A						**23A**				0	0	0	**23A**	3	10	1	3	17
Pigeon Guillemot																		
Sectors					**Total**	Sectors						**Total**	Sectors					**Total**
6	1	1	11	6	19	**6**	1	6	7	2	2	18	**6**	1	9	7	0	17
7A	3	0	27	3	33	**7A**	1	1	0	8	0	10	**7A**	25	3	6	0	34
7B	1	0	26	1	28	**7B**	0	0	0	1	3	4	**7B**	17	2	4	0	23
23	1	1	22	7	31	**23**	0	2	1	1	3	7	**23**	0	35	8	8	51
23A						**23A**				0	0	0	**23A**	0	0	1	4	5
Barrows Goldeneye																		
Sectors					**Total**	Sectors						**Total**	Sectors					**Total**
6	0	0	0	0	0	**6**	0	0	0	0	0	0	**6**	0	0	0	0	0
7A	0	0	0	0	0	**7A**	0	0	0	0	0	0	**7A**	0	0	0	0	0
7B	0	0	0	0	0	**7B**	0	0	5	0	0	5	**7B**	0	0	0	0	0
23	4	20	14	0	38	**23**	0	0	8	0	0	8	**23**	14	20	0	0	34
23A						**23A**				0	0	0	**23A**	0	0	0	0	0
Scaup sp.																		
Sectors					**Total**	Sectors						**Total**	Sectors					**Total**
6	0	0	0	0	0	**6**	0	120	0	0	0	120	**6**	0	0	0	0	0
7A	0	46	0	2	48	**7A**	0	0	0	1	0	1	**7A**	0	0	0	0	0
7B	0	0	0	0	0	**7B**	0	0	0	0	0	0	**7B**	0	0	0	0	0
23	36	56	219	0	311	**23**	0	188	242	78	27	535	**23**	2	155	3	240	400
23A						**23A**				0	0	0	**23A**	0	1	0	0	1

2000/2001[1]						2001/2002							2002/2003[1]					
	Dec	Jan	Feb	Mar			Nov	Dec	Jan	Feb	Mar			Dec	Jan	Feb	Mar	
Red-breasted Merganser																		
Sectors					**Total**	Sectors						**Total**	Sectors					**Total**
6	0	9	0	0	9	**6**	0	0	0	0	0	0	**6**	0	0	0	0	0
7A	0	12	4	11	27	**7A**	0	0	6	1	0	7	**7A**	0	0	0	0	0
7B	0	0	0	2	2	**7B**	0	0	0	0	0	0	**7B**	0	0	0	0	0
23	16	67	5	0	88	**23**	0	6	9	143	122	280	**23**	0	9	8	2	19
23A						**23A**				0	0	0	**23A**	0	4	1	0	5
Yellow-billed Loon																		
Sectors					**Total**	Sectors						**Total**	Sectors					**Total**
6	0	0	0	0	0	**6**	0	0	0	0	0	0	**6**	0	0	0	0	0
7A	1	0	0	0	1	**7A**	0	0	0	0	0	0	**7A**	0	0	0	0	0
7B	0	0	0	1	1	**7B**	0	0	0	0	0	0	**7B**	0	0	0	0	0
23	0	0	0	0	0	**23**	0	0	0	0	0	0	**23**	0	0	0	0	0
23A						**23A**				0	0	0	**23A**	1	0	0	0	1
Marbled Murrelet																		
Sectors					**Total**	Sectors						**Total**	Sectors					**Total**
6	0	0	9	0	9	**6**	0	0	0	0	0	0	**6**	6	3	0	0	9
7A	2	0	0	0	2	**7A**	0	0	0	1	0	1	**7A**	16	0	0	0	16
7B	0	0	0	0	0	**7B**	0	0	0	0	0	0	**7B**	0	0	0	0	0
23	0	0	0	0	0	**23**	0	0	2	0	0	2	**23**	0	22	0	0	22
23A						**23A**				0	0	0	**23A**	0	3	0	0	3
Green-winged Teal																		
Sectors					**Total**	Sectors						**Total**	Sectors					**Total**
6	0	0	0	0	0	**6**	0	0	0	0	0	0	**6**	0	0	0	0	0
7A	0	0	0	0	0	**7A**	0	0	0	0	0	0	**7A**	0	0	0	0	0
7B	0	0	0	0	0	**7B**	0	0	0	0	0	0	**7B**	0	0	0	0	0
23	0	6	0	0	6	**23**	2	7	2	0	0	11	**23**	0	2	0	8	10
23A						**23A**				0	0	0	**23A**	0	0	0	0	0
King Eider																		
Sectors					**Total**	Sectors						**Total**	Sectors					**Total**
6	0	0	0	0	0	**6**	0	0	0	0	0	0	**6**	0	0	0	0	0
7A	0	0	0	0	0	**7A**	0	0	0	0	0	0	**7A**	0	0	0	0	0
7B	0	0	2	0	2	**7B**	0	0	0	0	0	0	**7B**	0	0	0	0	0
23	0	0	0	0	0	**23**	0	0	0	0	0	0	**23**	0	0	0	0	0
23A						**23A**				0	0	0	**23A**	0	0	0	0	0
Common Goldeneye																		
Sectors					**Total**	Sectors						**Total**	Sectors					**Total**
6	0	0	0	0	0	**6**	0	0	0	0	0	0	**6**	0	0	0	0	0
7A	0	0	0	0	0	**7A**	0	0	0	4	0	4	**7A**	0	0	0	0	0
7B	0	0	0	0	0	**7B**	0	0	0	0	0	0	**7B**	0	0	0	0	0
23	0	0	1	0	1	**23**	0	28	10	21	13	72	**23**	0	0	11	9	20
23A						**23A**				0	0	0	**23A**	0	0	0	0	0
Common Murre																		
Sectors					**Total**	Sectors						**Total**	Sectors					**Total**
6	0	0	0	0	0	**6**	0	0	0	0	0	0	**6**	0	0	1	0	1
7A	0	0	2	0	2	**7A**	0	0	0	2	0	2	**7A**	16	1	0	0	17
7B	0	0	2	0	2	**7B**	0	0	0	0	0	0	**7B**	1	1	0	0	2
23	0	0	0	0	0	**23**	0	0	0	4	0	4	**23**	0	0	0	0	0
23A						**23A**				0	0	0	**23A**	0	2	0	0	2
Emperor Goose																		
Sectors					**Total**	Sectors						**Total**	Sectors					**Total**
6	0	0	0	20	20	**6**	0	0	0	0	0	0	**6**	0	0	0	0	0
7A	0	0	0	0	0	**7A**	0	0	0	0	0	0	**7A**	0	0	0	0	0
7B	0	0	0	40	40	**7B**	0	0	0	0	4	4	**7B**	0	0	0	0	0
23	0	0	0	175	175	**23**	1	0	0	0	0	1	**23**	0	0	0	0	0
23A						**23A**				0	0	0	**23A**	0	0	0	0	0

This page was revised 8/23/04.

APPENDIX 3

Appendix 3: Status of mitigation projects identified for the Unalaska Harbor Project. This table represents all ideas presented and evaluated by the Corps, Service, City and others between 2001 and 2004. Suggestions have been invited from agencies and the general public at meetings held throughout the planning and evaluation of this project. Additional details for the most viable options are provided in the main report. The Service conclusion on project viability is provided in bold.

PROJECT DESCRIPTION	POTENTIAL RESOURCE BENEFIT	COMMENTS AND CONSIDERATION TO DATE
Establish conservation easements on tidelands adjacent to the harbor site : If the recommended harbor site of LSA-South is developed, then tidelands off the LSA-North site should be protected by establishing a conservation easement. or Alternatively, should LSA-North be selected for development, then tidelands off the LSA-South site should be protected by establishing a conservation easement.	Either of these easements would provide long-term protection of intertidal and subtidal habitats, seabird/waterfowl habitats, and juvenile fish migration paths.	If LSA–South is the selected harbor site, tidelands adjacent to the LSA–North site (tracts ATS-1396 B and 1246) would be protected from future development via a conservation easement. Although specific language and details of any potential conservation easement have not been discussed, the City has indicated they are opposed to this mitigation measure. Because this measure is considered to provide the only on-site, in-kind mitigation available in the area, it is still considered tentatively viable. **Tentatively Viable, Mitigation Project 1** If LSA–North is the selected harbor site, tidelands adjacent to the LSA–South site (tract ATS-1352) owned by the Ounalashka Corporation (OC), would be protected from future development via a conservation easement. **Tentatively viable, Mitigation Project 1**

Appendix 3: (continued)

PROJECT DESCRIPTION	POTENTIAL RESOURCE BENEFIT	COMMENTS AND CONSIDERATION TO DATE
Construct mussel beds near entrance of Margaret Bay	Creation of mussel beds could be an enhancement if sites are presently of low value. The acreage of the enhancement area will depend on the amount of material available for habitat enhancement.	Landownership issues need to be discussed further. OC is the landowner of tidelands near the mouth, and the City is the owner of tidelands south of the mouth. We have proposed creation of a mussel bed approximately 1 acre in size, and we have identified a potential site. Additional information is need on amount/type of material available for enhancement. **Viable/Mitigation Project 2**
Enhance intertidal habitats - Margaret Bay	Past fill activities have filled productive bay bottom and created a steep shoreline with little intertidal habitat. Restoration of a shallow intertidal shelf would improve this area for fish, wildlife and subsistence use.	Existing fill could be excavated from the shoreline at a slope of approximately 7:1 to create an intertidal area. This would affect a narrow strip of land along the northern shore of Margaret Bay (approximately 700 ft x 30 ft). Implementation would include: landowner approval; estimate of the amount of material to be removed, final side slopes to be achieved, identification of disposal site (although material could be beneficially used during construction of mussel bed as described in mitigation project 2); following BMPs to prevent potential adverse impacts from the excavation. **Tentatively viable, Mitigation Project 3**

Appendix 3: (continued)

PROJECT DESCRIPTION	POTENTIAL RESOURCE BENEFIT	COMMENTS AND CONSIDERATION TO DATE
Morris Cove Creek: Enhance anadromous fish runs by restoring the entrance channel and natural function of the system, thereby increasing rearing habitats and restoring access to spawning habitats.	This project would involve restoring the creek so that it goes around, rather than through, a berm. Restoring the historic alignment would change and lengthen the creek connection to the ocean, providing additional habitat. This project would restore anadromous fish access to a small lake in the headwaters. By redirecting the creek around the berm near the mouth of the creek, there would be nearly a three-fold increase in coho rearing habitat. Other salmonids, including pink salmon and Dolly Varden also would benefit.	This site is several miles from the proposed action. However, enhancement of the Morris Cove Creek fisheries could have some positive effect on fish populations that would be most directly affected by a harbor at LSA-South, because many young salmon move along nearshore coastlines, including the harbor site, before moving into the open ocean. It would provide a measure of compens ation for anticipated adverse effects on salmonids and a less direct measure of compensation for general habitat losses. If on-site and in-kind compensation opportunities are limited, it becomes more reasonable to pursue off-site and out-of-kind compensation opportunities such as this one. **Viable, Mitigation Project 4**

Appendix 3: (continued)

PROJECT DESCRIPTION	POTENTIAL RESOURCE BENEFIT	COMMENTS AND CONSIDERATION TO DATE
Enhance Margaret Bay by removing flocculated sediments, which cover about 1/3 of the bay bottom. The site presently supports large numbers of sea birds in winter and salmon and char in summer.	Provide bird foraging/resting area; Red King crab rearing area	We had previously recommended that passive flushing of this material be accomplished by dredging a channel through a sill outside the mouth. However, because dredging would impact a sewer line located approximately 5' below the Bay bottom at the mouth, we recommend that removal be accomplished by mechanical means, i.e., a bucket dredge or suction dredge. However, unanswered questions remain regarding whether the sediment is contaminated or not. The Corps sampled the sediments in 2001, but lab results could not confirm what contaminant(s) may be present. Initial results prompted the Corps to consider the material could be fish oil. Based on recent discussion with the ADEC), it appears to be a hydrocarbon based oil. However, additional sampling is needed to determine whether the sediments contain a fish oil, diesel or something else, and whether the sediments require treatment or could be discharged into Iliuk Harbor or elsewhere Additional information needs include: conduct additional sampling of the flocculated sediments and comprehensive lab analyses to determine what the material is; upon receiving lab results, consult with ADEC regarding disposal and/or treatment options; evaluate the feasibility of removal by mechanical means, i.e., a bucket dredge or suction dredge; aAny subsequent removal plan should utilize BMPs to minimize siltation, turbidity, or other adverse impacts.
Remove sediment delta from inlet to Unalaska Lake.	Site may be former sockeye salmon spawning area. Would be valuable for health of fishery/watershed but situation is complex. Unalaska River is becoming seriously degraded from development activity.	Costs are unknown. ADFG biologist states that coir logs could be used to create containment area, and small suction dredge could be used to remove sediment. The City has improved conditions of roads, etc. upstream and it is believed that sediment input from upstream land management practices has been reduced. **Tentatively viable.**

Appendix 3: (continued)

PROJECT DESCRIPTION	POTENTIAL RESOURCE BENEFIT	COMMENTS AND CONSIDERATION TO DATE
Monitoring: This mitigation measure is necessary to ensure that mitigation goals are obtained for each measure implemented and to determine corrections or additional measures needed where necessary.	This does not offset direct losses to fish and wildlife resource, but for each mitigation measure implemented, monitoring is critical to ensure that mitigation goals are reached. Monitoring methods and data gathered will vary, depending on the specific measure implemented. Findings from monitoring are necessary to document the value of project features that did or did not work as desired or anticipated, and to subsequently improve the effectiveness of mitigation recommendations, Corps projects, and City plans for future projects.	No substantial discussions have occurred at this time, but the Service is committed to collaborating with the Corps, the City, and other interested parties to monitor all mitigation measures implemented in development of a boat harbor at Unalaska. **Viable** (and have been incorporated in project descriptions)
Remove abandoned barge at head of Captains Bay.	Concern has been expressed that equipment on barge may contain contaminants; aesthetic problem.	Recent reports indicate there are no hazardous materials on board. However, there are several pieces of abandoned heavy equipment on top of the barge. Barge is approximately 100' x 50. There is little potential for bird strikes because the barge is not lighted. If removed, approximately 0.1 acre of benthic habitat would be uncovered and could be recolonized by benthic organisms. Benefit of this project is primarily aesthetics. **Tentatively viable, but benefit to fish and wildlife resources is minimal.**
Interpretive signs at harbor	While resource education does not replace lost habitats, it is important to minimize adverse impacts from human actions.	Does not directly offset significant adverse impacts to important fish and wildlife habitats, but can result in more environmentally sensitive actions (e.g., less trash/better spill prevention) at harbor. **Viable**

Appendix 3: (continued)

PROJECT DESCRIPTION	POTENTIAL RESOURCE BENEFIT	COMMENTS AND CONSIDERATION TO DATE
Establish a local education program. Two ideas include: 1) organize a volunteer bay–bottom clean up program; and/or 2) develop a program with local educators to provide students information about the development of this project, including: marine ecology, the EIS process, applicable environmental laws and regulations, harbor construction practices, mitigation, etc.	While resource education does not replace lost habitats, it is important to minimize adverse impacts from human actions. A local bay-bottom clean-up program would educate citizens about the amount and type of pollutants that degrade the bay and affect their quality of life, and create a sense of ownership of the bay. An education program that involves the entire process of harbor construction would provide hands-on experience with the environmental decision-making process.	These are minor projects that would not offset direct losses to important fish and wildlife habitats, but their primary value to fish and wildlife resource would be an and increased knowledge of the local ecosystem and the decision-making processes involved in the use of natural resources, and result in more environmentally sensitive actions, as above. **Viable**
Establish a trust fund for fish and wildlife habitat conservation and restoration.	To compensate for habitat losses resulting from boat harbor development and operation by funding implementation and monitoring of habitat conservation, restoration, enhancement, and creation projects in the vicinity of Unalaska.	The local sponsor would establish a trust fund to support projects involving habitat conservation, restoration, enhancement, and creation projects in the vicinity. **Tentatively Viable**
Conservation Easement: City of Unalaska tidelands in upper Captains Bay.	Long-term protection of relatively pristine island and estuarine habitats (variable acreage); little threat of development.	City of Unalaska stated neighboring landowners would oppose such conservation measure. **Deleted**
Conservation Easement: Margaret Bay.	Long-term protection of relatively productive marine waters important to juvenile salmon and wintering seabirds; some development threat (approximately 8 acres).	Recently part of a tideland exchange between City of Unalaska and Ounalashka Corporation. OC opposes a conservation easement on this land. **Deleted**

Appendix 3: (continued)

PROJECT DESCRIPTION	POTENTIAL RESOURCE BENEFIT	COMMENTS AND CONSIDERATION TO DATE
Conservation Easement: Uplands at southern tip of Amaknak Island.	This is an upland area that would serve as a buffer separating wintering seabirds from harbor activities; not important habitat as itself, but serves important physical barrier.	Ounalashka Corporation (landowner) wants to retain option of future development on this site and is opposed to an easement. **Deleted**
Improve marginal habitats and fish passage problems: Iliuliuk Lake.	No fish passage problems identified. Resource benefits are not believed to be worthwhile.	ADFG states that this site is already good habitat with many juvenile fish. **Deleted**

Appendix 3: (continued)

PROJECT DESCRIPTION	POTENTIAL RESOURCE BENEFIT	COMMENTS AND CONSIDERATION TO DATE
Acquire/Enhance habitat: Ball Field Pond.	Two parts: 1) Restore hydrologic connection to Unalaska Lake, benefitting fish 2) Purchase and conserve pond to forestall future development of site	Initially thought a project here could create juvenile fish habitat. Recent site evaluation indicates that replacing culverts would likely drain the pond and would not create juvenile fish habitat. **Deleted**
Restore habitat following encroaches on stream: Shop Creek.	Stream is high-energy (no fish habitat), poor maintenance practices add gravels and fines and degrade downstream fish habitats	Because the City appears responsible for impacts to the stream; they should repair resource damage and install a catchment basin to trap sediments, but not as part of this project. **Deleted**
Replace culvert at road crossing: Unnamed Creek.	Not a fish passage concern (yet), stream impacted by placement of fill.	This appears to be a Section 404 violation that may be investigated. **Deleted**
Spawning and Rearing Ponds: Unalaska Creek.	These were habitats created for migratory birds.	These ponds were created specifically as mitigation for losses of waterfowl and shorebird habitats (not fish) and it was agreed they should not be modified. **Deleted**
Construct docks/boardwalk: Iliuliuk River.	Minimal impacts exist. Minimal resource benefits would be achieved. Not supported by Service as appropriate mitigation as it would primarily benefit recreation and aesthetics.	Beaching and mooring of skiffs continue to damage streambank. Some local citizens oppose project. Continued impacts would occur following any restoration efforts. **Deleted**

Appendix 3: (continued)

PROJECT DESCRIPTION	POTENTIAL RESOURCE BENEFIT	COMMENTS AND CONSIDERATION TO DATE
Greenbelt Acquisition: Unalaska Creek and Iliuliuk River.	Green belts are important in protecting stream systems. Several City development projects already have encroached on active channel.	City of Unalaska unsupportive of this mitigation option because of potential high cost and availability of properties. Does not replace lost habitats. **Deleted**
Wetland Acquisition: Coe Whittern Estate holdings.	This is a large tract of wetlands at the head of Unalaska Lake that could be protected from future development.	Most high-value habitats not for sale. **Deleted**
Provide funding for Steller's eider conservation in region.	Lack of basic information for Steller's eiders makes it difficult to provide adequate impact avoidance/minimization measures.	Some agencies do not consider this appropriate mitigation (i.e., not in-kind or on-site). **Deleted, addressed under Endangered Species consultation**
Remove abandoned barge at head of Captains Bay.	Concern has been expressed that equipment on barge may contain contaminants; aesthetic problem	Recent reports indicate there are no hazardous materials on board. Aesthetics benefit is low priority tradeoff for loss of high-value marine habitats for harbor construction. **Deleted**
Construct mussel beds off Front Beach (Iliuliuk Harbor).	Creation of mussel beds could be an enhancement if sites are presently of low value.	Sites are extremely exposed to open ocean and may be at their maximum biological productivity. **Deleted**
Remove sediment delta from inlet to Unalaska Lake.	Site may be former sockeye salmon spawning area. Would be valuable for health of fishery/watershed but situation is complex. Unalaska River is becoming seriously degraded from development activity.	Cost-prohibitive and massive sediment input upstream continues from poor land and watershed management planning; any benefits short-lived as additional sediment input guaranteed. **Deleted**
Create artificial reefs.	Habitat diversity generally considered beneficial.	Recent evaluations show reef creation projects in nearshore waters of Unalaska have not met expectations. **Deleted**

APPENDIX 4

Results from dive transects located off the southern tip of Amaknak Island

Two marine transects were surveyed off the extreme southern tip of Amaknak Island in February 2001 (Figure 7; Dive Transects 3 and 4). These dives were conducted on the reef complex at the southern tip of Amaknak Island, and were not directly in the LSA-South project site. This reef complex extends up and into the southern portion of the proposed LSA-South site (the originally proposed Alternative 1 would place the rubblemound directly on high-value mussel bed habitats on this reef). Data from these transects document the high value of this reef complex to fish and wildlife resources. Because of the recognized high value and importance of this reef complex, the Corps' tentatively recommended plan is Alternative 1b, which incorporates moving the rubblemound breakwater off of the reef. While the majority of direct impacts to the reef would be avoided, it appears that the distal edge of the rubblemound breakwater would still impact the reef. Furthermore, there are also potential indirect impacts as a result of the proximity of the breakwater and alteration of currents

Dive Transects 3 and 4: No current was detected during the dive and visibility was poor (2-3 m, ~6 ft). The duration of the dives was affected by difficult entries and exposure to cold. Consequently, the dives did not necessarily reach 100 m (328 ft) from shore, nor were maximum depths achieved.

The Dive 3 transect reached a depth of 5.7 m (16 ft) at 100 m (328 ft) from shore. The substrates at the beach edge consisted of bedrock, but then changed to cobble with increasing amounts of gravel further from shore (USFWS 2001). There was little evidence of silt or other fine sediment accumulation, indicating good water circulation. The relatively shallow profile of the transect supported a wide intertidal zone. The intertidal zone was characterized by a wide variety of marine plants and animals, including some not seen during any of the other marine surveys completed in nearby areas.

Sea colander (*Agarum fimbriatum*) kelp was the most dominant algae, beginning at 30 m (97 ft) from shore in water 1.6 m (4.5 ft) deep. Other algal species included rockweed (*Fucus furcatus*) in the intertidal zone and red rock crust (*Lithothamnium* sp.) along the entire transect length.

The upper intertidal zone near the start of this dive consisted of a depression in the bedrock ledge that was colonized with barnacles (*Balanus spp*) set in a matrix of barnacle shell hash (Figure A-5-1). This matrix also supported sea cucumbers (tentatively identified as *Cucumaria* sp.), burrowing anemones *(Anthropleura artemesia*), green sea urchins (*Strongylocentrotus dendroebachiensis*), black Katy and lined chitons *(Katharina tunicata* and *Tonicella lineata*), and at least three species of limpets (Order Patellogastropoda).

Above this bedrock/shell hash matrix there were a mudflat and a large blue mussel bed with scattered rockweed, sea lettuce (*Ulva* sp.), and sea sac (*Halosaccion glandiforme*) interspersed among a few imbedded rocks. A large number of ribbon worms, (Nemeretans, at least two species) were moving across the exposed mudflat (Figure A-5-2). Ribbon worms are formidable marine predators, feeding on polychaete worms, crustaceans and sometimes mollusks and fish. They in turn are preyed upon by crabs, fish and birds.

An abundance of other organisms, such as clams and mottled sea stars *(Evasterias troschelii*) were observed on the shallow reef during a low tide at this site in June 2001 and July 2003. Juvenile salmon, gunnels, and sculpins were observed in the tidepools. Additional observations at this site continued to document numerous snails, chitons, and sea cucumbers.

Moving offshore, deeper water and stable substrates (varying amounts of cobble and sand juxtaposed with outcropping of bedrock) supported a consistent number of plumose, Christmas, and crimson anemones (*Metridium sp., Telia crassicornis,* and *Cribinopsis fernaldi*), especially large numbers at stations between 70 and 100 m (194 - 325 ft) from shore in water 5.7 - 10.4 m (16 - 29 ft) deep. Remnant shells and siphons of live clams representing several species were observed all along the transect. Bivalves noted included heart cockle (*Clinocardium nuttalli*), softshelled clams *(Mya pseudoarenaria* and *M. truncata)*, rock jingle (*Pododesmus cepio*), littleneck clam (*Protothaca staminea*), and butter clam (*Saxidomus giganteus*). Large numbers of green urchins were observed along the entire transect and had reduced much of the *Agarum* to holdfasts and stipes.

Four different species of sea stars were noted along this transect; the mottled sea star, the blood star (*Henricia leviuscula*), the sun star (*Solaster dawsonii*), and the sunflower star (*Pycnopodia helianthoides*). The abundance and diversity of these marine predators indicate a high prey biomass along the dive transect. This high biomass is also reflected by the presence of a giant Pacific octopus (*Octopus dofleini*) observed in a rocky cave near the start of the transect (station 3). The divers also had a close encounter with two bull Steller sea lions along this transect.

