APPENDIX B
ECONOMIC ANALYSIS OF NAVIGATION IMPROVEMENTS AT AKUTAN, ALASKA

Appendix B: Economic Analysis of Navigation Improvements At Akutan, Alaska

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1 OVERVIEW OF REGION AND COMMUNITY

This report provides background information about the socioeconomic composition of the study area.[1] This information is necessary to enable planners and report reviewers to understand the community infrastructure, the level of economic activity, and the potential of the area to support the project under consideration.

1.1 Problem Statement

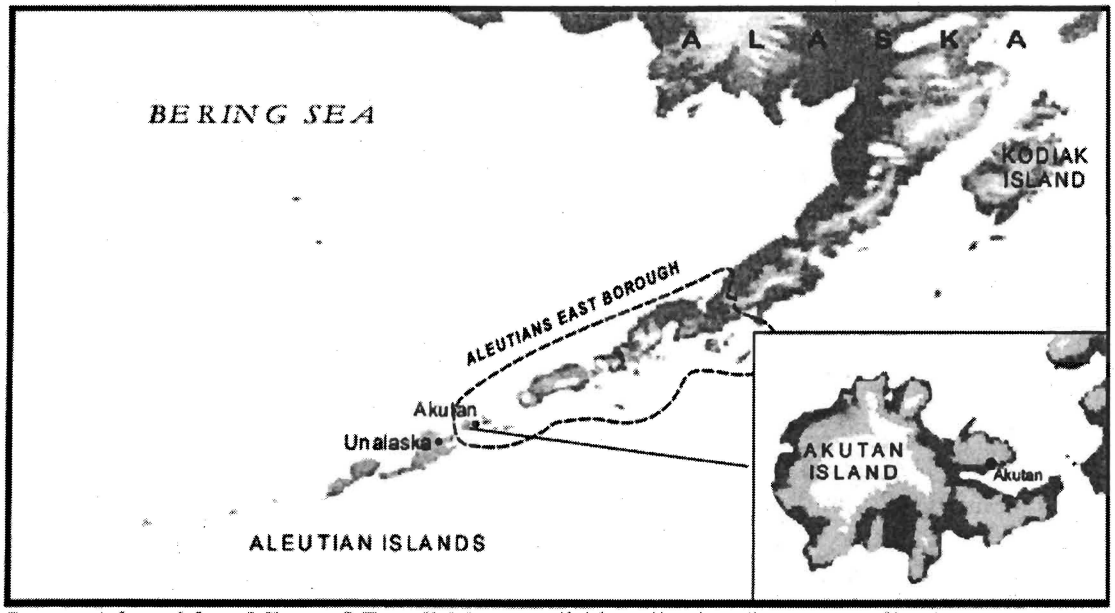
Akutan, Alaska is a relatively small, remote community. Although it is one of the most important fishing ports in the United States in terms of volume and value of seafood production, it has very little infrastructure. The community, along with the Aleutians East Borough, has worked for many years to address the need for a small boat harbor in the community. The navigation improvements evaluated in this report are focused on meeting resolving several navigation problems currently facing vessels utilizing Akutan Bay. These problems include: 1) the necessity to travel to other ports in-season in order to secure safe moorage, 2) the necessity of travel to the Pacific Northwest each year, problems associated with the practice of rafting. In addition, residents of Akutan are hampered in their ability to develop a small boat commercial fishery and their subsistence harvests are also being constrained by the lack of available moorage.

1.2 Akutan

In 1878 and 1879, a number of Aleut families from neighboring islands moved to Akutan Island to establish the present community. The Russian Orthodox Church supported this move and immediately built a church and a school. Western Fur and Trading Company built a fur storage and trading post, and its resident agent started a cod fishing business in the village. In 1912, the Pacific Whaling Company built a processing station that operated until 1942, when the Japanese invaded the Aleutians and the Aleuts from Akutan were evacuated to camps in Southeast Alaska.
Akutan's proximity to the rich Bering Sea fishing grounds and the shelter of its deep bay brought the crab and fish processing industry to the community in the late 1940's. At first, the processing companies operated with floating processing ships. This was followed in the early 1980's by construction of a very large processing plant owned by Trident Seafoods. Although the Aleut population of the local village remains at 90 to 100 residents, the processing activity brings the total year-round population of Akutan to over 500, peaking during certain parts of the year at around 1,000 (Aleutians East Borough).

The City of Akutan is a traditional Aleut fishing village on Akutan Island, one of the Krenitzin Islands of the Fox Island group in the