After the transect survey was completed and the divers were returning to shore, they turned over loose boulders and noted a large number of sea cucumbers, shrimp, hermit and lyre crabs, small fish, brittlestars, and other marine life. These organisms are not typically active during daylight hours or would likely experience increased risk of predation if they ventured away from cover. Their abundance and diversity is further documentation of the productivity of the site.

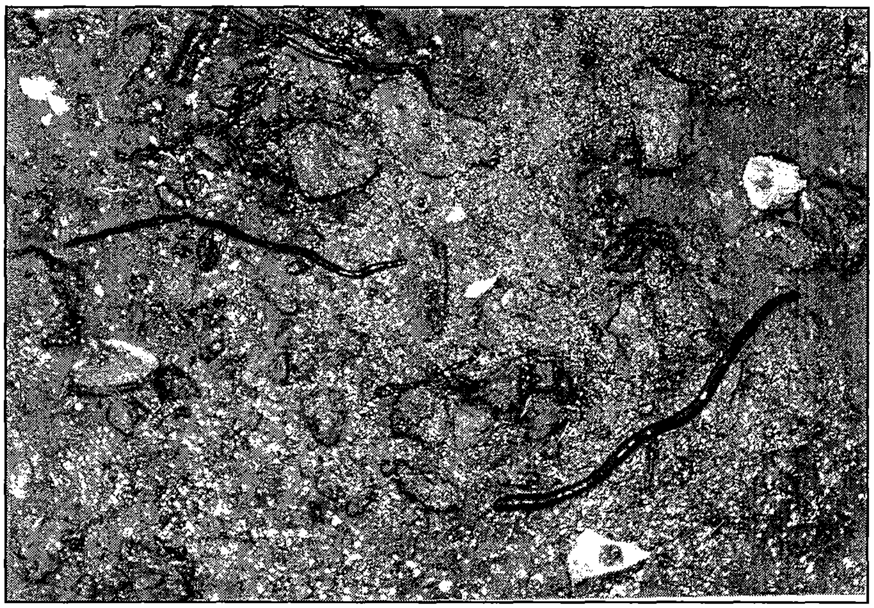


Figure A-5-1: Nemeretan worms on the exposed mudflat habitat near the mussel beds at the southern tip of Little South America, Amaknak Island, Alaska.

The substrates along the Dive 4 transect were generally similar in basic composition to those of Dive 3, but there were more gravels and more interspersion of smaller particles with larger ones as opposed to the relative sorting of sizes at Dive 3. Also, water depths along transect 4 were shallower along most of its length (maximum depth was 5.75 m (16 ft)). The two transects were similar in their productivity and diversity of marine life, as would be expected given their proximity and substrates. The differences, however, included a larger number of green urchins, bivalves, and sunflower stars than was noted on Dive 3. There was also a conspicuous abundance of relatively large amphipods that were stirred up upon the approach of the divers.

APPENDIX 5

Attachment of 19 pages:

Appendix 5: Graphics provided to illustrate anticipated impacts from each alternative to the 5 resource types. Note that this provides visual representation of location and sizes of the 5 resource types based upon data collection ate ach site (see Methods section). This also illustrates the concept

FIGURES DEPICT THE FOLLOWING:

Figure A-1. Overview of project area and relative position of alternative sites.

Figure A-1-1. Project Area LSA-South (Alternative 1).

Figures A-1-2 through A-1-7: Resource types within footprint of LSA-South (Alternative 1).

Figure A-2-1: Project Area and Features: LSA-North (Alternative 2).

Figures A-2-2 through A-2-6: Resource types within footprint of LSA-North (Alternative 2).

Figure A-3-1: Project Area and Features:

Figures A-3-2 through A-3-5. Resource types within footprint of Expedition Inlet/LSA-North (Alternative 3)

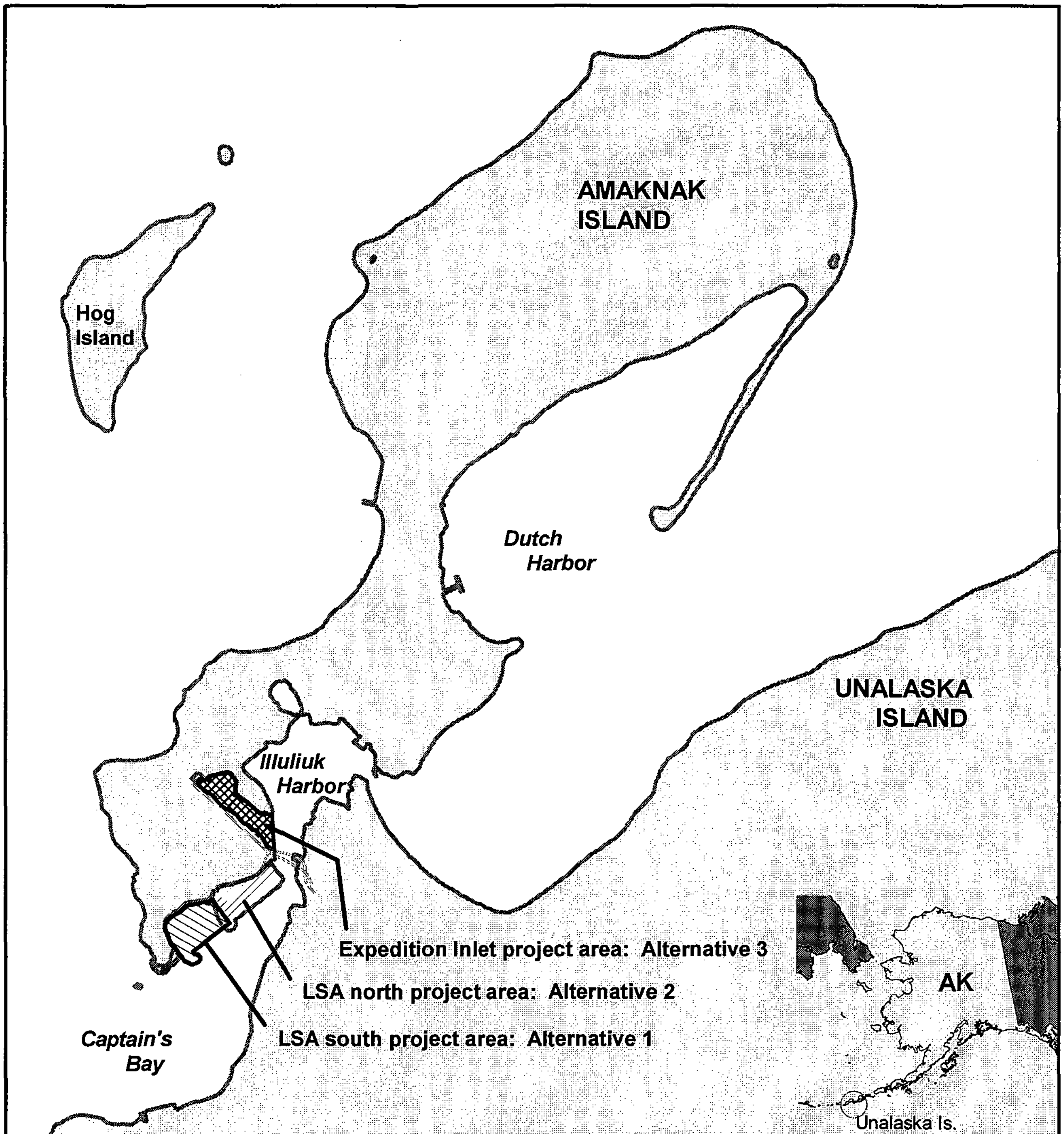
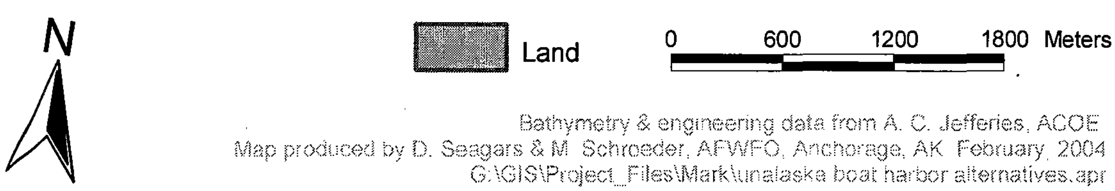


Figure A-1. Overview of project area and relative position of alternative sites.



Bathymetry & engineering data from A. C. Jefferies, ACOE
Map produced by D. Seagars & M Schroeder, AFWFO, Anchorage, AK February 2004
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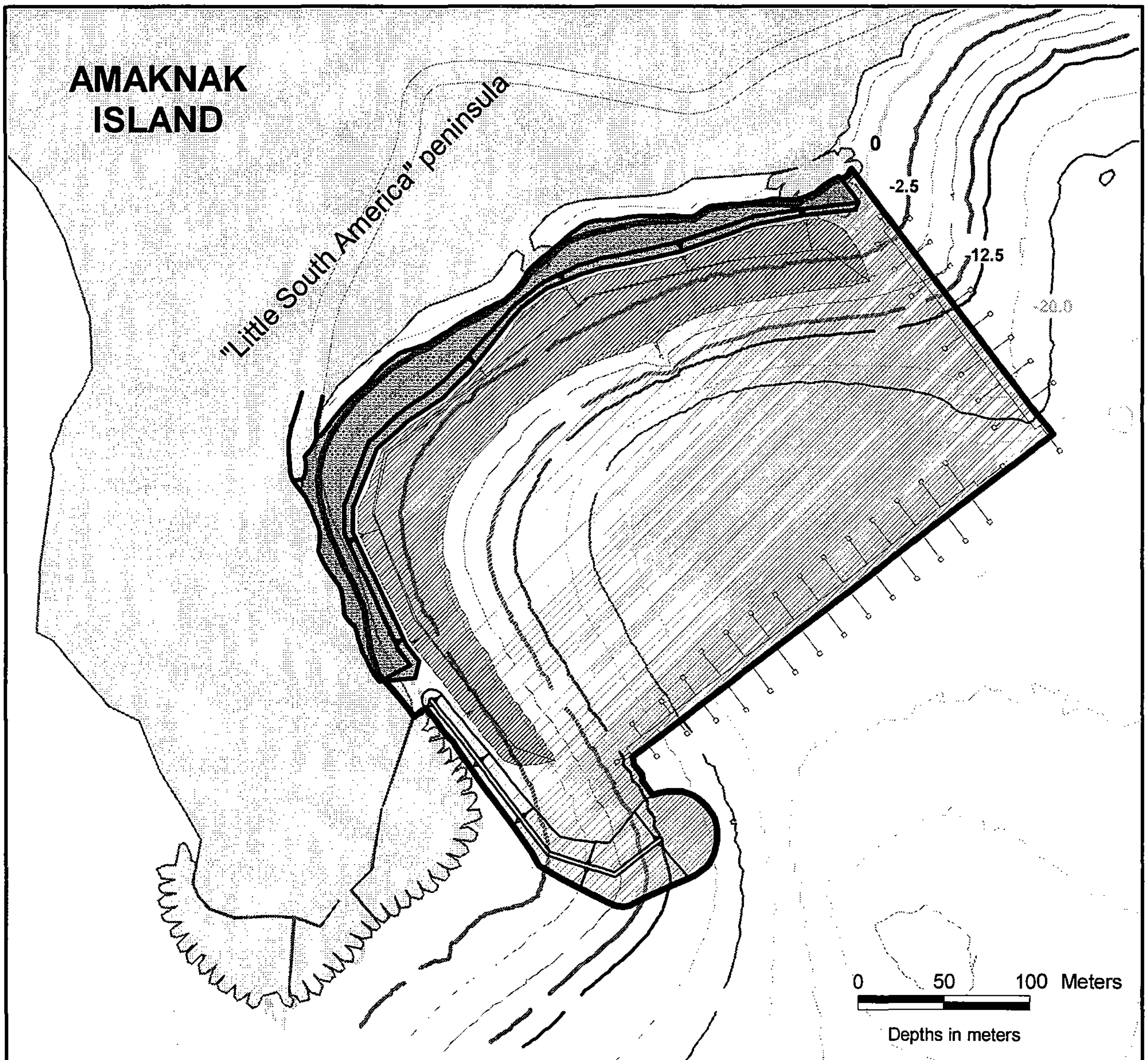

Figure A-1-1. Project Area and Features: LSA - South (Alternative 1)

Land

Project area LSA - South. Area impacted = 9.6 ha (23.8 ac).

Dredge area - 1.8 ha (4.5 ac)

Fill area - 1.1 ha (2.8 ac)

N

Bathymetry & engineering data from A. C. Jeffries, ACOE.
Map produced by D. Seagars & M. Schroeder, AFWFO, Anchorage, AK February, 2004
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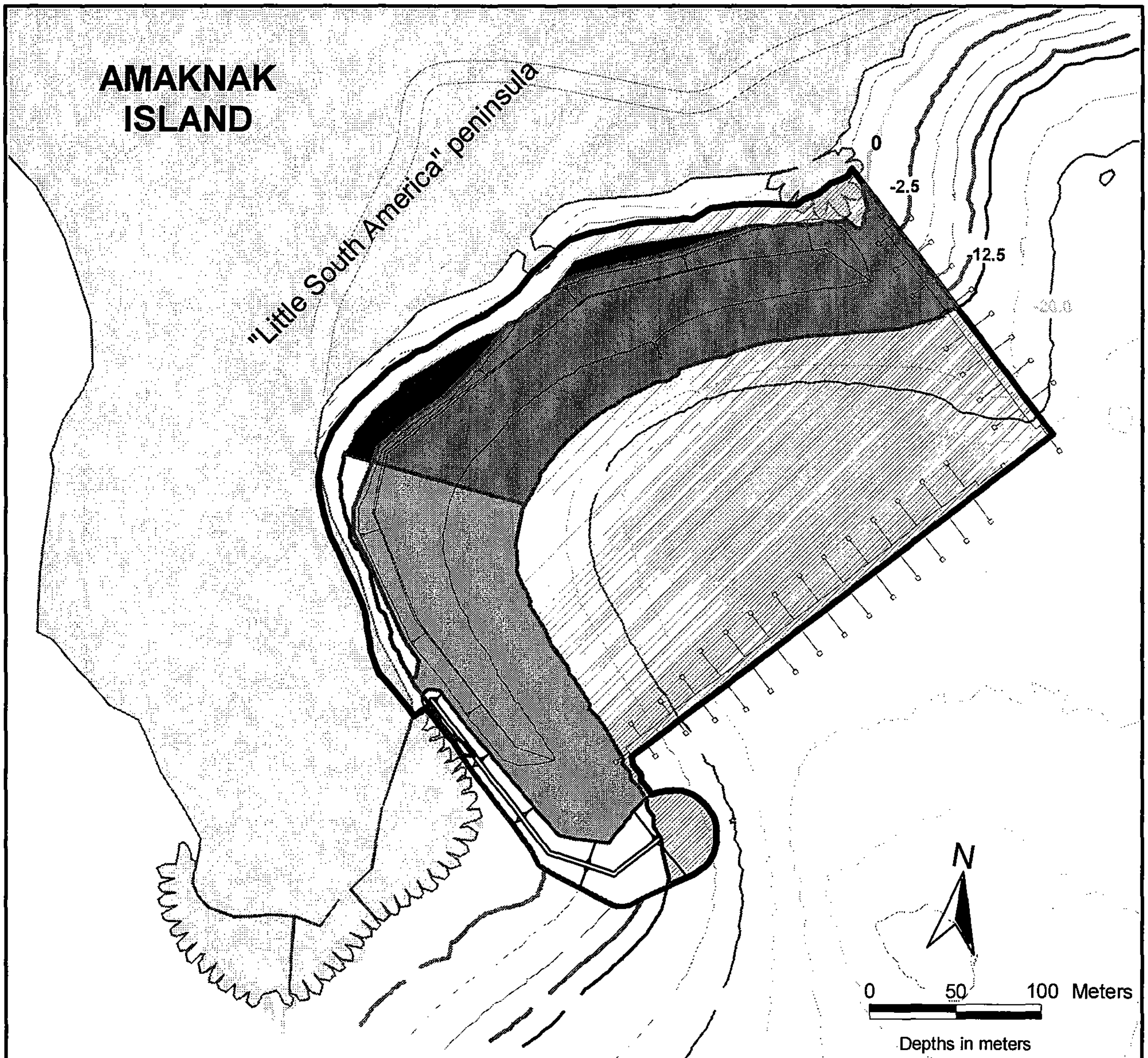

Figure A-1-2. Clams - Habitat Impact Areas: LSA south (Alternative 1)

Land

Project footprint

Dredging footprint

High value clam habitat (loss).
Area = 0.5 ha (1.2 ac)

Moderate value clam habitat (loss).
Area = 0.2 ha (0.6 ac)

High value clam habitat (loss & degraded); area = 1.6 ha (4.1 ac)
1.7 ac loss (from dredging)
2.4 ac degraded (from habor ops)

Moderate value clam habitat (degraded).
Area = 2.2 ha (5.4 ac)
2.8 ac loss (from dredging)
2.5 ac degraded (from habor ops)

Bathymetry & engineering data from A. C. Jeffries, ACOE.
Map produced by D. Seagars & M. Schroeder, AFWFO, Anchorage, AK February, 2004
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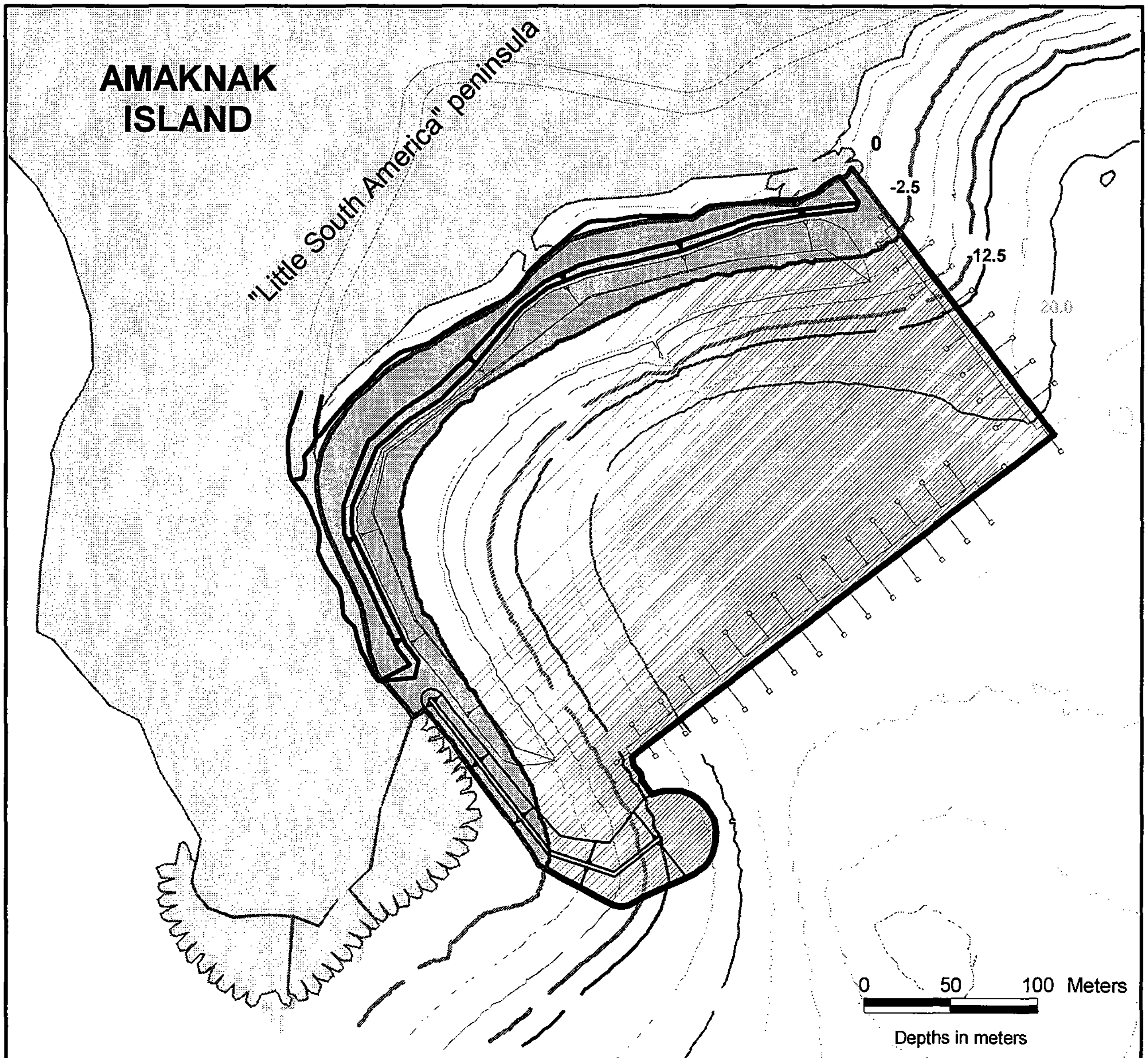

Figure A-1-3. Juvenile fish - Habitat Impact Areas: LSA south (Alternative 1)

Land

Project footprint

High value juvenile fish rearing habitat (loss).
Area = 2.2 ha (5.5 ac)

N

Bathymetry & engineering data from A. C. Jeffries, ACOE.
Map produced by D. Seagars & M. Schroeder, AFWFO, Anchorage, AK February, 2004
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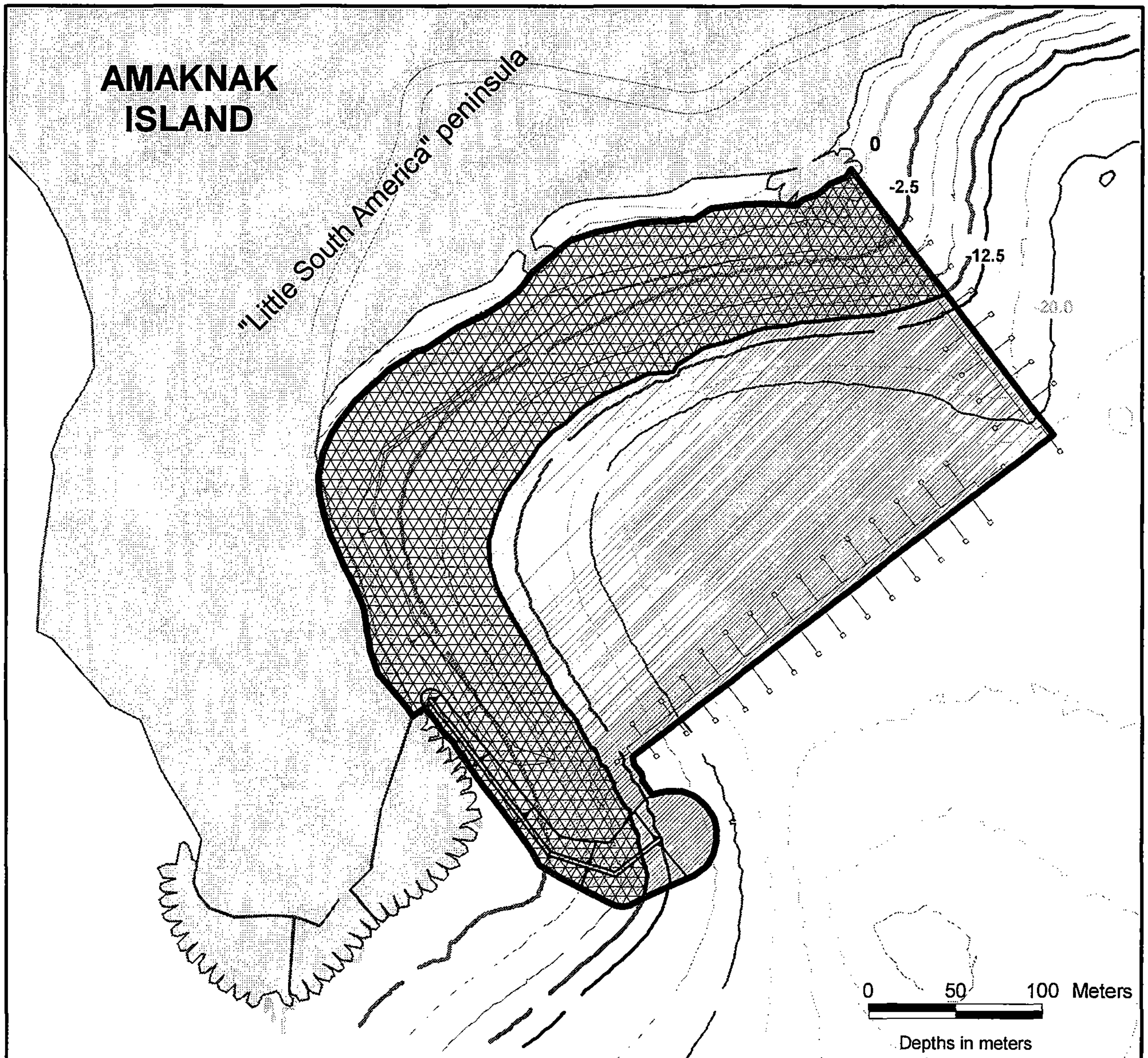

Figure A-1-4. Waterfowl/seabirds - Habitat Impact Areas: LSA south (Alternative 1)

Land

Project footprint.

High value waterfowl / seabird foraging habitat (loss),
Area = 4.6 ha (11.4 ac)

Moderate value waterfowl / seabird resting area (loss).
Area = 9.6 ha (23.8 ac).

N

Bathymetry & engineering data from A. C. Jeffries, ACOE.
Map produced by D. Seagars & M. Schroeder, AFWFO Anchorage, AK February, 2004
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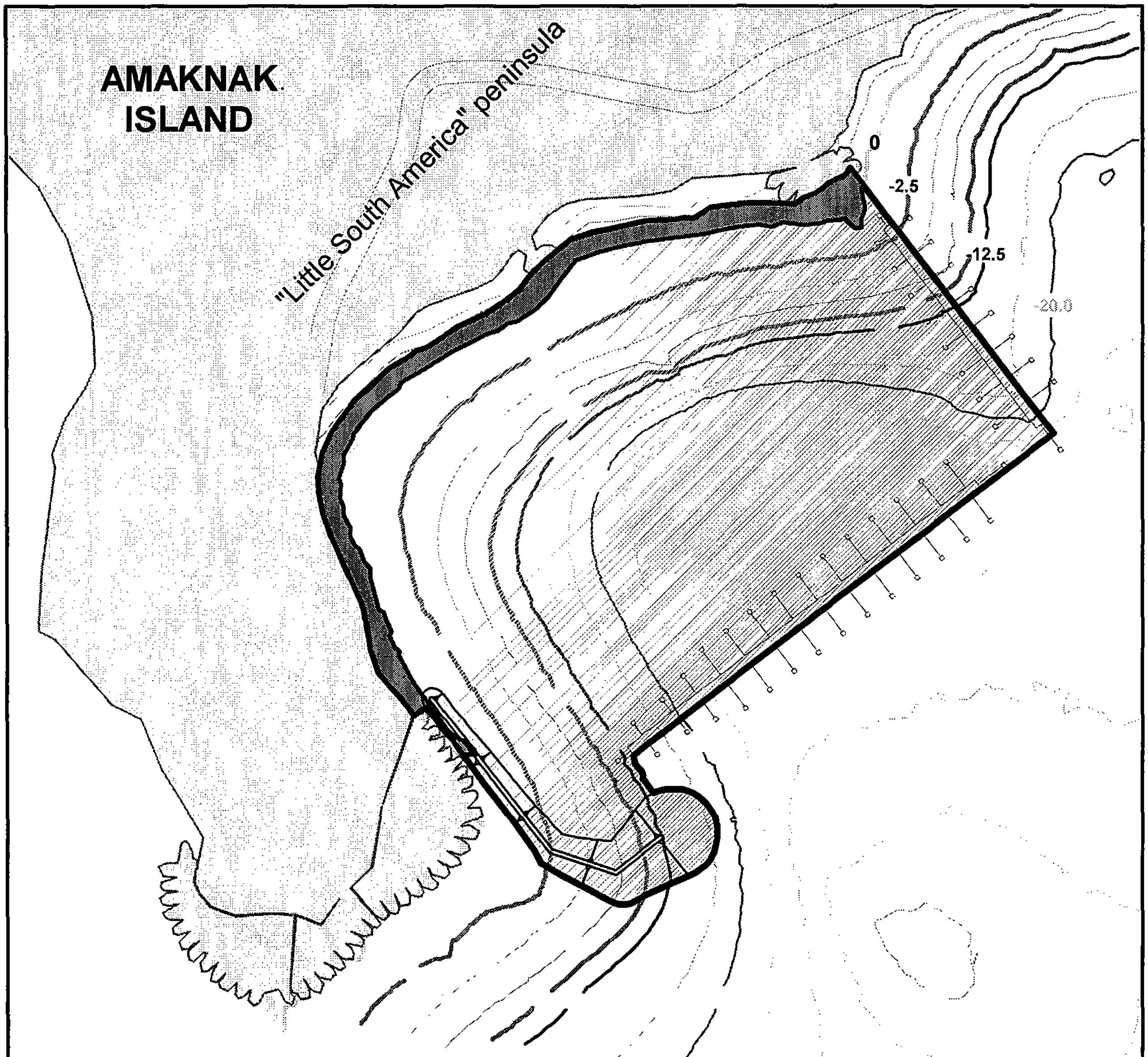

Figure A-1-5. Intertidal - Habitat Impact Areas: LSA south (Alternative 1)

Land

Project footprint

Moderate value intertidal habitat (loss).
Area = 0.6 ha (1.6 ac)

0 50 100 Meters

Depths in meters

Bathymetry & engineering data from A. C. Jeffries, ACOE.
Map produced by D. Seagars & M. Schroeder AFWFO, Anchorage AK February, 2004
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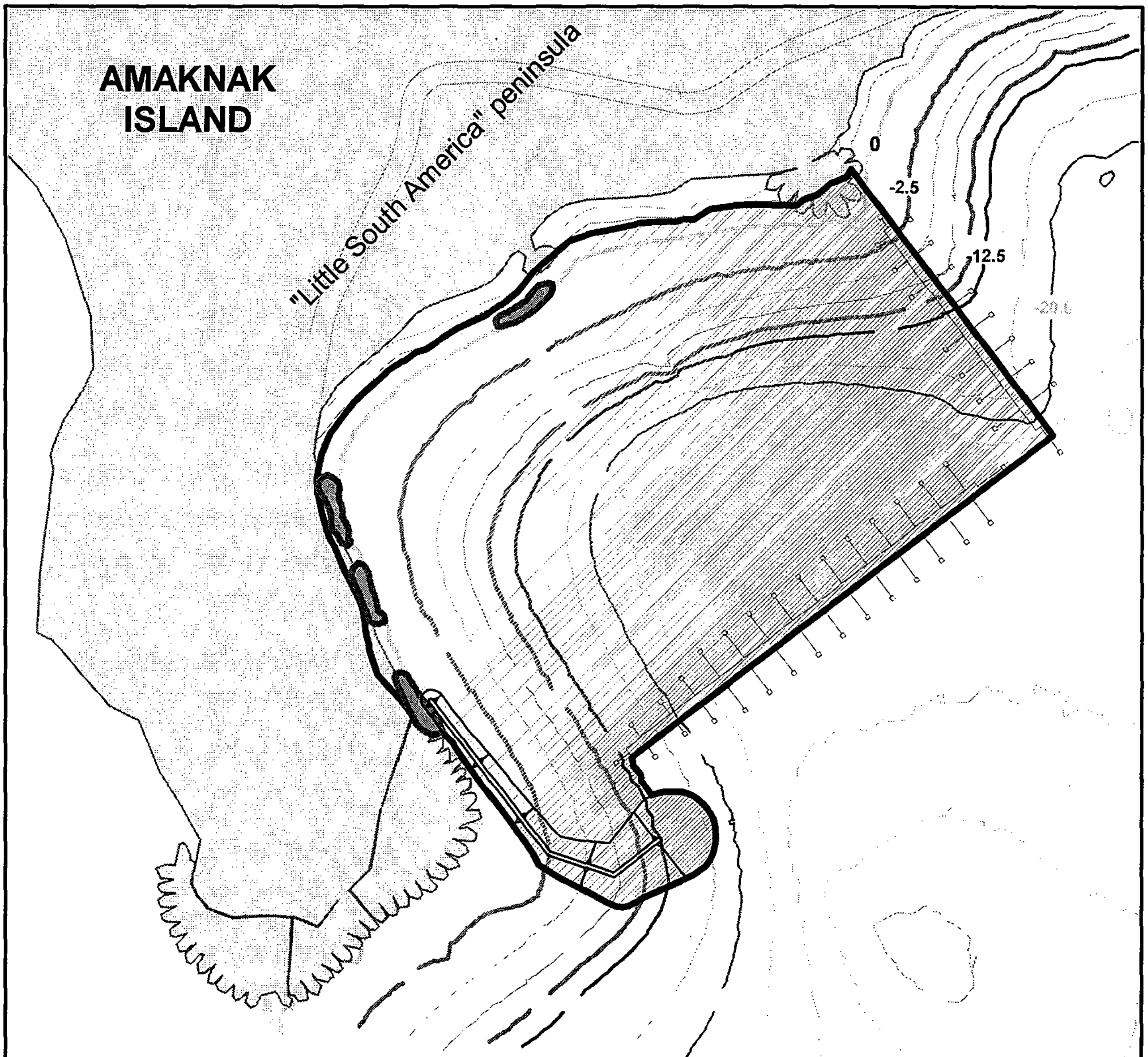

Figure A-1-6. Mussel beds - Habitat Impact Areas: LSA south (Alternative 1)

Land

Project footprint

High value mussel bed habitat (loss).
Area = 0.1 ha (0.3 ac)

N

0 50 100 Meters

Depths in meters

Bathymetry & engineering data from A. C. Jeffries, ACOE.
Map produced by D. Seagars & M. Schroeder, AFWFO, Anchorage, AK February, 2004
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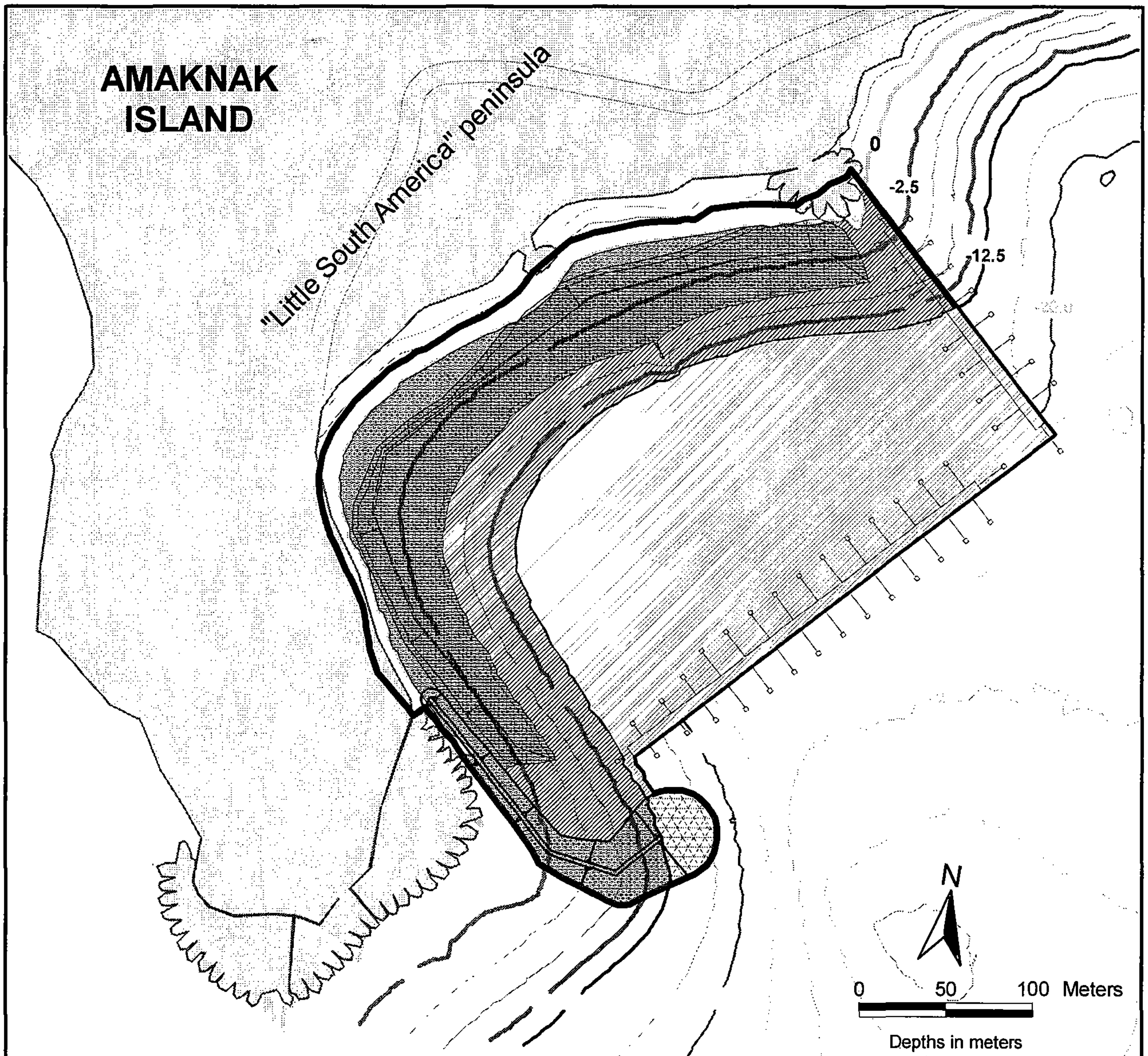

Figure A-1-7. Red king crab - Habitat Impact Areas: LSA south (Alternative 1)

- Land
- Project footprint
- Moderate value adult red king crab - wintering habitat (degraded). Area = 4.3 ha (10.7 ac)
- High value juvenile red king crab - rearing habitat (degraded). Area = 1.8 ha (4.5 ac)
- Moderate value adult red king crab - wintering habitat (loss). Area = 0.2 ha (0.4 ac)
- High value juvenile red king crab - rearing habitat (loss due to fill). Area = 0.9 ha (2.2 ac)
- High value juvenile red king crab rearing habitat (loss & degraded due to dredging). Area = 1.8 ha (4.5 ac)

Bathymetry & project data from A. C. Jeffres, ACOE.
Map produced by D. Seagars & M. Schroeder, AFWFO Anchorage, AK February, 2004
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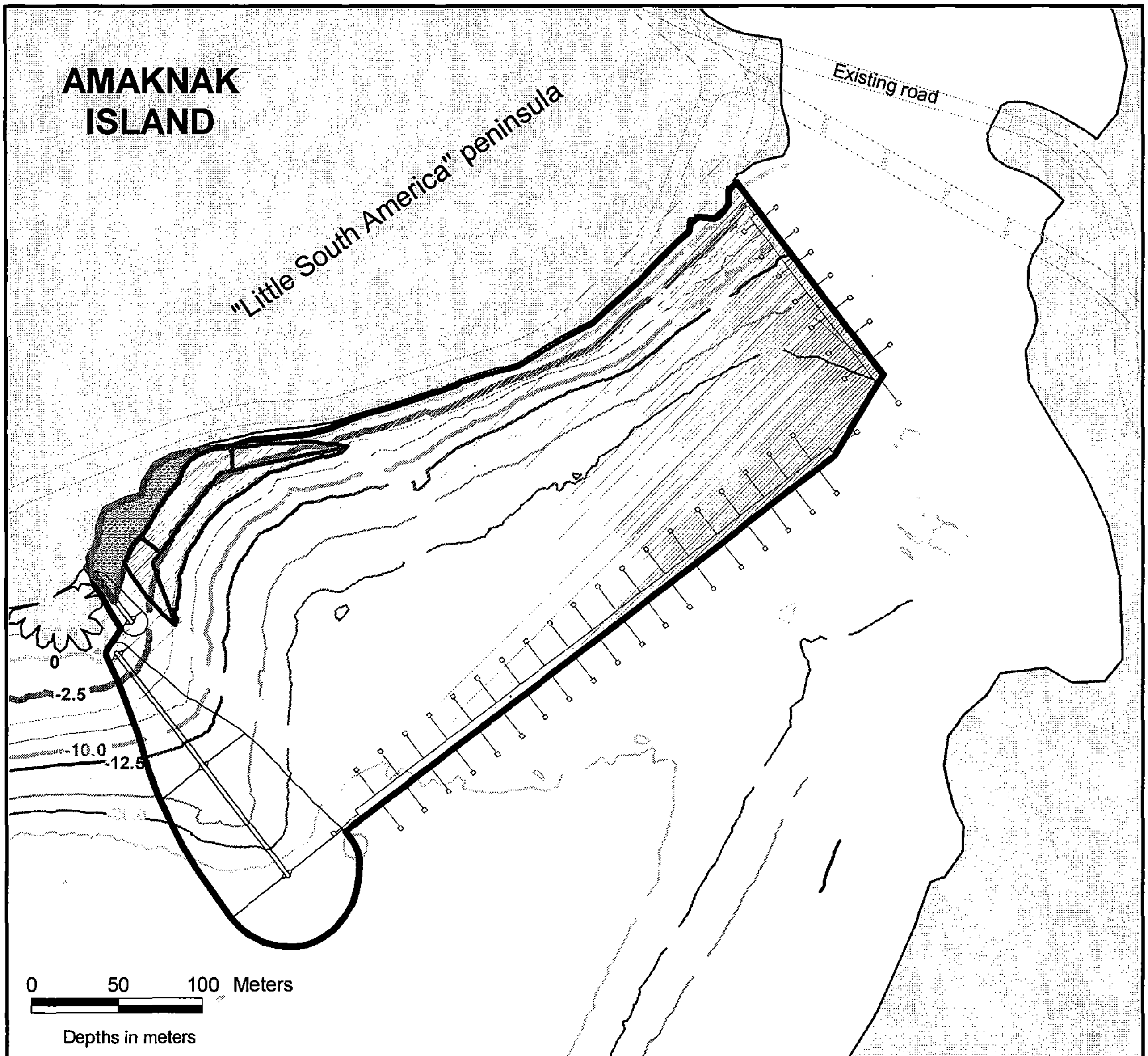

Figure A-2-1. Project Area and Features: LSA North (Alternative 2)

N

Land

Project footprint LSA - North. Area impacted = 9.2 ha (22.6 ac)

Dredging area = 0.4 ha (1.0 ac)

Fill area = 0.2 ha (0.4 ac)

Bathymetry & engineering data from A. C. Jeffries. ACOE.
Map produced by D. Seagars & M. Schroeder, AFWFO. Anchorage, AK February, 2004
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U.S. FISH & WILDLIFE SERVICE

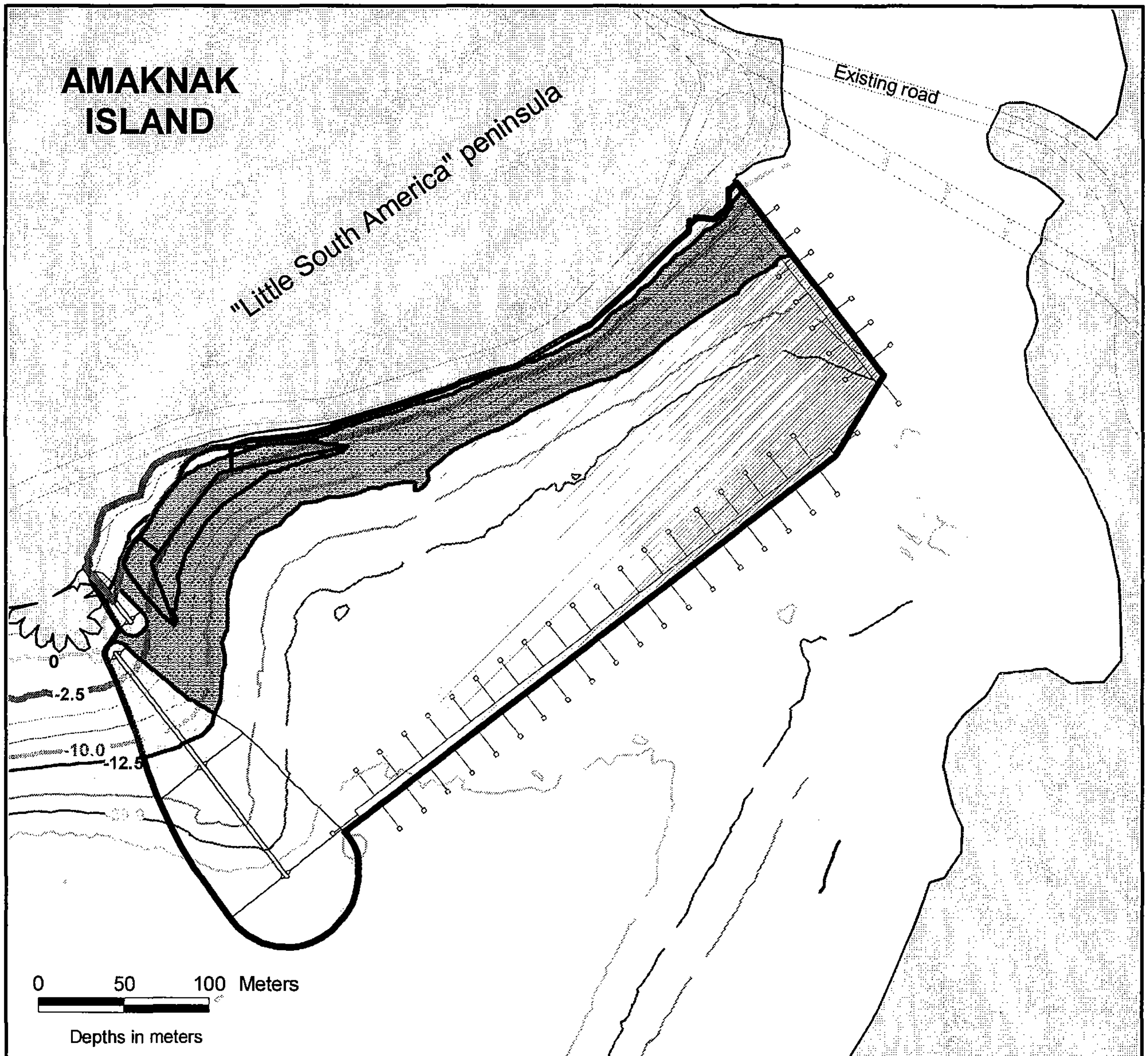

Figure A-2-2. Clams - Habitat Impact Areas: LSA north (Alternative 2)

N

Land

Project footprint, area = 9.2 ha (22.6 ac)

Dredging region

Fill region

Moderate value clam habitat (degraded).
Area = 2.0 ha (4.8 ac)
3.8 ac degraded (from harbor operations)
1.0 ac loss (from dredging)

Moderate value clam habitat (loss)
Area = 0.3 ha (0.6 ac)

Bathymetry & engineering data from A. C. Jeffries, ACOE.
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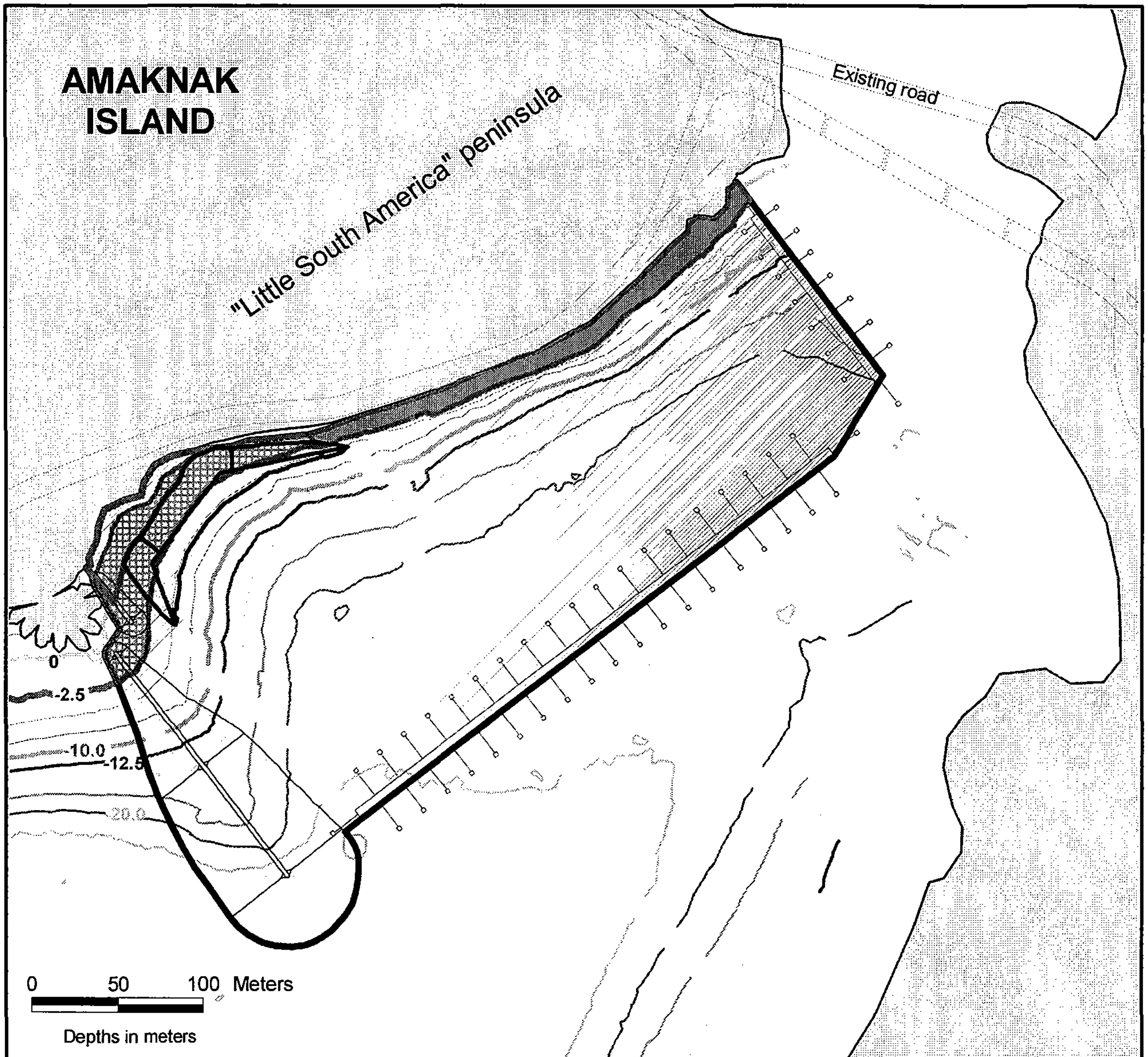

Figure A-2-3. Juvenile fish - Habitat Impact Areas: LSA north (Alternative 2)

Land

Project footprint, area = 9.2 ha (22.6 ac)

Dredging region

Fill region

Moderate value juvenile fish rearing habitat (degraded). Area = 0.3 ha (0.8 ac)

Moderate value juvenile fish rearing habitat (loss). Area = 0.4 ha (1.1 ac)

N

Bathymetry & engineering data from A. C. Jeffries, ACOE.
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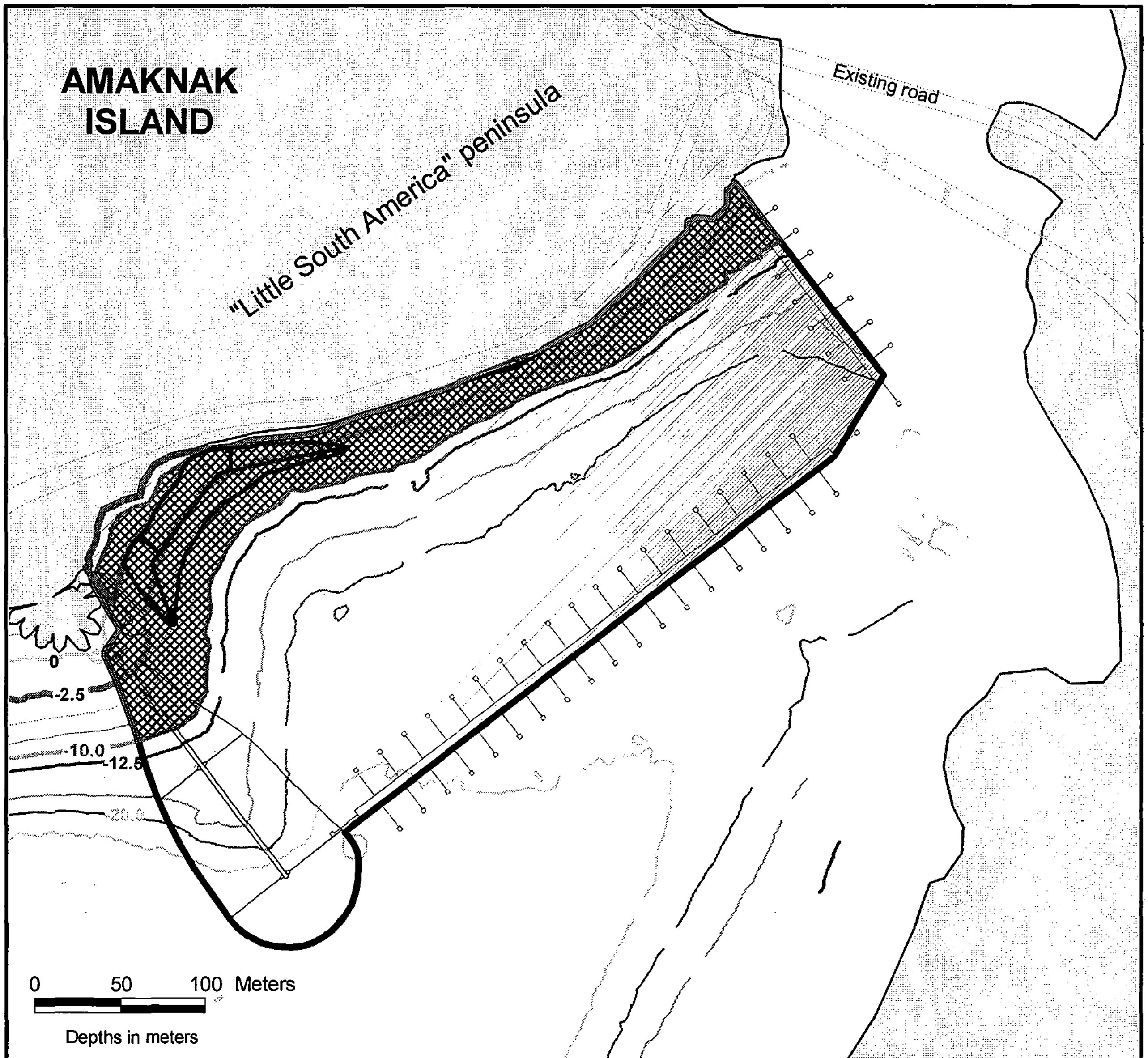

Figure A-2-4. Waterfowl/seabirds - Habitat Impact Areas: LSA north (Alternative 2)

Land

Project footprint; area = 9.2 ha (22.6 ac)

Dredging region

Fill region

High value waterfowl/seabird foraging region (loss). Area = 2.0 ha (4.9 ac)

Moderate value waterfowl/seabird resting region (loss). Area = 9.2 ha (22.6 ac).

N

Bathymetry & engineering data from A. C. Jeffries, ACOE.
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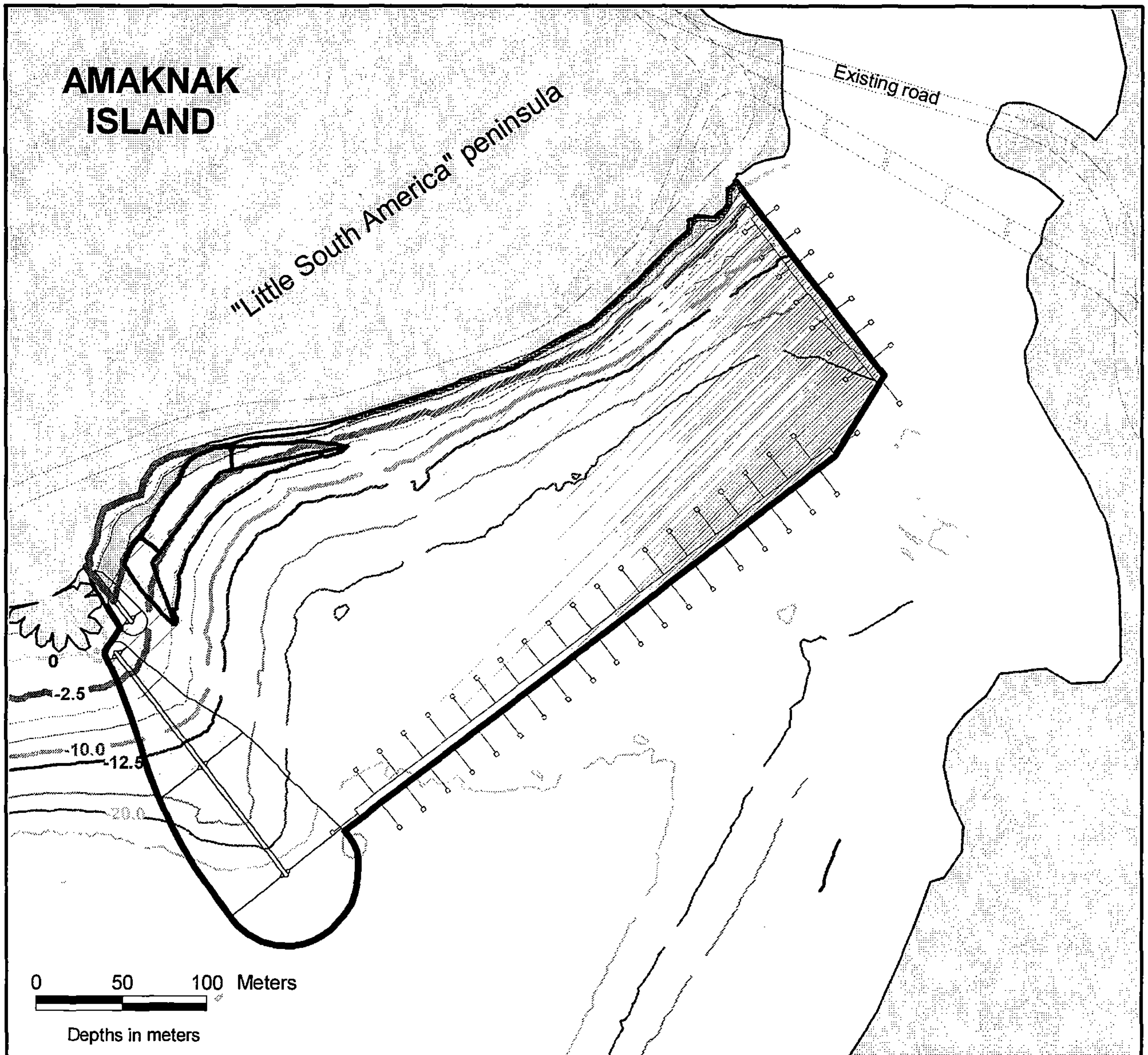

Figure A-2-5. Intertidal - Habitat Impact Areas: LSA north (Alternative 2)

N

Land

Project footprint Area = 9.2 ha (22.6 ac)

Dredging region

Fill region

Moderate value intertidal habitat (degraded). Area = 0.1 ha (0.3 ac)

Moderate value intertidal habitat (loss). Area = 0.2 ha (0.4 ac)

Bathymetry & engineering data from A. C. Jeffries, ACOE.
Map produced by D. Seagars & M. Schroeder, AFWFO, Anchorage AK February, 2004
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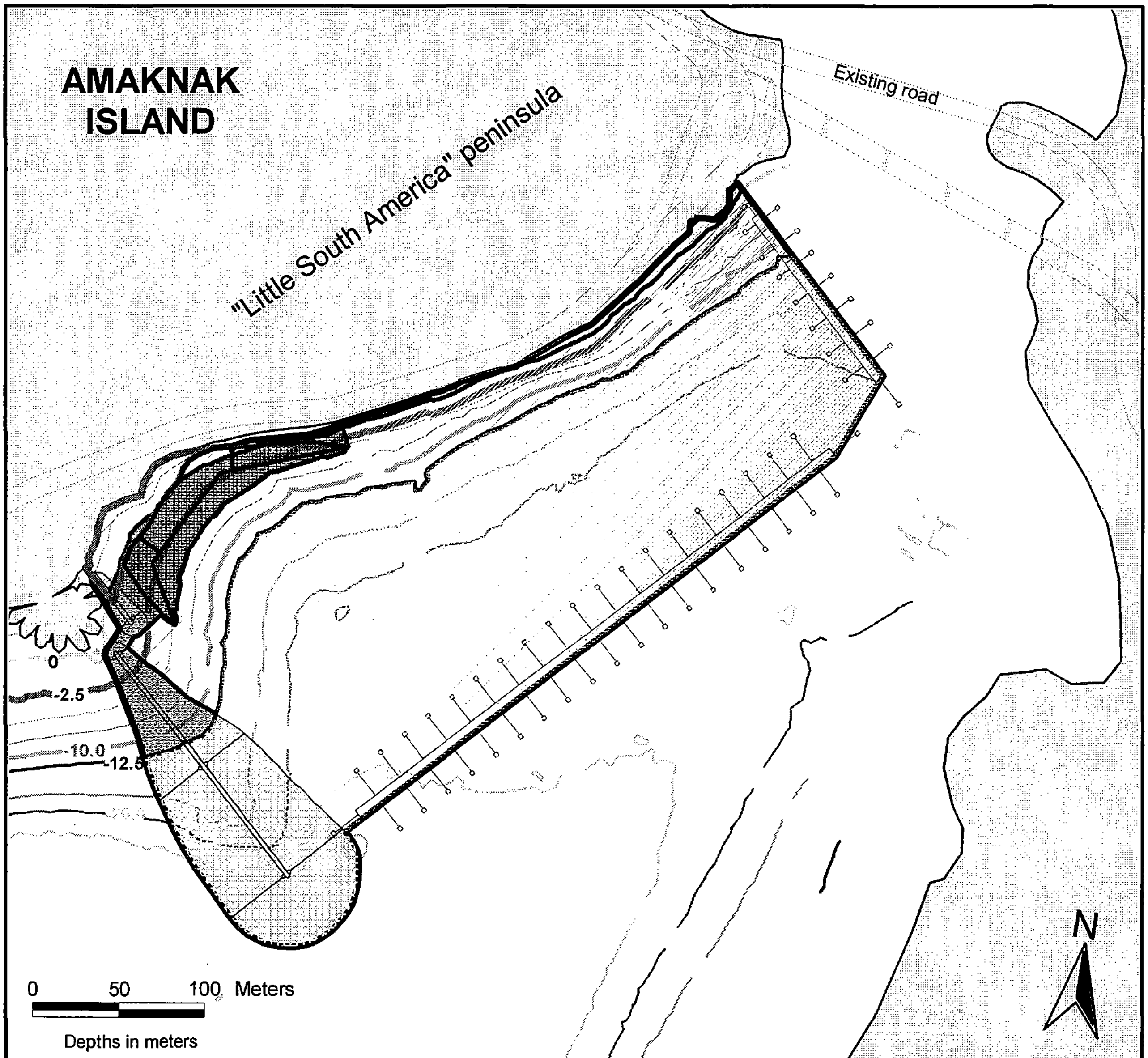

Figure A-2-6. Red king crab - Habitat Impact Areas: LSA north (Alternative 2)

Land

Project footprint

Fill region

Dredging region

High value red king crab - juvenile rearing habitat (degraded). Area = 1.5 ha (3.7 ac)

Moderate value adult red king crab winter habitat (degraded). Area =5.6 ha (13.8 ac)

High value juvenile red king crab rearing habitat (loss due to fill). Area = 0.3 ha (0.7 ac)

Moderate value adult red king crab winter habitat (loss). Area =1.0 ha (2.5 ac)

High value juvenile red king crab rearing habitat (loss & degraded due to dredging). Area = 0.4 ha (1.0 ac)

Bathymetry & engineering data from A. C. Jeffries, ACOE
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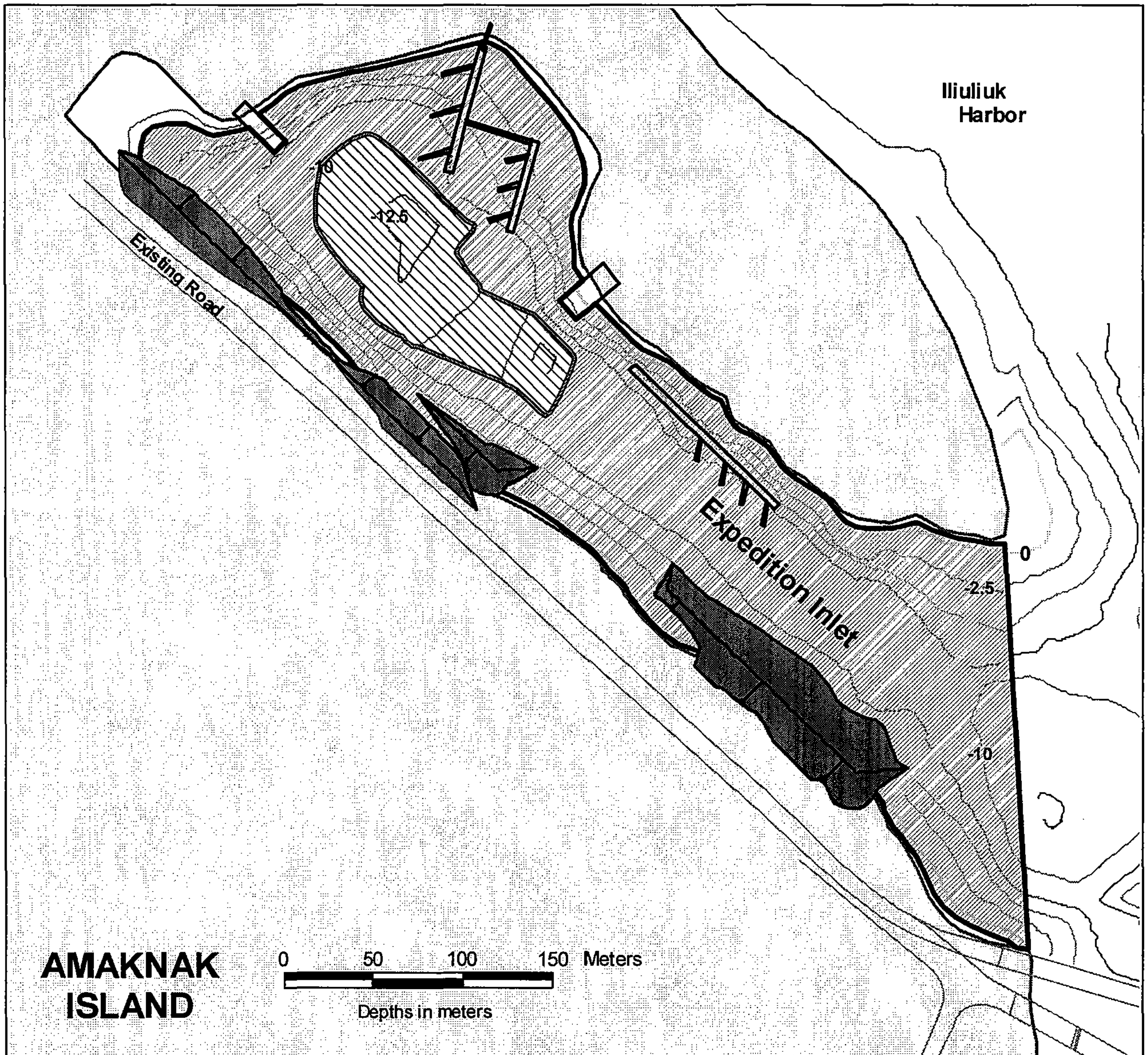

Figure A-3-1. Project Area and Features: Expedition Inlet / LSA North (Alternative 3)

Land

Project footprint (6.8 ha, 16.7 ac)

Fill area
0.4 ha (1.0 ac)

Dredging area
0.7 ha (1.8 ac)

Region of heavy sedimentation
Area = 0.9 ha (2.3 ac)

N

Bathymetry & engineering data from A. C. Jefferies, ACOE
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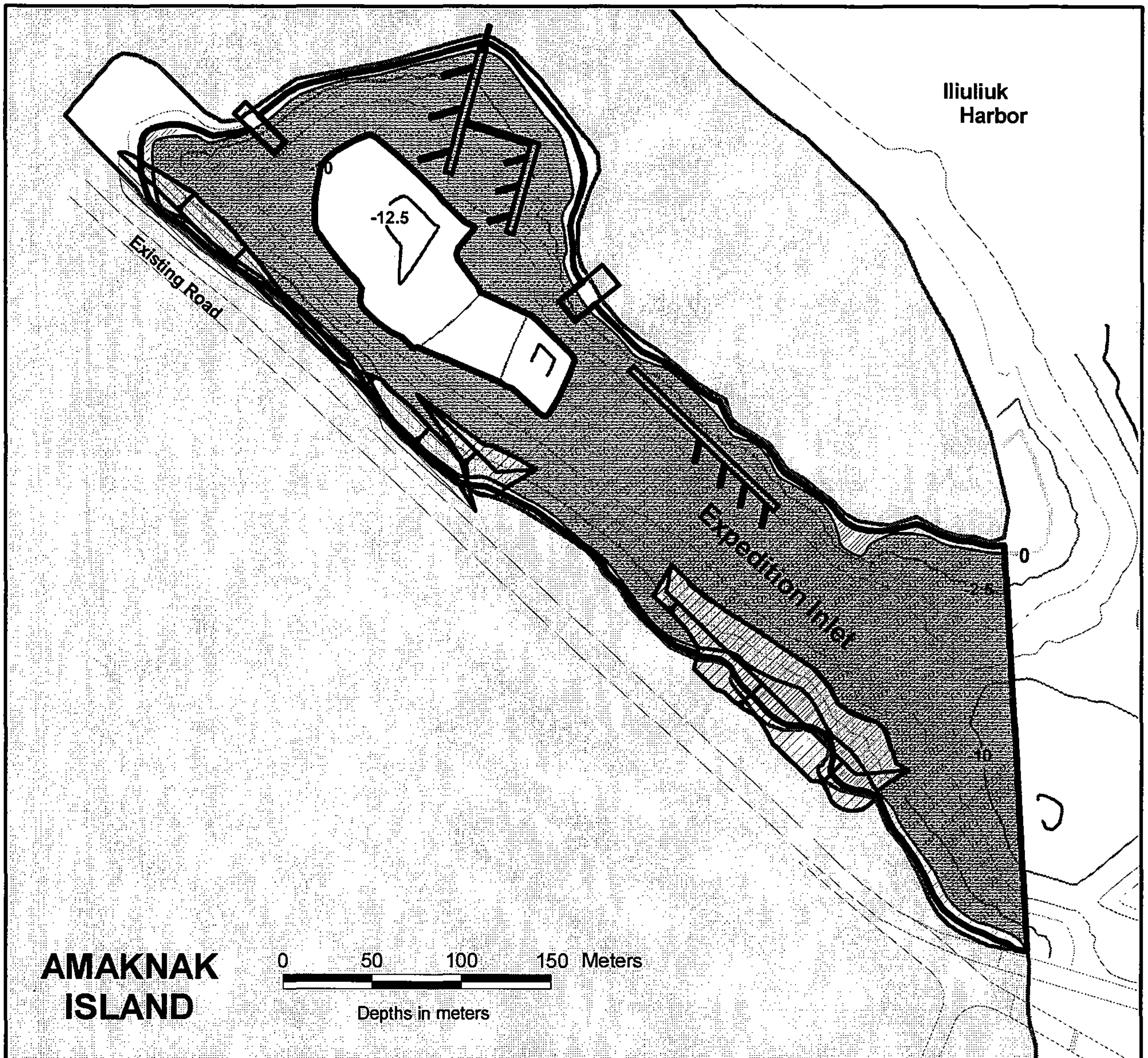

Figure A-3-2. Clams & Red King Crab - Habitat Impact Areas: Expedition Inlet / LSA North (Alternative 3)

N

- Land
- Project footprint (6.8 ha, 16.7 ac)
- Proposed fill
- Proposed dredging
- Moderate value clam & high value red king crab habitat (loss due to fill). Area = 0.2 ha (0.4 ac)
- Moderate value clam habitat (degraded) & high value juvenile red king crab habitat (degraded). Area = 5.6 ha (13.8 ac)
- Moderate value clam & high value red king crab habitat (loss & degraded due to dredging). Area = 0.4 ha (1.0 ac)

Bathymetry & engineering data from A. C. Jefferies, ACOE.
Map produced by D. Seagars & M. Schroeder, AFWFO, Anchorage, AK February, 2004
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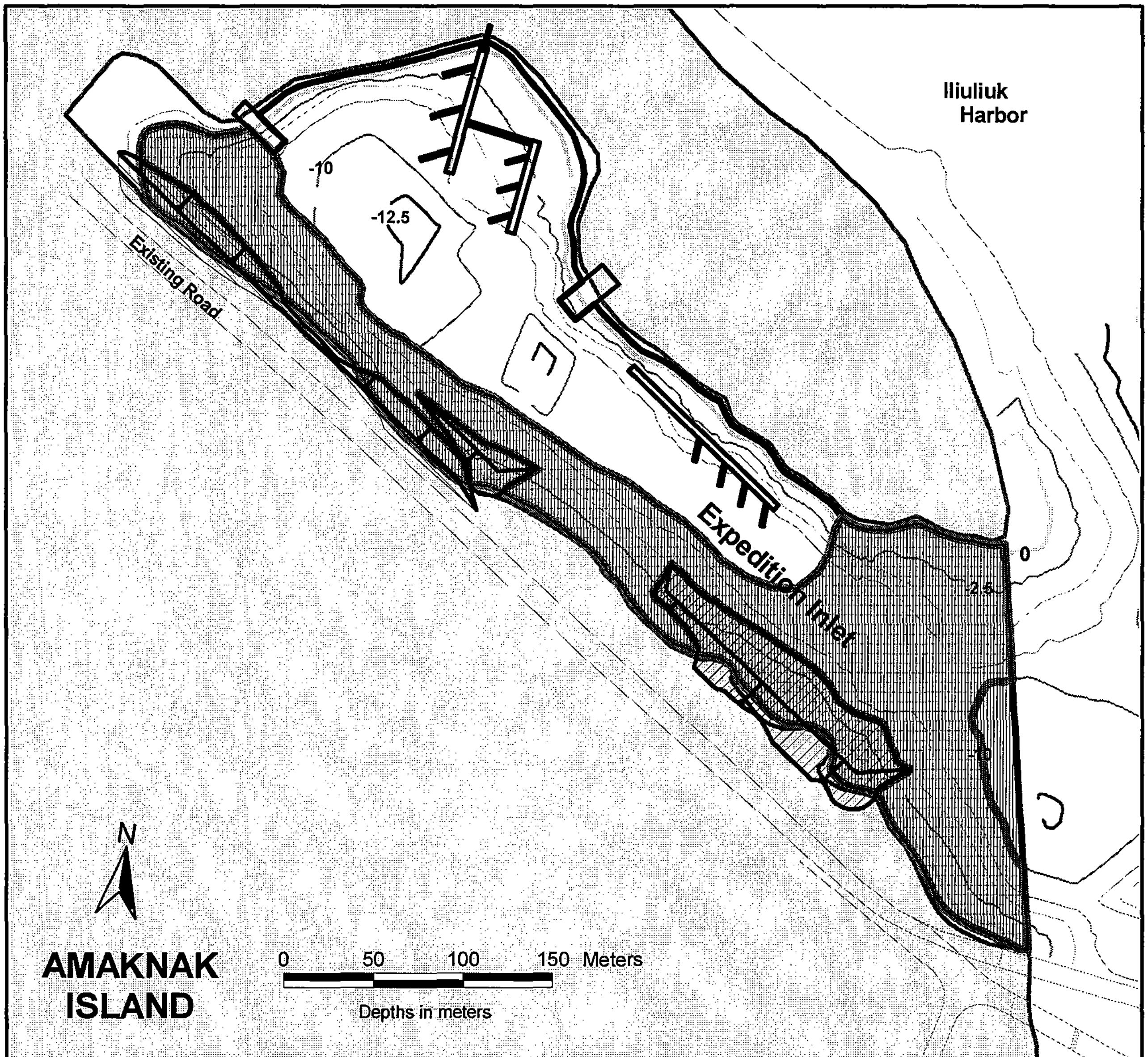

Figure A-3-3. Waterfowl/seabirds - Habitat Impact Areas: Expedition Inlet / LSA North (Alternative 3)

Land

Project footprint (6.8 ha, 16.7 ac)

Proposed fill

Proposed dredging

Moderate value waterfowl/seabird habitat foraging (loss). Area = 4.0 ha (9.8 ac)

Moderate value waterfowl/seabird habitat - winter resting (loss). Area = 4.2 ha (10.3 ac)

Bathymetry & engineering data from A. C. Jefferies, ACOE.
Map produced by D. Seagars & M. Schroeder, AFWFO, Anchorage, AK February, 2004
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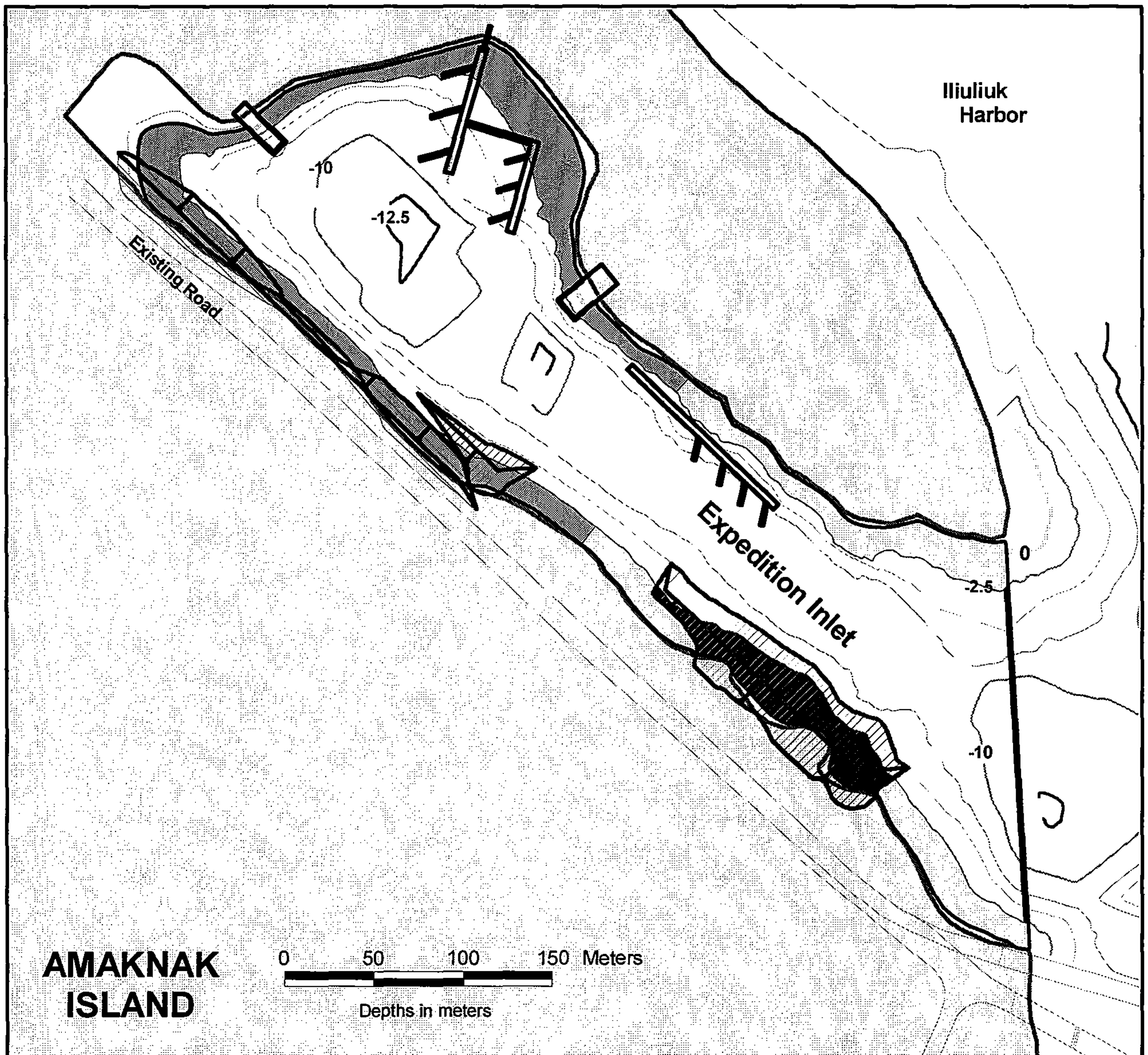

Figure A-3-4. Fish - Habitat Impact Areas: Expedition Inlet / LSA North (Alternative 3)

- Land
- Project footprint (6.8 ha, 16.7 ac)
- Proposed fill
- Proposed dredging
- Moderate value juvenile fish rearing habitat (degraded). Area = 0.6 ha (1.5 ac)
- Moderate value juvenile fish rearing habitat (loss). Area = 0.3 ha (0.7 ac)
- Low value juvenile fish rearing habitat (degraded). Area = 0.9 ha (2.3 ac)

N

Bathymetry & engineering data from A. C. Jefferies, ACOE
Map produced by D. Seegars & M. Schroeder, AFWFO, Anchorage, AK February 2004
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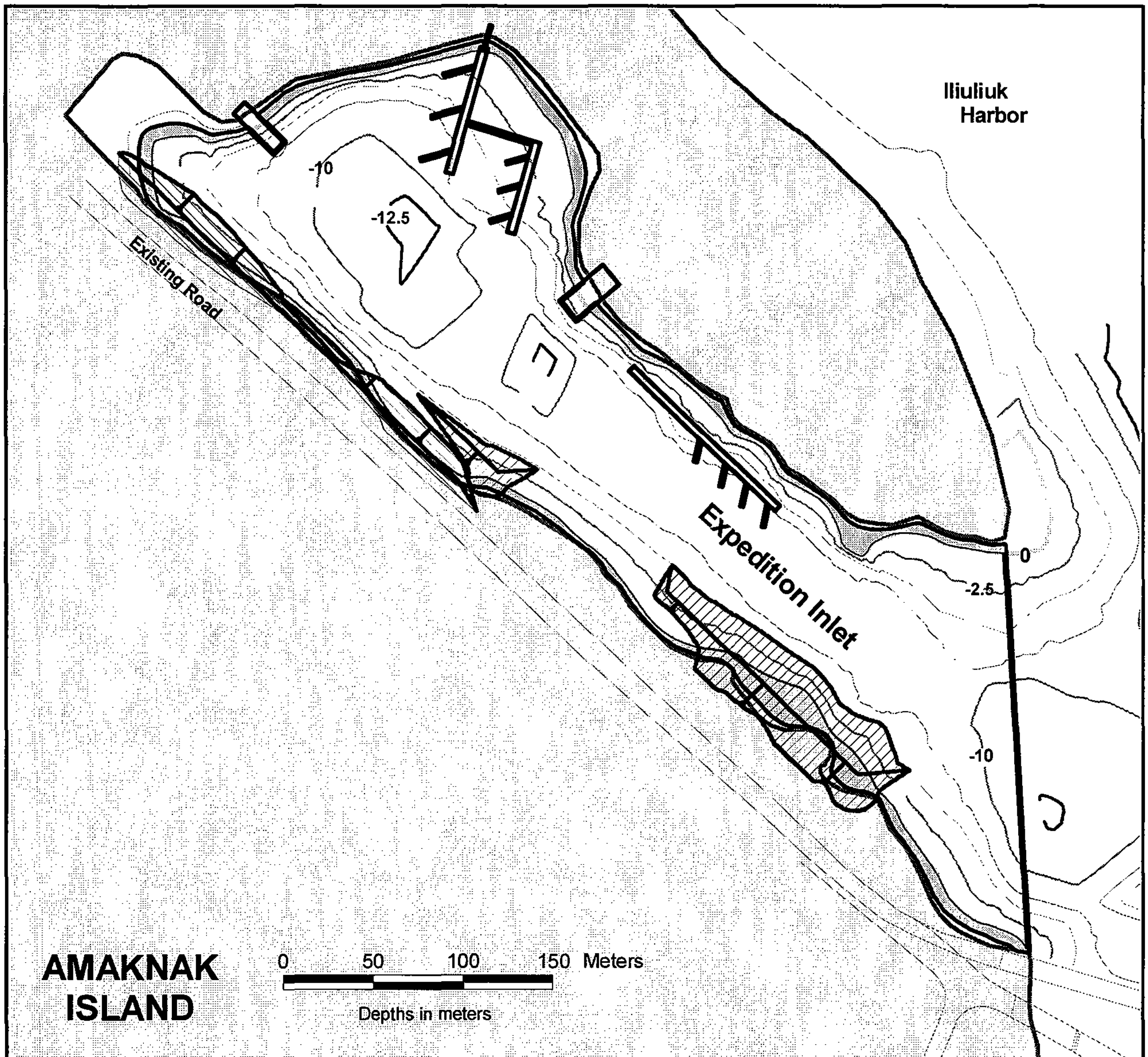

Figure A-3-5. Intertidal - Habitat Impact Areas: Expedition Inlet / LSA North (Alternative 3)

N

Land

Project footprint (6.8 ha, 16.7 ac)

Proposed fill

Proposed dredging

Low value intertidal habitat (degraded)
Area = 0.4 ha (1.0 ac)

Low value intertidal habitat (degraded due to direct impacts).
Area = 0.2 ha (0.6 ac)

Bathymetry & engineering data from A. C. Jefferies, ACOE.
Map produced by D. Seagars & M. Schroeder, AFWFO, Anchorage, AK February 2004
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APPENDIX J

RESPONSES TO COMMENTS

Unalaska Navigation Improvements

CITY OF UNALASKA
DEPARTMENT OF PLANNING
P.O. BOX 610
UNALASKA, ALASKA 99685-0610
(907) 581-3100 • FAX (907) 581-4181

August 10, 2004

UNALASKA,ALASKA

U.S. Army Engineer District, Alaska
ATTN: CEPOA-EN-CW-ER, Guy McConnell
P.O. Box 6898
Elmendorf AFB, Alaska 99506-0898

Re: Draft Environmental Impact Statement Navigation Improvements, Unalaska

Dear Guy:

The City of Unalaska has reviewed the draft EIS and compliments the Corps on a well consolidated document. We recognize the time and effort the Corps team devoted to generating this very thorough product for our harbor project. We also wish to express our appreciation for your allowing us to participate in the biweekly meetings to complete this document:

The City of Unalaska agrees with the Corps conclusions in that we support the LSA-South Alternative as the preferred site for our navigational improvements. Other more specific comments on the draft EIS are as follows:

1. Page 3, 1.3 Study Participants and Coordination. Correct the name of the Coastal Service Area to be: **Aleutians West Coastal Resource Service Area**. (Delete the 'and')

1. Name of the Coastal Service Area has been corrected.

2. Page 10, 2.2 Moorage Conditions, Problems, and Needs. Correct Bullet 4, the 510 meters for use by the USCG belongs under Bullet 3, the UMC.

3. Page 7, 2.1.4 Fisheries, old fisheries data for Unalaska/Port of Dutch Harbor landings and value should be changed to reflect more current information listed in other fishery sections in the EIS document. The most current landing for Unalaska / Port of Dutch Harbor for 2002 and they are 908 million pounds-landed at a value of 136 million dollars.

4. Page 17, 3.1 .2, 1st bullet incorrect statement that at the UMC facility they are working cargo in the street, that doesn't take place.

5. Pages 94 to 98, 6.1.8 Economy, on page 94 the 4th paragraph Needs corrected to read: early in the 20th century fishing and processing centered on herring, salmon and cod. In the late 1960s until the early 1980s the Red King Crab fisheries dominated fishing and processing in Unalaska.

Again, we thank you for opportunity to participate at such a detailed level. We look forward to beginning the pre-construction phase of the project.

Sincerely,

Robin Hall

Robin Hall
Director of Planning

2. Correction made as requested.

3. Text has been revised to reflect the more current fisheries information.

4. Text revised as requested.

5. Text has been revised as requested.

United States Department of the Interior
OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
1689 C Street, Room 119 Anchorage, Alaska 99501-5126

TAKE PRIDE IN AMERICA

ER 04/499 August 9, 2004

U.S. Army Engineer District, Alaska
ATTN: CEPOA-EN-C W-ER (McConnell)
P.O. Box 6898
Elmendorf AFB, Alaska 99506-0898

Re: Draft Integrated Feasibility Report and Environmental Impact Statement for Navigation Improvements, Unalaska, Alaska

Dear Mr. McConnell:

The Department of the Interior (DOI) has reviewed the Draft Integrated Feasibility Report and Environmental Impact Statement for Navigation Improvements at Unalaska, Alaska (Draft EIS). The U.S. Fish and Wildlife Service (FWS) completed extensive winter and summer field evaluations, and actively participated in numerous interagency meetings, work sessions, teleconferences, and document: reviews as this project has been formulated. FWS's role in this project is defined by both the Fish and Wildlife Coordination Act (16 USC 661-667(e)) (FWCA) and the Endangered Species Act of 1973 (ESA), as amended. In addition, the National Park Service has provided comments under the National Historic Preservation Act of 1966 (16 USC 470 et seq.). The following DOI comments are provided under the authorities described above and pursuant to the National Environmental Policy Act of 1969.

Cultural Resources

1. Federal undertakings in National Historic Landmarks (NHL) that have the potential for adverse effects require adequate resource documentation, consultation, and planning. We believe the cultural resource section requires substantial revision to ensure that in the Final Environmental Impact Statement (EIS), the section includes

1. We have added additional discussion to Section 6 about the Unangan people who were removed during World War II and returned to their homes via Captains Bay. The discussion also

all appropriate information to correctly document and address the importance of the Dutch Harbor Naval Operating Base and Fort Mears, U.S. Army National Historic Landmark (Dutch Harbor NHL). This is important to ensure that the Final EIS adequately addresses both the historic context of the Dutch Harbor NHL site and the implications of the harbor and upland development on the area of potential effect.

For example, on page 1.41 of the Draft EIS, the last paragraph only briefly describes the World War II activity on the island. The context of World War II for Unalaska, and especially Amaknak Island, is historically of national significance, including the bombing of U.S. soil, the deployment of thousands of troops, and a major defensive build up given the occupation of the outer Aleutian Islands by Japanese forces. The build up of World War II infrastructure is what constitutes the Dutch Harbor NHL and its resources, both structural and those that constitute the cultural landscape. The structures on Little South America were highly camouflaged, buried, and fortified. We believe discussion of this resource type in the Final EIS is essential given the remaining resources on Hill 400. This activity was far greater than the role of the submarine base on Expedition Island and the minor role of the marines. We believe the discussion in the Final EIS needs to include the role of the Army and the build-up, and how the fortifications on Little South America contributed to the overall defensive role of Unalaska. There were hundreds of structures on Little South America, many of which remain in the higher elevations, and their context needs to be addressed. We appreciate that throughout its environmental cleanup process, the U.S. Army Corps of Engineers (USACE) has treated the World War II concrete foundations as "contributing" to the NHL. We recommend that the Final EIS include a discussion of the foundations and any potential effects on those structures. In addition, we believe the discussion of the Unangan people,, who were removed from the Aleutians and later returned via Captain's Bay, needs to be expanded in the NHL section of the Final EIS.

presents information that emphasizes the national importance of the World War II component and the role of Little South America within the National Historic Landmark.

2. The USS *Northwestern,* which is on the National Register of Historic Places and is partially sunk at the head of Captain'; Bay, may also be part of the area of potential effect, given the degree of dredging or staging for construction. Therefore, we believe it is important that the Final EIS include a discussion of the potential effects of proposed activities on this National Register site.

2. The *USS Northwestern* would be several kilometers outside the area of potential effect. Dredging and filling for the proposed action would be confined to the shoreline at Little South America.

Fish and Wildlife

As described in the Draft EIS, a harbor constructed and operated at the Little South America-South (LSA-South) site would result in significant adverse impacts to natural resources and impacts to subsistence activities. These include loss and modification of at least 9.6 hectares of intertidal/marine habitats due to project features and subsequent vessel use, potential introduction of petroleum compounds and other hazardous materials into marine waters from vessels, and displacement of, and disturbance to, fish and wildlife from harbor sites and possibly from associated secondary developments. The five major species groups/habitat types we believe would be affected by harbor development include: nearshore fish, clam beds, king crabs, wintering waterbirds, and intertidal life.

3. Compared to any other harbor sites evaluated in the Unalaska vicinity, the LSA-South harbor site often has the highest density, diversity, and/or aerial extent of these five species groups/habitat types (e.g., intertidal areas, clam biomass, use by rearing juvenile fish and red king crabs, and use by wintering seabirds/waterfowl). The area's gradually sloping beach/subtidal area and lack of historical industrial uses at the specific harbor site contribute to the current productivity and habitat values.

3. Comment noted. We generally agree, but believe the five major species groups/habitat types should have been selected and applied to evaluation of resources and impacts with the participation of interested parties rather than by USFWS acting alone.

Over 600 Steller's eiders, and their winter foraging and resting habitat, occur within the action area of the proposed project. Approximately 25 of these birds are assumed to be from the listed Alaska breeding population, which currently numbers no more than a few thousand and has had several failed breeding; seasons in a row. The Pacific Steller's eider population (Alaskan and Russian breeding birds) is declining annually at a rate of 6.1 percent.

4. As written, the last paragraph on page 189, the section on "Endangered Species" in the "Environmental Consequences" chapter, includes information that is potentially misleading and results in an inappropriate comparison between the purposes of the ESA and FWCA. Terms and Conditions are measures intended to minimize "take" which could result from a proposed action. Those measures must be implemented within the action area of the project. The Draft Biological Opinion (BO) (USFVIS 2004a) identified the primary threat to the Steller's eider from the proposed action to be chronic oiling and identified the action area within which this threat was

4. The same action that "avoids take" in the context of the Endangered Species Act may be termed "mitigation" in the context of a document prepared under the National Environmental Policy Act. "Mitigation" includes avoidance and minimization of effect ("avoidance of take" in BO language) as well as compensation. "Terms and conditions" in the draft BO included much more than minimization of take from oil spills; they included requirements for lighting, sign posting, and

anticipated to be the greatest. Terms and Conditions must address this avenue of injury to the Steller's eider, rather than compensate for "take." Thus, Terms and Conditions focused on preventing oil spills and promptly containing and cleaning up any spills that may occur. Conservation easements and land transfers do not minimize "take" resulting from spilled fuel. The Draft EIS incorrectly implies that mitigation measures proposed in the April 2004 FWCA Report (2004 CAR) (USFWS 2004b) are invalid if corresponding Terms and Conditions are not included in the BO. Because the information in the last paragraph is both unnecessary and potentially misleading, we request that the entire paragraph in this section be deleted in the Final EIS. Assuming this paragraph is deleted and specific revisions requested in Attachment 2 related to endangered species are made, the Terms and Conditions from the Draft BO will have been appropriately incorporated into the Final EIS.

restriction of boat traffic, among others. Those requirements for lighting, boating restrictions, oil spill avoidance, and other terms and conditions that were intended to minimize effects to Steller's eiders also avoid or minimize "take" of species that are not endangered. The referenced paragraph simply puts the actions required by the BO into the context of this EIS and feasibility report. We believe it is needed to bridge the differences between the two sets of regulations and decline to delete it. We have, however, incorporated minor corrections.

<u>Mitigation Measures</u>

5. It appears that inconsistent evaluation of mitigation options in the Draft EIS resulted in some mitigation projects being eliminated from the Recommended Plan. For example, while the Draft EIS states it is acceptable to develop specific details for intertidal habitat creation during the preliminary design stage, the rationale provided for eliminating other projects (e.g., Unalaska Lake Spawning Area Restoration and Margaret Bay Benthic Habitat Restoration) includes lack of project-specific details and inability to collect data in time for the final report. In addition, some mitigation measures were dismissed, at least in part, because they were considered "offsite" (e.g., Unalaska Lake Spawning Area is about 2.5 km away, while the recommended barge removal project is about 6 km from the project site.) Furthermore, other mitigation projects were dismissed, at least in part, because they were considered to be "out-of-kind" (e.g., Unalaska Lake Spawning Area Restoration, which would benefit sockeye salmon), while at the same time, the Morris Cove Creek project, which would also benefit sockeye salmon, was identified as providing "...a measure, of in-kind compensation" (Draft EIS p. 55).

We believe a more flexible and consistent approach that includes trade-offs for off-site or out-of-kind mitigation--which we support when adequate on-site, in-kind mitigation is not available--is compatible with our recommendations (USFWS 2001, USFWS 2003, and USFWS 2004b). In summary, we believe the Final EIS needs to

5. Discussion of compensatory mitigation measures is revised in section 4.5.3 to more specifically define why some measures were not recommended. A comparison table is provided to more clearly define that information to reviewers.

evaluate all mitigation alternatives with consistent criteria; reconsider mitigation recommendations categorized as off-site, out-of-kind; and clearly identify the specific criteria used to accept or reject mitigation recommendations.

6. We support the creation of at least 0.8 hectares of intertidal habitat that will provide positive resource benefits. We believe the majority of the created habitat should be mussel beds. The Draft EIS, however, does not state a specific habitat objective to be achieved, rather it states that different locations and different-sized. material could be used to "establish habitat favorable to mussels in one area and sand lance in another." We understand that in order to meet the proposed project schedule, delaying development of project-specific details may be necessary. While that is acceptable, we believe the Final EIS needs to identify the specific habitat objectives, target footprints, and potential locations. As the project-specific details are identified, we encourage a continued dialogue with appropriate FWS representatives.

6. This text has been revised to state a specific objective for replacement of mussels. It also provides for all interested resource agencies to participate in developing additional objectives and methodology during the project design phase.

7. In summary, we believe the goal of the mitigation plan should be to fully offset anticipated adverse impacts to fish and wildlife resources. Therefore, we believe the Recommended Plan in the Final EIS needs to include additional mitigation as recommended in the 2004 CAR (e.g., removal of sediments/enhancement of habitat in Margaret Bay, sediment removal in Unalaska Lake, and Morris Core Creek stream alignment).

7. Corps of Engineers regulations require that recommended projects incorporate mitigation by avoiding, minimizing, and compensating to the extent justified. A discussion of this requirement and its application to the Unalaska Navigation project is presented in section 3.1.5. The Alaska District, U.S. Army Corps of Engineers Regulatory Branch reviewed the draft FR/EIS to determine if the proposed mitigation measures were comparable to mitigation measures for a similar action requiring a Regulatory permit under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. The Regulatory Branch determined that with the proposed mitigation (avoidance of impacts, minimization efforts, and the proposed compensatory mitigation), the project would exceed mitigation measures required for other projects authorized in Western Alaska.

8. Additionally, for the intertidal mitigation component proposed in the Draft EIS, we suggest that specific habitat objectives be developed that include creation of mussel beds with a target footprint.

8. Please see response to comment 6.

9. Moreover, in the event that problems arise during the design stage, we believe an alternate plan should be prepared to ensure this mitigation, or something comparable, is completed.

9. If this measure could not be implemented, we would work with interested parties to define another comparable measure.

10. We also recommend re-evaluation of potential mitigation projects on private land, and resolution of potential barriers to their implementation by using land. exchanges, leases, easements, and land-use agreements.

10. We have re-evaluated those options and have not identified any feasible resolution. We also have invited USFWS to provide specific suggestions. As the project review and development proceed, we will continue to work with USFWS to explore ways to improve this action.

11. Furthermore, we believe mitigation funds to remove/scuttle the barge would be better spent on projects with more natural resource benefits. More specific comments on mitigation measures are included in Attachment 1.

11. At the recommendation of the USFWS, the barge removal compensatory mitigation measure was eliminated from further consideration.

We appreciate the opportunity to comment on this document and look forward to working with you as the Final EIS is prepared. If you have any questions, please contact Ann Rappoport, Field Supervisor, Anchorage Fish and Wildlife Field Office at 907-271-2787. For information or questions regarding National Historic Landmarks or sites on the National Register of Historic Places, please contact Linda Cook, Superintendent, Affiliated Areas, National Park Service at 907-644-3503.

Sincerely,

Pamela Bergmann

Pamela Bergmann
Regional Environmental Officer - Alaska

Enclosures

Attachment 1

Mitigation Alternatives: Specific Comments

Intertidal Habitat Creation

Mitigation proposed in the Recommended Plan would result in the creation of 0.8 hectares (~2 acres) of intertidal habitat. Rationale provided for this amount is that 0.8 hectares of intertidal habitat would be "destroyed or substantially altered" (Draft EIS p. 66). The intertidal area to be lost includes mussel beds, which are the most productive type of habitat in the area. While the 2004 CAR recommended mitigation included creation of both mussel bed and intertidal habitat, the Draft EIS does not define specific habitat objectives, nor does it explicitly state that mussel beds would be created. Instead,, it states "...material of different grain sizes could be used at specific locations to achieve different habitat objectives (e.g., to establish habitat favorable to mussels in one area and sand lance in another)."

In addition, while the Draft EIS(page 67) indicates there are a number of possible sites, we believe only one site has been evaluated for its suitability as intertidal habitat or mussel bed sites, and that some sites may prove unsuitable. The 2004 CAR recommended mussel bed creation at a site near the entrance to Margaret Bay. Through FWS SCUBA dives at that site, it was determined that enlargement of an existing, adjacent mussel bed would likely be feasible and a net habitat improvement. Furthermore, there are substantial differences in construction methods for mussel beds as compared to those for intertidal habitats, as well as differences in habitat value.

12. It should be noted that while the 2004 CAR recommended creating 0.4 hectares of mussel bed, this was part of a larger mitigation package; the 2004 CAR indicated that the ultimate size could vary. We support creation of as large an area(s) of mussel beds and other intertidal habitats as feasible, with the goal of fully offsetting anticipated adverse impacts to fish and wildlife resources.

12. Please see responses to comments 6 and 7. Please note that in the Unalaska region, mussel beds are one type of intertidal habitat. General references to intertidal habitat in the text of this report refer to all the habitat types, including mussel beds, between extreme high tide and extreme low tide.

13. We understand that in order to meet the proposed project schedule, delaying development of project-specific details may be necessary. While that is acceptable, we believe the Final EIS needs to identify the specific habitat objectives, target footprints, and potential locations. As the project-specific details are identified, we encourage a continued dialogue with appropriate FWS representatives.

13. Please see responses to comments 6 and 7. The primary potential location is outside the mouth of Margaret Bay, as recommended by USFWS. We probably can commit to constructing the entire mitigation feature at that site, but did not designate that site because we understood that USFWS wanted us to consider additional nearby sites.

Margaret Bay Flocculated Sediment Removal

While the Draft EIS provides additional information about the removal of flocculated sediments on the bottom of Margaret Bay, the Draft EIS concludes that this mitigation alternative is not feasible. However, we believe that additional information and details are needed to more fully evaluate this potential mitigation alternative before a decision is made regarding its feasibility. We also believe that the additional information should be included in the Final EIS.

14. We agree with the USACE on the need to gather additional data, particularly regarding whether or not the materials are contaminated. Alaska Department of Environmental Conservation (ADEC) representatives cited in the 2004 CAR stated the material appeared to be a hydrocarbon based oil, but that additional sampling is needed to determine (1) whether the sediments contain fish oil, diesel or something else; and/or (2) whether the sediments require treatment or could be discharged into Iliuliuk Harbor or elsewhere. We agree on the need to consult with ADEC to evaluate disposal and treatment options, once further lab results are received. Therefore, we recommend initiating sampling as soon as possible to confirm the nature of the flocculated sediments, any necessary treatment, and disposal options. We propose this project be reconsidered with a commitment to pursue it as a Section 206 Project, if it ultimately can not be worked out in conjunction with harbor development.

14. We have worked with USFWS since 1999 and have examined a number of potential restoration alternatives for this site. None of those alternatives can be recommended as a compensatory mitigation measure with the present uncertainties and without acquiring the land from a Native corporation, which does not want to lose it. Those uncertainties are identified in section 4.5.3 and are summarized in table 4-5. We will continue to look for viable restoration opportunities at Margaret Bay to the extent that funding is available in the Section 206 program and a non-Federal sponsor is willing to participate.

15. We recommend the Final EIS describe the likelihood that any archaeological sites are located in the area of interest on the bottom of Margaret Bay, in addition to any required conservation measures, if appropriate. It is our understanding that any potential artifacts would likely be sunken vessels embedded or buried in bottom sediments, underneath the recently deposited, loosely consolidated materials.

15. Text on page 64 of the draft FR/EIS notes the presence of pre-contact archaeological sites on the shoreline of Margaret Bay and the opinion of a qualified archaeologist with a very strong local experience on Amaknak Island. His opinion is consistent with the views of other experts we have consulted in this matter. All have agreed that the site is very likely to have pre-contact material and Dr. Knecht stated the site may have remains of more recent vessels. Additional information regarding sunken vessels has been added.

Sediment Removal in Unalaska Lake to Restore Salmon Spawning Areas

16. This project, which involves removing sediment in Unalaska Lake that has covered areas used by spawning sockeye salmon, was reconsidered as viable in response to comments FWS received from the Alaska Department of Fish and Game (ADFG) on the 2004 CAR. Rationale in the Draft EIS (page 60) for not including this as mitigation in the Recommended Plan includes: (1) the amount of spawning habitat that could be returned to productivity cannot be estimated with existing data; (2) data cannot be collected in time to include in the USAGE report; and (3) this measure would provide out-of-kind, out-of-place mitigation. However, we believe the extent of spawning habitat covered can be estimated through field investigations. We believe that, provided the goals of this mitigation project are agreed upon, the data can be collected consistent with the approach the USAGE has recommended with the intertidal mussel beds. With respect to the concern that this mitigation option would provide out-of-kind, out-of-place mitigation, we believe that this option is an appropriate mitigation measure. Even though Unalaska Lake is about 2.5 km from the LSA-South project site, smothering of spawning gravels in Unalaska Lake has impacted salmon, which is a resource that would be impacted by harbor construction. In addition, we concur with ADFG that the project could be cost-effective and provide net resource benefits. Therefore, we recommend that this project be reconsidered as a mitigation measure in the Final EIS.

16. This mitigation alternative is subject to much greater uncertainty than creation of intertidal habitat. Please refer to section 4.5.3 and table 4-5.

Morris Creek Cove Stream Alignment and Margaret Bay Mitigation Alternatives

17. The Draft EIS states that Morris Cove Creek stream alignment, the Margaret Bay remediation, and Margaret Bay intertidal habitat creation were either eliminated, or were eliminated in part, from consideration because they are either privately-owned or owned by Ounalashka Corporation (OC). We encourage USACE to investigate solutions for addressing landownership of these areas, so that these areas may be included in the Final EIS as mitigation options. We suggest that USACE examine options such as: (1) land exchanges (similar to that executed between the City and OC for the project site itself); (2) leases, easements, or other land management/use agreements (similar to an easement the City has on OC lands to stage material for harbor construction); and third party involvement, including the option of providing funding to a third party who would complete the project.

17. The Morris Cove Creek mitigation alternative would take the land out of the middle of a 160-acre Native allotment, severely affecting its value. We will not take Native-owned land for the relatively low potential outputs that might be achieved from this mitigation alternative (see table 4-5). Any arrangement that would allow the project to use Ounalashka Corporation land at Margaret Bay as a mitigation site would prevent the Corporation from using the land. This would greatly impact future development in this commercial area and is opposed by the Corporation. The principal objective of the Mararet Bay intertidal habitat alternative (i.e. create 0.2 hectare of intertidal habitat) can be achieved at another location without impacting the Corporation's ability to generate income for the Native people it supports. Providing funding to a third party would not be an allowable project cost under regulations that direct Corps navigation projects.

Barge Removal

18. We consider removing, the barge at the head of Captains Bay a low priority for mitigation funds because we believe natural resource benefits of this removal would be minimal. The steel barge (which has rusted) has been cleaned of fluids/deleterious materials; it is not a hazard to marine organisms nor is it a bird-strike hazard. While the barge occupies approximately 0.05 hectares (about 0.1 acres) of aquatic bottom, we do not believe it is adversely affecting marine life in the larger vicinity. Generally, introduction of ferrous material into a large aquatic system is not toxic to marine life (e.g., marine organisms, including sensitive species, commonly colonize and grow on steel). In summary, we believe that other mitigation projects would result in greater natural resource benefits.

18. This alternative has been eliminated from the project recommended plan as suggested by USFWS.

Attachment 2

Specific Comments

19. Page vii, Paragraph 5. FWS did not estimate the "take" of seabirds expected with harbor construction. The "take" of the listed population of Steller's eiders due to all sources could total six, not four. Therefore, the last sentence should be corrected to read in the Final EIS as follows: "Based on calculations USFWS used for the listed population segment of Steller's eiders, for each year of operation, the recommended plan might take (harm or kill) no more than one eider as a result of petroleum releases, no more than one eider as a result of striking harbor-associated structures, and no more; than four eiders as a result of habitat losses due to harbor construction."

19. This paragraph discusses potential impacts to seabirds other than Steller's eiders. It has been revised to state more clearly that the estimate was by Corps biologists.

20. Page ix, Paragraph 2. All aspects of this project are "subject to Congressional action," not just the Terms and Conditions. This qualifier should be removed from the second sentence of this paragraph in the Final EIS.

20. Text was revised as requested.

21. Pages xi-xiv, Table S-2. The Final EIS needs to indicate in the second column that USACE will provide FWS with a comparison of the final proposed action with the alternative analyzed in the BO. Once the comparison is received, FWS can then determine if this BO is adequate and can be confirmed as a final document, and therefore, if consultation is complete.

21. The table reports status rather than steps to achieve status. For consistency and brevity, the table was not revised in response to this comment. The referenced comparison has been provided to USFWS.

22. Page 46, Paragraph 9, Section 4.5.2. In the Final EIS, the first sentence in "Avoidance and Minimization Measures" needs to be revised to read as follows: "Terms and Conditions that avoid or minimize harbor impacts may involve any of the following categories..." In addition, the term "mitigation" needs to be deleted in the second sentence in this section in the Final EIS.

22. While many of the recommended avoidance and minimization measures were terms and conditions in endangered species coordination, others were not. The broader phrasing used in the draft is appropriate and remains unchanged in the final FR/EIS. The word "mitigation" has been deleted from the second sentence and the paragraph was further revised for clarification.

23. Page 48, Paragraph 1. We recommend that the breach be designed to allow free migration of juvenile fish during all tide stages and that this revision be included in the Final EIS. The present design provides water in the breach

23. USFWS recommendation is noted. Reasons for not adopting a full-tide breach are presented in the text.

only 80 percent of the time. We believe the current design is inadequate for fish passage.

24. Page 48, Paragraph 3. We recommend eliminating in the Final EIS, the dollar values, especially on a per hectare basis, to the reef habitat. The dollar values compare the cost of eliminating one specific habitat (e.g., constructing the breakwater on the reef is less expensive) to the additional cost of moving the breakwater footprint off the reef (which would require additional material due to deeper water conditions). Dollar values do not account for the different values of habitats that would be affected by various project features, or that would be restored or enhanced by various mitigation options. We believe these numbers do not provide useful comparisons of mitigation costs because of the inherent difficulties in assigning monetary evaluations to the intangible benefits, provided by fish and wildlife, and also because similar comparisons are not provided to evaluate losses of fish and wildlife from the project. If such comparisons are required, we believe they should be made for all project features (including the barge removal alternative) in the Final EIS.

24. Monetary figures in this section are not habitat valuations. They are project costs for the mitigation measures. Raw costs are used to calculate unit costs in accordance with Corps Engineering Regulation guidance (ER 1105-2-100).

25. Page 51 ,Paragraph 1. We recommend that intertidal fill be avoided as much as possible, and the intertidal staging area be reduced (e.g., as per the Draft EIS, "the staging area could be reduced by placing dredged material in deeper areas in the harbor at about the same cost'). While we agree that the value of intertidal habitat that is not directly filled by the harbor is diminished, degraded habitat retains some functions whereas a filled area does not.

25. The fill is needed for the harbor to operate safely and efficiently. Filling less than 0.8 hectare of low-value habitat to allow a harbor to operate properly appears to be a reasonable trade-off, particularly when the lost habitat would be replaced in the mitigation plan.

26. Page 51, Paragraphs 2. 3. We recommend re-evaluating the statement that a boat ramp will provide "...an increment of mitigation for project impacts on traditional subsistence and personal use harvest of coastal resources." It is our understanding that the local sponsor replaced the existing boat ramp at Iliuliuk River/Iliuliuk Harbor confluence approximately two years ago and many local residents keep their skiffs in the lower portion of the Iliuliuk River since there is no charge to them and it is close to their residences in Unalaska.

26. The referenced text also points out that larger boats could use a ramp inside the harbor at all tide stages, which is not always possible at the existing ramp. Not all subsistence and personal use is from skiffs. Larger boats are being used to allow safe non-commercial harvests farther from port, and the mouth of the Iliuliuk River is too shallow to allow them to use the ramp at low tide.

27. Pages 52-54 Section 4.5.2. The Avoidance and Minimization Measures section in the Final EIS needs to include all Terms and Conditions in the 2004 Draft BO (i.e., 2.1, 2.3, and 3.1).

27. Lighting has been annotated as T&C 2.1 in the final FR/EIS. T&C 2.3 (City provides USFWS a copy of the oil spill response plan) is an administrative matter and not a mitigation measure. Monitoring Steller's eiders has been added to the "Mitigation During Construction" section and is noted as T&C 3.1

28. Page 53, Paragraph 1. We believe the restriction of dredging during April and May is insufficient to protect natural resources. We recommend that dredging be restricted from April 1 through July 31 to protect juvenile salmon, if the dredging operation is not completely isolated from the open waters of South Channel. We also recommend that best management practices for the project should include an effort to dredge during low tides to minimize in-water work/impacts to water quality unless the area can be completely isolated from the open water of South Channel, and that the Final EIS include these recommendations.

28. Text has been revised to more clearly state that silt curtains would be used to isolate the dredging activities so dredging can be done from April through mid-November. Timing and silt curtain plans would be reviewed with interested agencies before construction and would be modified if indicated by current industry practice. Limiting dredging to low tides is not feasible or necessary.

29. Page 55, Paragraph 3. It is unclear why re-establishing the natural channel of Morris Cove Creek would impact an archeological site. This should be explained further in the Final EIS.

29. The text has been revised to explain why an archaeological site would be impacted.

30. Page 55, Paragraph 4. Information that leads to the conclusion that "Rebuilding the berm...could ...raise the lake to its former level" should be provided in the Final EIS.

30. This statement was removed from the text.

31. Pages 56, Paragraph 4 and Page 57, Paragraphs 1-4. These paragraphs refer to LSA land-use restrictions that have long since been removed from further consideration. Other mitigation options that have been similarly removed from consideration are not addressed in this section. For consistency, either this discussion should be deleted or all mitigation projects identified in Appendix 3 of the 2004 CAR should be included. We recommend revising Section 4.5.3 to omit nonviable/deleted projects, instead referring to the 2004 CAR in Appendix H for a list of mitigation projects identified and considered between 2001 and 2004.

31. This mitigation measure is presented because at one time it was strongly advocated by USFWS, and others were interested in it as a potential mitigation measure. This provides interested individuals with information about the range of mitigation alternatives considered and why some were not recommended. It is retained in the final FR/EIS for that reason.

32. Page 57, Paragraph 5. This section deals with tidelands, rather than uplands use restrictions, therefore this paragraph needs to be deleted in the Final EIS because it is unnecessary and potentially misleading.

32. The statement is introductory and explains to readers the position of the Corporation. It briefly refers to the evolution of mitigation recommendations. We included this paragraph because we did not see the need to expand it into a more complete evaluation, but want to "close the loop"with interested participants. It is retained in the final FR/EIS for that reason.

33. Page 58, Paragraph 2. We believe the option of using tideland restrictions as a mitigation option could apply to development of a harbor at either the LSA-South or LSA-North site. Additionally, some development of a tideland easement could be compatible with conservation goals. Consequently we recommend the last sentence be rewritten as follows: "The degree to which tidelands real estate restrictions would compensate for impacts of either the LSA-South or LSA-North alternatives cannot be fully estimated until specifics of potential easement are proposed. Some development could be compatible with conservation goals."

33. We believe the statement as written in the draft FR/EIS is more accurate and have retained it in the final.

34. Page 58, Paragraph 3. Information from the first sentence "there is a reasonable likelihood that the LSA-North alternative site would be developed for marine-related industrial or commercial use in the foreseeable Future..." should be included in the Cumulative Effects section beginning on page 195 in the Final EIS.

34. Concur. This potential is discussed as a cumulative impact.

35. Page 58, Paragraphs 3 -5. Throughout these paragraphs in the Final EIS, Tract ATS 1396 should be referenced as 1396 Tract B, to differentiate it from 1396 Tract A.

35. Concur. Text has been revised.

36. Page 58, Paragraph 4. The approximate appraised values of the tidelands may be obtained from the recent land exchange between the City and OC as per a 2001 memo from the City. Copies of relevant pages from this document (pp. 1 and 6) are in Attachment 4, and the information is summarized below. We recommend that this information be included in the Final EIS.

LSA-North = $36,000 (2.8 acres,, ATS 1246) + ATS 1396 Tract B (4.8 acres, value not reported) LSA-South) = $438,000 (13.4 acres, ATS 1352)

36. The value of the principal area in the LSA-North tract was not appraised, and therefore, the information is too incomplete to be of value.

37. Page 58, Paragraph 5. Although verbiage of a tidelands conservation easement has not yet been negotiated, at this time, we are not aware of any supporting information to substantiate the conclusion that "any" restrictions on City-owned tidelands would prevent OC from fully realizing economic benefit from their uplands. We believe that some tidelands development could be compatible with a conservation easement. Furthermore, we believe successful

37. We do not find the referenced statement regarding economic benefits in the text of the draft FR/EIS. Text in the draft FR/EIS also does not conclude that this would be an environmental justice issue. If the USFWS proposed specific deed restriction or easement language, and if the proposal was considered in detail, then it would be evaluated to determine whether effects on the minority owning the Ounalashka Corporation were subject to the executive order on environmental justice.

upland development can occur without tideland development, for example: 1) the upland quarry adjacent to LSA-South, operated for several years without any tideland improvements; and 2) Prime Alaska Seafoods, adjacent to the LSA-North site, has similarly operated without any tideland development. We also believe statements and conclusions that this is an environmental justice issue are unsubstantiated. Therefore, we believe the last two sentences of this paragraph need to be deleted in the Final EIS.

38. Page 91, Paragraph 3. The sentence "This heritage area....." needs to be revised in the Final EIS to read: "This affiliated area park is a partnership between the general public...." The Aleutian World War II National Historic; Area is not a designated heritage area.

38. Concur.

39. Page 189, Paragraph 5. In the Final EIS, the last sentence of this paragraph, "The Corps and the project sponsor (City of Unalaska) have generally concurred with the terms and conditions of the draft biological opinion," needs to be replaced with the following sentence: "The Corps and the project sponsor (City of Unalaska) concurred with the Terms and Conditions of the February 5, 2004, Draft BO during; a teleconference with FWS on December 10, 2003. These Terms and Conditions will be made final upon confirmation of the Draft BO as a final document, and must be implemented for "take" anticipated as a result of the proposed action to be exempt from prosecution under ESA.."

39. Representatives from the Corps and the City of Unalaska participating in the referenced teleconference stated during the conference that they did not have the authority to commit their agencies, although there was general agreement about the draft terms and conditions. The text in the draft FR/EIS more accurately reflects the status of this action and is retained in the final FR/EIS.

40. Page 189, Paragraph 6. The last paragraph on page 189 needs to be deleted because it is potentially misleading and it makes an inappropriate comparison of the purposes of the ESA and the FWCA.

40. Please refer to comment 4.

Attachment 3

References

US Fish and Wildlife Service. 2001. Revised Draft Fish and Wildlife Coordination Act Report, Unalaska Navigation Improvements. Ecological Services, Anchorage Field Office. 84 pages.

US Fish and Wildlife Service. 2003. Addendum to draft the U.S. Fish and Wildlife Service September 18, 2001, Revised Draft Fish and Wildlife Coordination Act report for the Unalaska Boat :Harbor. November 2003. 27 pages.

US Fish and Wildlife Service. 2004a. Draft Biological Opinion on Threatened Steller's Eider, Unalaska Navigation Improvements. February 5, 2004. 57 pages.

US Fish and Wildlife Service. 2004b. Revised Draft Fish and Wildlife Coordination Act Report, Unalaska Navigation Improvements. Ecological Services, Anchorage Field Office. 113 pages.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
P.O. Box 21668
Juneau, Alaska 99802-1668
August 12, 2004

Mr. Guy McConnell

U.S. Army Corps of Engineers
Alaska District
EN-CW-ER
P.O. Box 898
Anchorage, Alaska 99506-0898

Re: Unalaska Small Boat Harbor
Draft Environmental Impact Statement

Dear Mr. McConnell:

The National Marine Fisheries Service (NMFS) has reviewed the Draft Environmental Impact Statement (DEIS) for the proposed small boat harbor project located in Unalaska, Alaska. This DEIS is the accumulation of project reviews and meetings, which have specifically discussed potential impacts the project may have on living marine resources under NMFS, jurisdiction:

General Comment

1. The project includes an alternative, referred to as Little South America South -Avoid Mussel Bed Alternative (LSA South) that directly addresses many of the resource concerns NMFS has raised during the design of the proposed project. LSA South incorporates measures to avoid the direct loss of

1. Comment noted. NMFS, in a correction to this letter, recognizes that the proposed action does not include fish cleaning stations and supports this decision.

marine habitat and minimizes the footprint of the project in marine waters. These measures include a construction timing window to avoid those times when sensitive fish life stages utilize or migrate through the project area, disposal areas for marine waste, fish cleaning stations, a blasting plan review requirement, and the development of a site specific oil spill response plan.

2. Additional mitigation includes the creation of a 0.8-hectare intertidal habitat area, a 3-year monitoring effort, and the removal of two derelict barges at the head of Captains Bay.

2. Barge removal was eliminated at the recommendation of the USFWS.

<u>Preferred Alternative Design Comment</u>

3. The LSA South Alternative addresses specific issues of concern previously detailed by NMFS (NMFS Letter to COE-CW; October 4, 2001) and incorporates design changes which avoid and minimize fill impacts from the offshore breakwater.. The alignment of the breakwater avoids a large intertidal area which has been documented to contain barnacles shell hash, mussels, marine vegetation, and cobble. These habitat. characteristics are known to be important for juvenile red king crab as settling substrate. Additionally, this alternative moves the breakwater offshore to allow construction of a nearshore breach at or just below the 0.0' MLLW contour. This breach will maintain the nearshore migratory corridor for marine fish and crab.

3. Comment noted.

NMFS offers that this breach is adequate and will allow fish and crab to pass, except for a couple of hours a day for those 10 to 12 days of each month when the lower tide cycle is below 0.0' MLLW.

Essential Fish Habitat (EFH)

4. The DEIS concludes that there will be an effect on Essential Fish Habitat (EFH) for any of the design-build alternatives. Many of the mandatory components of an EFH Assessment [50 CFR 600.920 (e)(3); description of the action; effects analysis; action agency conclusions; mitigation] are contained in many sections in the document, however, it is difficult to specifically locate these components. Also, pertinent EFH species information is scattered in other sections of the DEIS, such as the red king crab and fish discussions in Sections 7.4.3 and 7.4.4, respectively.

4. Section 7 of the final FR/EIS has been revised to include the requested information.

NMFS recommends that the Final EIS clearly identify and reference where the mandatory components of the EFH Assessment are contained in the document. Reference should also be made to where EFH species are discussed in other sections of the document. Completion of these recommendations will facilitate EFH consultation and ensure provisions of the Magnuson-Stevens Act are satisfied.

5. Further, should the LSA South - Mussel Bed Avoidance Alternative be constructed and mitigated as proposed, NMFS preliminary determines, from information in the DEIS, that adverse effects on EFH will likely not occur. Should the project change through your public environmental review process, NMFS may conclude differently.

5. Text of the FR/EIS has been revised to indicate that EFH is unlikely to be adversely affected by the proposed action.

NMFS remains willing to assist you with EFH and other living marine resource issues if needed. If you have any questions regarding our comments

contact Matthew P. Eagleton in Anchorage at
(907) 271-6354.

Sincerely,

James W. Balsiger
Administrator, Alaska Region

ADEC, ADFG, ADGC, USFWS, EPA - Anchorage

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue Seattle, WA 66101

August 11, 2004

Reply To Attn of: ECO-088 Ref: 01-066-COE

Mr. Guy McConnell
U.S. Army Engineer District Alaska
ATTN: (CEPOA-EN-CW-ER)
P.O. Box 898
Anchorage, AK 99506-0898

Dear Mr. McConnell:

The U.S. Environmental Protection Agency (EPA) has reviewed the draft Environmental Impact Statement (EIS) for the proposed **Unalaska Navigation Improvements Project**, (CEQ No. 040284) in accordance with our responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act. Section 309, independent of NEPA, specifically directs EPA to review and comment in writing on the environmental impacts associated with all major federal actions and rate the adequacy of agency documentation in meeting NEPA requirements.

The draft EIS analyzes the impact of the development of a harbor to serve the navigation needs of residents and the fishing industry in. and around the town of Unalaska, Amaknak Island, in the Aleutian Islands of the State of Alaska. The EIS analyzes three sites for a boat harbor; one located at the Little South America North site (LSAN), one at the Little South America South site (LSAS), and one which would develop two smaller moorage sites at LSAN and the Expedition Inlet site. The Corps' preferred alternative is the LSAS site.

1. EPA recommends that the EIS provide additional clarification on the project purpose and need and alternatives. We request that the EIS be modified to include additional information on the effect of the project in impaired waters under Section 303(d) of the Clean Water Act (CWA), and compliance with requirements imposed by the State of Alaska pursuant to the CWA. We also

1. Additional information related to each of these subjects is presented in the final feasibility report/environmental impact statement (final FR/EIS).

request clarification on impacts to subsistence resources and biological resources in the marine environment, and the addition of an environmental justice analysis. Finally, we recommend that the Corps provide additional compensatory mitigation for impacts to biological resources.

We have assigned a rating of EC-2 (Environmental Concerns - Insufficient Information) to the draft EIS. This rating and a summary of our comments will be published in the Federal Register. A copy of the rating system used in conducting our review is enclosed for your reference. Our comments are discussed further in our enclosed detailed comments.

Thank you for the opportunity to review this draft EIS. If you would like to discuss the content of this letter, please contact Jonathan Freedman at (206) 553-0266 or feel free to contact me at (206) 553-6911.

Sincerely,

Judith Lefrone
NEPA Review Unit

Enclosures

cc: Marcia Combes, EPA Alaska Operations Office

U.S. Environmental Agency (EPA) Detailed Comments
Unalaska Navigation Improvements Project
Draft Environmental Impact Statement

Purpose and Need

2. The purpose and need is discussed in both Chapters 2 and 3 of the draft EIS. Chapter 2 states that there is a need 1) for additional moorage in Unalaska Harbor to protect commercial fishing boats from wave damage, eliminate the need to shift boats within existing moorage locations during periods of high wave action, and avoid the potential risk for injury and property damage; and 2) to reduce fuel and crew costs of returning fishing craft to homeports or harbors during extended fisheries closures. Chapter 3 (pg. 16) lists a number of goals and objectives used in the search for a project site. While we concur with most, of them, we do not concur that in order to fulfill the purpose and need, the harbor site needs to be "within walking distance of restaurants, stores, laundries, showers, and public facilities." We agree that having these amenities within walking distance would be desirable attributes, but this should not, in our view, be considered a necessary element of an acceptable project site. Another listed goal is compatibility with local land use plans and zoning. While we agree that conflicts with existing uses on adjacent properties can be grounds for rejecting a proposed project site, an apparent conflict with a local land use plan or zoning designation, in and of itself, should not be sufficient grounds to reject a project site. We recommend that these criteria be considered in the EIS as desirable attributes, but not be considered necessary criteria used for selection of a site.

2. Concerns identified in scoping, community planning, economic needs, and other factors are identified in the need for action and planning objectives sections. They become important elements in the identification of alternatives and the resources that are the focus of ensuing sections. While section 3 identifies many planning objectives expressesd by many different stakeholders, most are discretionary to at least some extent. No alternatives were eliminated from detailed consideration because they were too far from restaurants or conflicted with zoning ordinances.

Action Alternatives

3. The draft EIS (Chapter 2) describes a number of alternative components which were eliminated from detailed study. Two of them, the Margaret Bay site and the Iliuliuk Bay site were rejected at least partly on the basis of cost. We recommend that the EIS include an estimate of costs for these two alternatives, so that they can be compared to the other alternatives rejected on the basis of cost, as well as those carried forward for further analysis in the EIS.

3. We did not prepare a full cost analysis for either alternative because initial cost estimates for the single most expensive construction component at each site would, by itself, make each alternative economically infeasible. Cost for additional required features would have driven cost much higher for each alternative. Information has been added to section 4.2 of the final FR/EIS to identify major construction costs that eliminated the Margaret Bay and Iliuliuk Bay sites from detailed consideration.

4. The draft EIS discusses the need for staging*areas, office space, parking, a harbormaster's office, restrooms, and areas for transfer and maintenance vehicles. It also describes the relative difficulty of providing adequate space for these functions because of limited available land at the three alternative sites considered in detail. However, the document does not disclose a precise size requirement for these functions, display them in diagrams, or compare the amounts of land available for each alternative and discuss how each site might be able to meet these needs. The EIS should include this information so that the public and the decision maker can understand how well each alternative site can provide these functions, and meet the project purpose and need.

4. Upland harbor features do not have size requirements that can be related precisely to staging areas because staging area configuration may affect layout and because size requirements are, to some extent, subjective. Corps harbor planning does not dictate the non-Federal sponsor's layout of upland or harbor facilities, so we do not provide layouts for them in this report. An estimate of anticipated uplands requirements has been added to section 3.2.2. It should be used as an indication of expected needs and uses, and not as components of the Federal project.

Water Quality Impacts

5. The draft EIS states that Greater Unalaska Bay was placed on the Section 303(d) list of impaired water bodies for petroleum products by the Alaska Department of Conservation (ADEC). It characterizes water quality in the Unalaska/Dutch Harbor area as significantly degraded in comparison to surrounding undeveloped areas by fuel spills. The EIS should discuss whether ADEC has developed or is developing a Total Maximum Daily Load (TMDL) for Unalaska Bay. The EIS should also include a discussion of whether ADEC has placed restoration requirements on new uses of the Bay such as the development of a Water Quality Improvement Plan to restore water quality, or if ADEC requires compliance with special conditions for new construction or facility operation.

5. The text in the relevant portions of sections 6 and 7 has been modified to provide more information about recent changes in the listing of impaired water bodies in the area. There also is additional information about TMDL's for the seafood processing facilities and their anticipated effects on the water bodies. The absence of TMDL's applicable to episodic releases of petroleum products, a water quality improvement plan, or any restriction or special conditions applicable to the construction or operation of a new harbor has also been noted.

6. The draft EIS also states that the proposed harbor would result in an increased concentration of vessels at the proposed project site and vicinity, increasing the chances of water quality degradation at the site. The draft EIS reports on the number and quantity of fuel spills that have occurred in the area since 1993. Volume 1 of the draft EIS and the Biological Opinion on the Steller's Eider (Appendix I) cite prior studies that note spill events and spillage volumes are greatest in the Aleutians where vessel traffic and use is the greatest, and that it is reasonable to assume that the construction of a new harbor facility would increase petroleum releases. The cited studies also include estimates of future spills. The DEIS should provide a plausible estimate, based on existing data, of the range in quantity of petroleum products that might be released in the proposed harbor. The EIS should additionally discuss what direct impacts these releases might cause to water quality in the harbor area, and

6. The data quoted in the draft biological opinion related vessel traffic to spills from a regional perspective (i.e. there are more spills in the Unalaska area and there is more vessel traffic there). From that perspective, the recommended plan would not lead to any increase in vessel traffic in the Unalaska area and therefore would not be expected to increase spills. Better mooring conditions and tighter controls in a harbor might be expected to reduce spills in the Unalaska region. From a different perspective, looking at local relationships between vessel activity and spills near Unalaska, the draft FR/EIS (section 7.3..3) noted that spills in Unalaska are more closely associated with fueling and industrial activity than with moorage. We strongly disagree with EPA's conclusion that "it is reasonable to assume that the construction of a new harbor facility would increase petroleum releases." As the text of both the draft and final FR/EIS indicate, it would not be reasonable to make that assumption.

whether effects may spread elsewhere, or transfer to other media such as bottom sediments. The EIS reports that construction of the harbor at the Little South America North (LSAN) site would reduce wave energy, current velocity and circulation at the site, resulting in possible accumulations of sediment at LSAN. The EIS should disclose whether construction of the rubblemound and floating breakwaters could significantly impede dispersion of fuel spills at the project site. In summary, the EIS should make a determination as to whether the project could be a substantial contributor to potential future exceedances in State of Alaska Water Quality standards in the project area. Finally, the analysis should consider how effective the Best Management Practices (BMPs) listed in Chapter 4 (pp. 53-54) would be at controlling spills along with assurances that they would be implemented as the harbor begins operation.

The cited study by Day and Prichard (2000) projected spills in the Unalaska area as an average based on past spill data. They did not make any estimate of spills at any single harbor or site, which would be more difficult. Their calculations indicated an average yearly spill rate of 3,537 gallons, while the draft FR/EIS shows the annual spill rate for a period of almost 4 years after that report averaged about 538 gallons per year. The spill projection cited in the draft BO was off by more than 650 percent for that period. If past data cannot provide a plausible prediction of regional spills, then we are not sure that we can provide much better accuracy in an estimate for the first harbor of its type to be constructed at Unalaska. Sections 6.2.4 and 7.3.3 in the final FR/EIS present our best analysis of spill potential.

Use of Subsistence Resources

The EPA is concerned that this proposed project could have a disproportionate adverse environmental, social, or health effects on minority and low-income populations (Executive Order 12898) and that Environmental Health and Safety Risks may also disproportionately affect children (Executive Order 13045).

7. The proposed project site appears to be one of the last undeveloped beaches within walking distance of the town where residents can participate in subsistence and recreational activities. This site has a history of subsistence and recreational use. The loss of those uses would be long term, persisting beyond the life of the project. The draft EIS notes (p. 138) that local residents report using the intertidal area just south of the proposed harbor for harvesting mussels, clams, crab fishing, and recreation, and reports observing the presence of crab pots in 2000 and 2001.

7. The draft FR/EIS stated that residents have harvested various invertebrates from the intertidal zone at the LSA-South site. This statement is correct, but is modified by the remainder of the paragraph, which indicates that this practice has ceased at that site because of concerns about paralytic shellfish poisoning. This statement is strengthened in the final FR/EIS to indicate that this gathering is non-existent or almost non-existent at the LSA-South site. There are a number of undeveloped stretches of shoreline in the City of Unalaska and within 3 kilometers of the central business area of Unalaska, although those shorelines may or may not be considered "beach" by different observers.

8. The document also states (p. 192) that researchers were not able to identify any residents who currently collect shellfish, but still predicts a loss of crab fishing and plant gathering. We are aware that the Environmental Assessment prepared for this project (2001) documented the importance of this site to the community by noting that an application for a Corps of Engineers permit for a seafood processor was contested by the community and eventually denied. The EIS should determine whether construction of the harbor would in fact cause a loss of shellfish gathering, and be more definitive as to whether the loss of crab fishing and plant gathering constitutes a significant loss in subsistence use for local residents.

8. Additional information has been added to section 7.7.1 about effects of the proposed action to personal use of plants and marine resources at and near the project site. Reviewers of the proposed action at LSA–South should note that a harbor is a very different project from a fish processing plant. The proposal to construct a processing plant at the LSA-South site brought opposition from many different people who had a range of concerns. The 2001 environmental assessment the Corps prepared for a harbor at LSA-South brought less comment from individuals than the earlier processing plant proposal. Comments about the environmental assessment generally expressed a narrower range of concerns, but asked for more information. During the public revierw of the draft FR/EIS, we received two comments that appeared to express opposition to the proposed action to construct a harbor at LSA-South. The FR/EIS and other interaction with the public may have answered many of the earlier questions about project purpose, needs, and effects. A harbor may be seen as having greater potential benefit to local needs and a less potential for water quality impacts than a processing plant at the LSA-South location.

9. We recommend that the EIS include an environmental justice analysis to determine what efforts were taken to meet the requirements of Executive Order (EO) 12898 *(Federal Actions to Address Environmental Justice* in *Minority and Low-Income Populations).* This should include a more comprehensive accounting of all impacts on low income and people of color, such as cumulative and indirect impacts, exposure pathways unique to the impacted communities, historic exposures, and a clear description of impacts to subsistence resources. In addition, the EIS should determine if the impacts to low income communities and people of color communities will be disproportionately higher than those on non-low income and non-people of color communities.

9. Additional information is presented in sections 7.2 and 7.7. Evaluation of project effects determined that the proposed action would not substantially affect any group of people, including minorities, in Unalaska.

Impacts to Biological Resources

A. Intertidal, Subtidal Communities and Fish Habitat

The impacts to habitat for fish, macrophytes and invertebrates presented in the EIS in the six Summation tables appearing from pages 162 and 177 are difficult to interpret and not always standardized or comparable across alternatives. For example, for the LSAN site, the category "subtidal invertebrate and macrophyte community" appears. For the combination alternative a similar "subtidal invertebrate habitat value" is presented. It is not clear if these two categories are meant to be equivalent, nor is it clear how the reviewer might compare "community lost" to "habitat value substantially reduced". The categories should be clarified and standardized in the EIS so that a precise measurement of impacts is clearly presented.

10. We acknowledge that the scientific community is not in agreement about a methodology for calculating habitat value through Habitat Evaluation Procedures (HEP) analysis in intertidal or subtidal marine environments (personal communication with Guy McConnell, Corps of Engineers, August 2004). Nonetheless, the EIS should present some estimates of habitat function, even if they are rated in relative terms, so that the impacts of the alternatives can be compared and contrasted. We recommend that the EIS include this data in one comprehensive summary table, and clearly define the impact categories to facilitate such comparison.

10. Discussion of impacts in sections 7.4 and 7.5 have been revised so that impacts can be more directly compared. Tables 4-6 and 7-3 summarize potential impacts of alternatives considered in detail. Habitat function is discussed in the narrative of those sections.

B. Seabird Habitat

The Little South America South (LSAS) site is an area of high biological productivity that is used by the endangered Steller's eider and other seabird species. The Steller's eider is a sea duck that spends the majority of the year in shallow, nearshore marine waters feeding on mollusks, polychaete worms, and crustaceans. Steller's eiders were observed in fairly large numbers on most days during the January and February ground surveys at Little South America site. The Environmental Assessment prepared for this project in 2001 noted that the group of birds observed appeared to be present at this location throughout the day. The EIS states that as many as 153 eiders were counted in one day around the southern end of Amaknak Island, which encompasses the project site.

EPA is concerned about the direct loss of 8 hectares of productive intertidal and subtidal habitat for seabirds and ducks, the reduced value of additional adjacent habitat, the increased risk of bird collisions with boats or above-surface harbor features, and the increased exposure of ducks and seabirds to petroleum contamination in the proposed harbor and offshore waters. This exposure is already occurring in the marine environment in other developed shoreline locations around Unalaska. Loss of small areas of critical habitat can be significant to important species and can be population limiting.

11. Because of the presence of Steller's Eider in heavily navigated sea-lanes, the large amount of time they spend on the water, and their foraging, behavior, eiders are among the most frequent victims of oil pollution in the. world's seas. If spills would occur at the LSAS, they could occur near a fairly large group of eiders. Effects to eiders from a spill and caused either by ingestion of oil through preening of contaminated plumage or by ingestion of contaminated prey. The construction of a boat harbor at this location would bring at least 160 additional vessels into the immediate area, passing through or around the location where Steller's eiders have been observed. This vessel traffic would likely cause increased disturbance to individual eiders in the area. There would also be considerably more human activity associated with the harbor operation which could potentially disturb eiders. The EIS should identify measures that would avoid or reduce conflicts between vessels and Steller's eiders using the area so that such impacts to the eider are minimized.

11. This statement is generally consistent with the draft biological opinion (appendix I), although the harbor would be designed for 75 boats, not 160. The endangered species coordination (appendix I) considered vessel activities, their impacts on Steller's eiders, and mitigation measures that might reduce those impacts. That information is incorporated into the FR/EIS by reference and each measure to reduce take of this species has been incorporated into the recommended plan as a mitigation measure. Consultation with the USFWS and our own analysis has not identified any feasible additional measures that might be adopted for the proposed action.

Summary of Biological Impacts

12. The assessment of impacts described in the main volume of the EIS is not consistent with the impact assessment in the Fish and Wildlife Coordination Act Report developed by the U.S. Fish and Wildlife Service (USFWS) in Appendix H, Pages 48 - 55). The USFWS assessment assigns a value to each different type of affected resource, and type of impact (loss vs. degradation) and calculates a much larger area of impact than the EIS, Volume 1 does. The EIS should reconcile the discrepancies between the information in the EIS and the USFWS assessment, discuss the merits of each calculation, and clarify what the direct and indirect impacts are expected to be.

12. Information has been added to discussions of impacts to biological resources in section 7.4 to describe why the Corps did not use the same resource categories as the USFWS to evaluate potential effects. That section also notes that the Corps does not accept the USFWS method of summing impacted areas to calculate a total area of impact. Section 7.4 also presents Corps views regarding potential impacts and why those views may differ from those of the USFWS.

Aquatic Resource Mitigation

13. The draft EIS presents a number of avoidance, minimization, and monitoring measures to be applied during construction of the proposed harbor improvements. EPA commends the Corps for evaluating design modifications in the EIS that would reduce impacts in the marine environment. Accordingly, the recommended plan (preferred alternative) shifts the location of the rubblemound breakwater to the north of its initially proposed location, avoiding some impacts to the intertidal reef/mussel bed and provides a fish passage breach between the shore and the end of the breakwater. There are additional BMP measures proposed for the harbor operation period. All measures, with exception of the Boat Exclusion Zone at the southern tip of Amaknak Island, are stated as possible measures. EPA recommends that these measures be implemented, and recommends that the EIS indicate that these measures would be employed with project implementation.

13. The recommended plan (section 5.0), which includes the mitigation plan, includes each measure stated in this comment, including the exclusion zone.

14. The EIS proposes creation of intertidal habitat in several sites in Illiuliuk Harbor, totalling 0.8 hectares to compensate for aquatic resource impacts. The removal of two grounded barges in intertidal and shallow subtidal habitat in Captain's Bay is also proposed, potentially restoring an additional 0.1 to 0.2 hectares of habitat. Three years of monitoring is also proposed to evaluate the success of mitigation. EPA is concerned that the monitoring period proposed as part of the Corps' mitigation (3 years) is not sufficiently long to evaluate the successful establishment of habitat and we recommend conducting monitoring for a more appropriate period, to be determined in accordance with resource agency recommendations.

14. The monitoring period may be extended if the interagency planning team determines it is necessary. Grounded barge removal was eliminated as a compensatory mitigation alternative after review of Department of Interior comments on the draft FR/EIS and recommendations in their final Coordination Act report.

15. EPA is concerned this proposed mitigation would not fully compensate for impacts of the proposed project to productive intertidal and subtidal habitats at the LSAS project site. As the draft EIS acknowledges, it is uncertain that the proposed mitigation sites would provide area-for-. area replacement of lost habitat functions. Also, since communities at the mitigation sites would establish over an unknown period of time, the project would result in a temporal loss of function. We recommend that the Corps continue their search for mitigation projects that can help to provide more adequate compensation.

15. The Corps has searched for mitigation measures since the feasibility study began in 1999 and has been most ably assisted by the USFWS. No new mitigation alternatives have been identified since we began this EIS. We will continue to look for ways to improve this proposed action until the report is submitted to the Federal decision maker.

16. The draft EIS evaluates a number of additional mitigation projects in detail (pages 54-66) but ultimately rejects them for several factors, including Corps' requirements under the Water Resources Development Act (WRDA) that project features be constructed on land owned either by the Corps or the local sponsor, the City of Unalaska. This poses an impediment to utilizing two sites considered suitable for mitigation (Morris Cove Creek, Margaret Bay) because neither the Corps nor the City own the land (they are respectively a privately owned native allotment and owned by the Ounalashka Corporation (OC).

16. As noted in the final FR/EIS, we decline to take land from a Native allotment or a Native corporation for these measures. See section 4.5.3 for more information.

17. It appears that the proposed mitigation measure which would set tideland land use restrictions at Little South America (sites shown on pg. 57) remains available. The EIS acknowledges that these tidelands would have value as a mitigation site by providing protection to resources most affected by the proposed harbor and notes that the site is currently owned by the city of Unalaska. The EIS states that the OC objected to mitigation on these tidelands, because this could prevent development of adjacent uplands, which they received in trade with the USFWS with an understanding that they could be used for economic gain. However, while development has been contemplated, the City of Unalaska has control over the future disposition of these tidelands and they also appear to be consistent under Corps' WRDA criteria for consideration as mitigation sites. The EIS should clarify whether these tideland tracts are still available for further consideration as mitigation sites. If they are no longer available, the EIS should include a discussion of why they are not.

17. The draft FR/EIS does not state that the Ounalashka Corporation objected to mitigation on those tidelands. Tidelands use restrictions are considered with other mitigation alternatives in section 4.5.3, and information has been added in the final FR/EIS.

18. Other mitigation projects, such as wetlands acquisition or dredging to restore salmon habitat restoration at the head of Unalaska Lake, may still be feasible. The Corps notes that this project as well as additional proposed mitigation projects would be off-site and out-of-kind, and presumably less suitable for selection as mitigation sites. Given the scarcity of onsite and in-kind areas available for adequate compensation for the impacts, the EIS should further explore the use of these sites.

18. Additional information has been added to section 4.3.5 and table 4-5 about these alternatives and why recommending them is not justified.

19. The Corps may also want to consider additional opportunities for mitigation and restoration in the vicinity of the project not discussed in the EIS. We believe this is consistent with the CEQ regulations at 40 CFR, Part 1500.2, which calls upon Federal agencies to use all practicable means to restore the environment and avoid or minimize adverse impacts of their actions upon it. As an added note, while we

19. We recognize that support for a later restoration project cannot be construed as mitigation. We noted another Federal authority because it would be a more appropriate route for resolving problems at Unalaska Lake or Margaret Bay. We recognize the intent of NEPA, but the Corps also must be consistent with other legislation and regulations that define

commend the Corps for supporting future pursuit of some offsite mitigation options such as the proposal for Unalaska Lake as restoration projects under separate WRDA authorization, they cannot considered as part of mitigation for this project.

the range of actions available for water resources development projects. We have thoroughly examined mitigation measures over the project study spanning more than 5 years. We believe the mitigation plan provides all the mitigation that can be justified under the regulations that guide our planning and that compensatory mitigation is consistent with that for other projects in this region constructed by both the Corps and by private industry.

U.S. Environmental Protection Agency Rating System for Draft Environmental Impact Statements Definitions and Follow-Up Action*

Environmental Impact of the Action

LO - Lack of Objections

The U.S. Environmental Protection Agency (EPA) review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC - Environmental Concerns

EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce these impacts.

EO - Environmental Objections

EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no-action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU - Environmentally Unsatisfactory

EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at. the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

Adequacy of the Impact Statement

Category 1- Adequate

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis of data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2 - Insufficient Information

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses or discussion should be included in the final EIS.

Category 3 – Inadequate

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the National Environmental Policy Act and or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

* From EPA Manual 1640 Policy and Procedures for the Review of Federal Actions Impacting the Environment. February, 1987.

STATE OF ALASKA

DEPARTMENT OF NATURAL RESOURCES
Office of Habitat Management and Permitting

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August 9, 2004

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The Alaska Department of Natural Resources, Office of Habitat Management and Permitting (OHMP) has reviewed the Draft Integrated Feasibility Report and Environmental Impact Statement (EIS), for Navigation Improvements at Unalaska, Alaska, as well as supporting documentation available for review. This included data appendixes and the Fish and Wildlife Coordination Act Report submitted to the Alaska District, U.S. Army Corps of Engineers.

The proposed project has been initiated to meet the need for additional moorage for commercial fishing vessels at Unalaska. The need for additional moorage was identified by the City of Unalaska as a critical issue that was limiting the future growth and economic development of the local area. To meet this need, the City of Unalaska identified that additional moorage would be needed to accommodate 75 vessels in a size class between 25 and 40 m in length.

Several alternative project designs were presented in the EIS ranging from a no action alternative to several comprehensive alternatives that would meet all project objectives. The location of the "Build" alternatives is along the, southeast shore of Little South America (LSA). This location would provide the required deepwater conditions for mooring commercial fishing vessels as well as protection from significant winds, storms, and waves. To enhance the protection of the vessels, the project would construct two floating breakwaters and a rubble mound to enclose a nearshore area along the shore of LSA. The alternative designs evaluated different locations of the facility as well as different configurations of the rubble mound and breakwaters.

The shoreline of Captains Bay has undergone significant modification since major development began in Unalaska Bay during the 1940's. At that time, a portion of the historic shoreline and nearshore habitats of Captains Bay and Unalaska Bay were filled with shot rock to provide the military with road access to all areas of the coast of Unalaska Bay. Bridges were constructed across the major channels of the Shaisnikof River while other channels were filled, isolating sloughs and impeding; anadromous fish migration. Other streams that support anadromous fish spawning are present along Captains Bay and Iliuliuk Harbor and were also impacted by the military construction. Since the initial disruption of nearshore habitats occurred, recolonization of the nearshore areas has progressed, fish blockages have been removed, and military development has been replaced by other industrial development (predominantly seafood support facilities).

Captains Bay and Illiuliuk Harbor are the most isolated marine waterways in Unalaska Bay. Captain's Bay extends approximately 4 miles from the Shaisnikof River to the western end of Amaknak Island where the proposed new moorage is proposed (Little South America). The bay ranges up to approximately one mile wide and extends to a depth of over 400 feet deep. Being a deep, relatively enclosed waterbody, water circulation between Captains Bay and the remainder of Unalaska Bay is very limited. Deep cold waters tend to remain in the deeper areas of Captains Bay, while surface circulation tends towards gyres moving water within Captains Bay instead of moving water between Captains Bay and Unalaska Bay. For this reason, contaminants introduced into the waters of Captains Bay and Iliuliuk Harbor are more likely to remain for longer periods of time than might occur in the more open waters of Unalaska Bay.

As noted in the Environmental Consequences section of the EIS, manmade structures sited in the nearshore environment that extend seaward beyond Mean Low Low Water (MLLW) have the potential to disrupt nearshore migration of fish and have the potential to result in the loss of important benthic habitat. During similar projects in other areas of Captains Bay and Iliuliuk Harbor that involved the development of shore-based facilities, the permitted design incorporated mitigative measures intended to minimize local adverse environmental consequences. The permits for these other developments included mitigation to reduce impacts to the nearshore habitats that support fish and shellfish as well as measures to reduce impediments to the migration of juvenile fish. These measures included breaches to ensure passage as well as construction of various schemes to increase cover and reduce predation of juvenile life stages.

The Preferred Alternative for the new moorage site has been designed to reduce adverse environmental consequences to the extent practicable. However, residual impacts are still anticipated to occur due to the loss of intertidal and subtidal habitat and changes to marine water quality.

Historically, the substrate and waters in the vicinity of this proposed facility have been observed to support a variety of fish, shellfish, birds, and marine mammals. In addition, anadromous fish make use of the shallow, nearshore waters while migrating along the coast. Juvenile anadromous fish also make use of the nearshore waters for migration and cover from larger predatory species.

The EIS describes the alternatives that are being considered for the development of the new moorage. Features of the project that are of interest to the Office of Habitat Management and Permitting include the following:

- Breach in the Rubble Mound - The nearshore area around Little South America provides habitat for juvenile anadromous fish. To ensure that the migration of juvenile fish is not disrupted, it is important to provide a breach near the base of the rubble mound. The preferred alternative (Alternative lb) has a breach designed into the rubble mound to provide for fish. passage.

- Placement of Rubble Mound - The placement of the rubble mound as noted in the EIS has been modified to minimize impacts to the adjacent reef. Considerations regarding placement of fill in this nearshore area are as follows:

1. a) <u>Avoid significant adverse impacts to important fish and wildlife habitats.</u> There are two components to this objective. First, <u>significant</u> impacts must be avoided and second the area to be disturbed must be <u>important</u> fish and wildlife habitat. All available: information indicates that Captains Bay and Iliuliuk Harbor do comprise important habitat for fish and wildlife. There is a highly diverse group of species that arepresent, and with limited water circulation, there is the potential for significant adverse impact to water quality and the marine species that depend upon the coastal waters. Although these marine waters are important as a whole, portions of the coast

1. Comment noted.

have higher resource value than other portions of the coast. The Resource Inventory Maps for this portion of Little South America indicates that the specific area proposed for the dock by the applicant is classed as being of high value due to the presence of the nearby reef noted in the EIS. To avoid impacting this sensitive habitat, the applicant developed a modified alternative that changed the location of the rubble mound such that impacts to the reef were minimized.

2. b) Avoid significant interference with fish migration, spawning, and rearing as well as other critical life history stages of wildlife. There are three known anadromous fish spawning; streams in Captains Bay and Iliuliuk Harbor: the Shaisnikof River located approximately 4 miles southwest from the proposed project location; a small stream along the southeastern side of Captains Bay, approximately 1.2 miles southwest of the project location; and the Iliuliuk River draining Unalaska Lake located approximately 0.5 miles northeast of the project location. The proximity of the project to these three anadromous fish waterways makes it unlikely that the project would directly affect the streams or their flow regimes. As Amaknak Island was created during WWII, significant modifications were made to the shore of the islands that now comprise Amaknak Island. Anadromous fish have adapted to this modified habitat and have continued to migrate to and from their spawning streams.

2. Comment noted.

3. c) Limit the: extent of direct disturbance to as small an area as possible. This objective refers to minimization of the size of the facility rather than avoidance of adverse impacts. There are two components to limiting the extent of disturbance relevant to this project. First the proposed project has been sited in an area already affected by previous development approximately 60 years ago. By making use of the protected waters of Iliuliuk Harbor, and the existing onshore infrastructure to support the new moorage, impacts from the project and the aerial extent of the affected habitats will be less than if the facility was constructed in another part of Unalaska Bay. This will serve to limit the extent of direct disturbance.

3. Comment noted.

4. d) Minimize turbidity and waterborne sediment transported away from the fill site. The proposed project would include the placement of shot rock from the adjacent quarry. The proposal does not include the placement of fine-grained materials. Therefore, the applicant has minimized the potential for turbidity and waterborne sediment transport away from the fill site.

4. Comment noted.

5. e) Maintain adequate circulation and drainage patterns. At present time, circulation patterns in Iliuliuk Harbor are limited by the presence of Amaknak Island and the

5. Comment noted.

other nearby shorelines. The circulation patterns that presently exist are significantly modified from the circulation patterns that existed prior to military development of 'Unalaska Bay.

OHMP believes that the project design has incorporated many important measures to avoid and minimize the adverse environmental impacts from the proposed development. However, not all impacts have been able to be addressed. Therefore, OHMP believes that a compensatory mitigation program will need to be prepared and implemented. There are several meaningful projects in the local area that could provide in-kind, compensatory mitigation. The mitigation effort that is closest to the project. site would involve enhancement of cover for increased survival of juvenile fish in Unalaska Lake. OHMP would appreciate the opportunity to discuss the options available for mitigation as the project plans are developed further.

Thank you for the opportunity to comment on this project.
Sincerely

Stewart Seaberg

Stewart Sea berg

Habitat biologist
cc:
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The Alaska Department of Natural Resources, Office of Habitat Management and Permitting (OHMP) has conducted additional reviews of the Draft Integrated Feasibility Report and Environmental Impact Statement (EIS), for Navigation Improvements at Unalaska, Alaska. This included review of data appendixes, review of the Fish and Wildlife Coordination Act Report submitted to the Alaska District, U.S. Army Corps of Engineers, and discussions with U.S. Army Corps of Engineers staff.

Comments noted.

The proposed project has been initiated to meet the need for additional moorage for commercial fishing vessels at Unalaska. The need for additional moorage was identified by the City of Unalaska as a critical issue that was limiting the future growth and economic development of the local area. To meet this need, the City of Unalaska identified that additional moorage would be needed to accommodate 75 vessels in a size class between 25 and 40 m in length.

The Preferred Alternative has been designed to reduce adverse environmental consequences to the: extent practicable. However, residual impacts are still anticipated to occur due to the loss of intertidal and subtidal habitat and changes to marine water quality. To offset these residual impacts, the Preferred Alternative has incorporated additional mitigative measures that, in combination, offset the potential adverse impacts. These are summarized below.

a) Avoid impacts to anadromous streams by siting the project a considerable distance away from these sensitive areas.

b) Minimize impacts to the reef adjacent to the project by changing the location of the rubble mound such that only a small portion of the reef is affected.

c) Minimize impacts to anadromous fish migrations along the coast by incorporating a breach in the nearshore portion of the rubble mound.

d) Minimize impacts to unaltered habitats by siting the project in areas already affected by previous development approximately 60 years ago. By making use of the protected waters of Iliuliuk Harbor, and the existing onshore infrastructure to support the new moorage, impacts from the project and the aerial extent of the affected habitats will be less than if the facility was constructed in another part of Unalaska Bay.

e) Minimize the potential for turbidity and waterborne sediment transport away from the fill site through the use of shot rock from the adjacent quarry rather than use fine-grained materials.

f) Conduct Compensatory Mitigation in the form of placement of dredged materials in Iliuliuk Harbor to create 0.8 hectares of intertidal habitat.
Thank you for the opportunity to comment on this project.

Sincerely,

Stewart Seaberg

Stewart Seaberg Habitat Biologist

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July 24, 2.004

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Anchorage, Alaska 99506-6898

Dear Mr. McConnell,

1. The following are my comments, for public record, on the proposed boat harbor project in Unalaska, Alaska at the Little South America site on Amaknak Island.

Unalaska has been my home now for twenty eight years. As a resident of this fishing community., I can understand the need for adequate dock space. We have, after all, historically been and continue to be a major North Pacific port. I commercial fished myself for many years, as have my family members, and we own a small boat arid a skiff here in the community. Yet I am against this project because of its proposed location.

2. There is something of a history in trying to protect this spot from development. In 1933, all of Amaknak Island was given a special designation by the United States government as an area protected specifically for subsistence use. After WWII the U. S. military attempted to sell land on Amaknak Island, which they assumed they now 'owned', and it was a few strong and outspoken Unangan who gained their land back. In the late 1980's the icicle Seafood company made plans to build a processing plant at south america, and the proposal set off a storm of protest resulting in a petition. The project did not go through. Also in the 1980's, a 'homesite committee' was formed by the Ounalashka Corporation. My husband, Benjamin J. Golodoff, served on the O.C. Board during this time and recalls many shareholders hoping that the

1. Comment is noted.

2. Comment is noted.

south america area might be set aside for homesites. Unfortunately nothing has come of these hopes and today Unalaska residents, Native and non Native alike, are still struggling with a shortage of land.

Unalaska / Dutch Harbor has been extremely accommodating and generous to the fishing industry; the city and major land-owners provide them most everything they need. Yet as a community many residents are feeling a sense of deprivation, for there has been little generosity extended to the needs of the community for residential land and land preserved specifically for public use. Subsistence and recreation use presently takes place on lands owned by O.C. and is allowed under a permitting system. As their lands continue to be developed none of these areas are guaranteed for our future use. In fact, in 1995 nearly all of O.C.'s land within city limits was zoned marine dependent industrial, the zone of least restriction. Residents of Unalaska, unlike many other smaller fishing communities, have no substantial ownership of the industry, and no real ownership of much of the land. Ownership of land through a corporation does not guarantee a say in its use. This lack of local ownership translates as a lack of leverage and therefore a voice hard to hear above the developer's din.

Granted, because of our lack of past planning and the resulting scarcity of any usable land left for residents, this project is generating more alarm than it otherwise might. But who is to blame for this and who is to pay? The truth of the matter is that if this project goes through, it will bring major changes to the community. For some it will be a gain, for others it will be the loss of one of our most well-loved and valuable areas close to town. South America is a favorite place, and the beaches and hillsides there have been cherished by many generations of Unalaska people, as evidenced recently in the archaeological work done near the site. One must honestly ask what the *residents* of Unalaska will gain from another large boat harbor, and what they will stand to lose by permanently changing the shoreline of South America and turning it into yet another industrial area. The fact is that every year there is less and less land near town that is left undisturbed, and the result is a change in the sort of community we have become. When our surroundings change, people's traditions, our daily activities and our lives are forced to change as well.

Beyond these general comments are specific concerns to be addressed:

Reassessment of need:

3. The present need for another facility for large vessels has become questionable. When this plan was first envisioned some10 or 15 years ago, the fishing industry's situation was very different. Even the most optimistic of planners must now admit that our large vessel fisheries are not expanding, but quite the opposite. Crab, cod and pollock stocks continue to be in question or decline, and we won't soon be seeing those days when the harbor was crammed with boats. You have also heard from us, many times, that the original plan for a small boat harbor was met with enthusiasm by local residents (something for us) but that the project became! something else entirely, and the plans were expanded more or less behind closed doors.

3. Analysis of demand (in appendix B) identifies needs of the commercial fishing fleet working out of Unalaska. Many residents of Unalaska have identified a need for additional moorage for local boats. Protected moorage could serve both needs.

Alternative sites:

4. The present `alternative sites' for the project do not include Dutch Harbor and this certainly seems a failure in sensible planning. The Dutch Harbor area should be considered as are alternative site for two major reasons. First, it is an excellent natural harbor, shallow near the shore and dropping right off to

4. Dutch harbor was thoroughly examined as a possible harbor site. While additional moorage could be added at Dutch Harbor, boats could not be protected from wind-generated waves that could damage vessels. This is discussed in section 4.4.2 of the final FR/EIS.

deep water. During WWI I the military made extensive use of the area. Not only could the present docks be expanded to accommodate more vessels, but there is plenty of additional shoreline that could be used. The entire west shore of the spit could be utilized, given good design. Second, and importantly, the Dutch Harbor area has historically been used for Barge vessels and remains the port's center for fueling, supplying and cargo work. Since WWII the shoreline has been heavily impacted and the bay badly contaminated. Large vessel activity is best confined to that area, as the habitat: has already been degraded there. USF&W, in response to the proposed project, conducted an assessment of nearshore fish habitat in July of 1999. The study found the intertidal habitat at South America healthy and abundant, while "Dutch Harbor in particular was depauperate of fish".

Impacts to Iliuliuk River and Subsistence Fishing:

5. One of the greatest concerns is how close the proposed project is to the mouth of Iliuliuk River, an anadromous fish stream. The project lies barely outside the 500 yard protected zone. Iliuliuk River still supports healthy runs of sockeye, pink, chum and silver salmon as well as dolly varden. Already, this whole river system must suffer from both the upstream impacts of wetland fill, gravel mining, siltation, run-off arid erosion, as well as the marine impacts of petroleum spills, seafood processing and debris. The runs of Iliuliuk River salmon provide

5. Experience in other areas of Alaska has shown that returning adult salmon will successfully migrate past harbors and most other marine development. Potential harbor effects on juvenile salmon and other fish are discussed in section 7.4 of the final FR/EIS. Text regarding pink salmon juveniles in harbors has been revised.

irreplaceable subsistence and sport catches for Unalaska residents. We are extremely lucky to have a salmon stream running though our community. The EIS mentions only the presence of pink salmon around the project area; that no mention is made of our sockeye, silver and chum salmon runs is rather alarming. Also, the statement on page 176 of volume 1 that "A harbor at the LSA-South site could offer better habitat for pink salmon than is now available there..." is questionable at bent. Traditionally, both sides of the channel south of the bridge are areas used for setting subsistence fishing nets. The impact of a large boat harbor at this site would be serious, from the inevitable fuel spills, garbage, activity, resource conflicts and loss of habitat. The back channel area is also used for setting subsistence crab pots.

Navigational Hazards:

6. The proposed dock would lie critically close to the' Bridge to the Other Side', which in bad weather may pose a dangerous navigational hazard. While the bight itself is protected, SW winds blowing out of Captain's Bay are notorious for funneling through that back channel. There is not a lot of swinging room for boats maneuvering back there. Inevitably, when one breaks loose from the dock or loses her steering, it will end up colliding with the bridge. A 150 foot steel crabber slamming into the bridge in a storm could either take out the bridge or cause a fuel spill right at the mouth of the river. I have also not heard any mention of the two small islands, locally called the Rat Islands, and the unmarked reef that lies between them, which is exposed only at low water. These, too, will pose hazards to navigation, although I am certainly not suggesting that the islands be blasted out of there.

6. Vessels moored or operating in the harbor would be unlikely to drift outside the harbor. A vessel that lost steering outside the harbor could damage the bridge, as could other vessels operating in the area.

Ongoing Water Quality Concerns and Cumulative Impacts:

7. Both Captain's Bay and Iliuliuk Harbor (the back channel) are very enclosed water bodies. Because of this the area has a very poor natural ability to flush out pollutants. There are documented and ongoing water quality concerns that we cannot legally ignore. We went through this whole scenario when Westward Seafoods put in their outfall line. For years now Westward has been barging their seafood processing water out to sea because they cannot meet the water quality standards mandated by the ADEC for Captain's Bay. Captain's Bay as a whole suffers from low dissolved oxygen problems and whatever goes into that waterbody tends to stay there and not get flushed out with tides and weather. Iliuliuk Harbor, the back channel area just north of the proposed project, has the same problem as is in fact has been on the State's 303 D list of impaired waterbodies. Clearly, the additional stress and the cumulative impacts of a major facility in this area would be of serious environmental and legal concern.

7. Water quality effects are addressed in section 7.3 of the final FR/EIS. Seafood processing plants have a very different potential to affect water quality than harbors.

8. In the EIS volume 1, page 157, top paragraph, I find your statements extremely contradictory. While you acknowledge that `Water quality at this site is already affected...' and that: 'New harbor facilities would bring additional releases...' you say `The harbor would not add to the overall problem...' Given the concerns about protecting this particular site's habitat with the already impaired water quality in the area, how can we be reassured with the statement that 'Instead, it would reposition boats that are already in those waters and would concentrate them at a location where effects of chronic petroleum losses and occasional larger spills would be more focused.' We hardly want spills to be focused at this site, and this is exactly why some of us object so adamantly to locating a new boat harbor at LSA,

8. The final FR/EIS contains additional information about water quality and harbor effects. The text looks at water quality from both regional and site-specific perspectives, which leads to the conclusion that the proposed action would not add petroleum or other contaminants to waters of the Unalaska area, but would increase petroleum in water at the project site.

We would rather that pollution remains `focused' in the Dutch Harbor area. All this talk about simply' moving the pollution around' seems like double speak and skirting around the cumulative impacts issues that you need to be honestly addressing.

Habitat Concerns:

9. Despite the fact that the upland area has been seriously damaged recently, the marine and intertidal habitat at South America remains remarkably intact and healthy still. The shallow and extensive reef, which is exposed at low tide, the rocky outer coast and the adjacent sand and fine gravel beach provide diverse habitat and excellent feeding for waterfowl, intertidal and marine life. The area supports both adult: and juvenile populations of crab, shrimp, salmon, pollock and other fish as well as intertidal species such as clams, cockles, chitons, urchins, etc. The area is used extensively by waterfowl and seabirds. They not only feed in the area but also find protection from the weather inside the bight, and often gather there in large flocks. Bird use of the area is well documented by both USF&W and by the Audubon Christmas Bird Counts. At least 40 species of birds are known to use the area.

9. Comment is noted.

10. I am quite puzzled ,at your use of a fifty seven year old bird list, (Cahn's 1947 list of birds found in the Unalaska area during WWII.) There are at least 15 common species (not including casuals and accidentals) missing from that list; not just the Steller's eider that you noticed. No mention is made of double crested cormorants, mew gulls, common mergansers, or even of common murres, 4,000 of which were counted in Captain's Bay alone during the Christmas Bird count of December 2002. What is interesting about Cahn's notes is the documentation of displacement caused by disturbance: 'pelagic

10. Additional birds have been added to the list in section 6.3 of the final FR/EIS.

cormorants- displaced from Amaknak island by Navy Base' and' rock ptarmigan- uncommon- left Amaknak due to disturbance'. Habitat loss and displacement continue to be major causes of declining bird populations worldwide.

11. The same protection from the weather that the area would afford as a boat harbor, has long been providing protection for seabirds.
While the EIS volume 1, page 182, states that' Steller's eider numbers at the LSA south alternative are highly variable...' this is most likely due to weather conditions and count effort. Steller's eiders are known for their `site fidelity' and LSA is a favored area for them. Many years of bird counts document this.

11. This information is consistent with information presented in the final FR/EIS.

12. The EIS does make mention of the harbor seals, sea otters and sea lions that frequent the area, but may not recognize that at certain times of the year one finds large congregations of Steller's sea lions there. Just last March (2004) a group of perhaps 50 young males was observed, (and filmed) near the Rat Islands and along the southwest shore of LSA.

12. The information provided has been incorporated into the final FR/EIS.

13. On page 145 of the EIS volume 1, the `land swap' between O.C. and USF&W is explained, and it is stated that USF&W' retains the right to prohibit development on those lands that would be incompatible with the laws and regulations that establish the purposes of the Alaska Maritime National Wildlife Refuge. Has the USF&W decided that this is a 'compatible use' or are they still stating 'repeatedly they believe a harbor should not be constructed at the (LSA) South site' ? (EIS, vol. 1 page 19).

13. The USFWS has not determined that the proposed action would be incompatible with refuge purposes, and we do not expect them to find the action to be incompatible. USFWS comments on the draft FR/EIS and recommendations in their Coordination Act report do not oppose a location of navigation improvements at the LSA-South site.

Traditional and Subsistence Use:

14. Not too many years ago local residents frequented the area gathering intertidal foods. Due to pollution no one eats from the beach there anymore, but South America continues to be one of the most important, valuable and accessible areas of year round use In Unalaska. With its southern exposure the first wild greens show up there in the spring and the area is without a doubt one of Unalaska's prime berry picking spots. It is one of the few locations in Unalaska that is accessible year round to people, (the Summer Bay road usually gets snowed in) so it is well loved and used, both winter and summer, for walking, hiking, snowshoeing, fishing, picnics, beach combing, subsistence salmon and crab fishing, berrying, plant gathering, birding and simply as a place to slip away from town for a little while. Being able to do these things is part of our life here.

14. Comment is noted.

Compliance with State and Federal Laws and Alaska Coastal Management Policies:

15. Many of these habitat and resource conflict concerns are addressed by State and Federal laws. This project will require State and Federal permits and must also comply with the policies of the Coastal Management Plan of the Aleutians West Coastal Resource Service Area. The plan includes policies on Coastal Development, Coastal Habitats and Resources, Air, Land and Water Quality, Cumulative Impacts, Subsistence and Personal Use, Traditional Access, Fisheries and Seafood Processing, Recreation and Archaeological and Historic Resources. The board and program director should be working with the public on their concerns and comments. As a past AWCRSA board member who dedicated many long hours to helping write those policies, I

15. Our review, based on experience with past projects and consistency reviews, indicates that the action is compatible. The Alaska Department of Natural Resources will make their determination after public review of the final FR/EIS.

have an extremely hard time believing the statement that `Each of the alternatives are consistent with the enforceable and administrative policies...' (page 195)

Those are my comments. In conclusion, I would hope that despite our long history in this town of resource exploitation and short term profits, we can still learn from our past mistakes, and set aside, while we are yet able, a few remaining hold outs of undisturbed land, just for the sake of the peace it brings to our lives. We all need that in a place we call home.

Thank you for listening.

Suzi Golodoff
P.O. Box 11
Unalaska, Alaska 99685
(907) 581-1359

cc:

Chris Hladick, City Manager, City of Unalaska
Ounalashka Corporation
Qawalangin Tribal Council
U.S. Fish and Wildlife Service

From: George Pletnikoff [mailto:georgepletnikoff@yahoo.com]
Sent: Saturday, July 31, 2004 1:17 PM
To: ALEUT-L; Mcconnell, Guy R
Cc: Ship AMCC
Subject: please take the time to read...........VIP

Guy...please include these comments as part of my comments into the record on the EIS...thank you...sorry I missed you when you were in town........

Comments noted.

To Aleut-L and ship to shore folks......

Hello again....this is a very important document....its implications are far reaching, especially if implimented.....I read into the plan to build an ignoring and marganializing of the Unangan and our VALUES....If this plan moves forward it is all tied into the destruction of our "bridge to the other side." This is a test of our commitment and will to protecting who and what we are, I firmly believe. The document I am referring to follows my little story, so please skip the first part if you have read it already....also, if you agree, please send, and or resend this whole thing to Guy McConnell of the Army Corp....his email address is: guy.r.mcconnel@poa02.usace.army.mil his phone number is (907)

753-2614 and FAX (907) 753-2625.....there is also a very interesting article in the last Dutch Harbor Fisherman if you can get a copy....wish I could scan and forward to you...I hope you will join in our efforts to once again establish an Unangan presence in the Aleutian Islands.....thank you.....

1,000 BC.... Ounalashka...aang...aang...Life here is good. We heard from a different visitor from a different land speak in a different way that their Creator once said: "And our Creator brought all things in being, and He said...*It is GOOD!"* Those words still ring loudly in the ears of our families. We are building a home here. The site we have chosen is good for raising our little ones. There is plenty of natural shelter. We have a view of the waters in which we can safely gather all the life we need for our bodies and soul: health; no matter the season. This site is located on a smaller island right across from the bigger island we call *"Little Great Land."* Truly we are blessed.

Our life is plentiful. We have fish, berries, birds, whales, seals, plants, and friends. We have family. We are in paradise much like our visitor speaks about that their Creator made for them. Drinking the water he also created is sweet. When we get tired, when we get ill, we have plants we use to help us get strong again. Our tools we make help us do our work. Our women help us gather life in baskets we all weave together while we sing of our good fortune. Our chief is wise and full of care for us. The sun, clouds and stars serve our needs to know we are not alone, that we are together.

We use our boats to explore for other homes of other people who sing and talk with us. They too have plenty. They welcome us to dance with them, to eat with them, to share and learn. We understand them and they understand us. We sing. Together we are thankful, and together we offer thanks, for it is good. The big mountains that light up at night, bright, hot and red is for our gift of thanks. We have plenty of these thanks places. The visitor said they too dance with their Creator on one of their thanks places close to their home. It is a good story, so we made a dance and a song for it. It is a special dance. A happy song.

We never get hungry for life. The life of our food take care of us. Our little ones care for them all the time. Our little ones make dance and song just like our life. They take the wood from the water and cut different faces of that life. The faces they cut are in our home close to little great land. They watch us as we eat and talk. The faces they cut make us happy when we feel quiet. They like us and we like them.

We can not have need. We have no word for that. What we have, our life gives us. And we go to our thanks places. Our life comes and comes, each at a different time. Once fish; once seals; and once plants; like a season, a cycle. Our life keeps us warm with themselves. We put them on our bodies, we wear them. They protect us. We honor our life, and they us. Oh, it is good. They thank us too for making them our life. They sing and dance for us too. Lots of them are so happy they jump out of their homes to look at us. Our thanks places give us warmth when we bring it home to our special place in our rooms. It makes us warm and gives us its light. We whisper our thanks for all to hear.

"Papa! Papa! Wake up!"

A big boat is coming. Our life is running away. Our thanks places are cold. Our home is falling down. We create a word for need. We sing and dance in loud. We wear our life no more. "Papa.....wake up! You are dreaming!"

It is 2004.

From: Arnold Harder [mailto:ArnoldH@tnh-inc.com]
Sent: Wednesday, July 21, 2004 3:58 PM
To: Mcconnell, Guy R
Cc: Therese Stokes; Gerry Welsh; TONYS.TNH@tnh-inc.com; Dan Golden
Subject: Unalaska Navigation Improvements Comments

Mr. McConnell: Thank you for sending us a copy of the Draft Integrated Feasibility Report and EIS. We have reviewed this document and offer the following comments regarding the LSA North Site:

1) This site would impact the use of the existing OC barge landing.

1. Comment noted.

2) It appears that this site would significantly obstruct navigational traffic crossing beneath the proposed South Channel Bridge.

2. Comment noted.

We also request a transcript from tonight's public meeting and any comments regarding the bridge.

Thanks,
Arnold Harder, Consultant Project Manager for
Unalaska: South Channel Bridge Replacement
Tryck Nyman Hayes, Inc.
343-0262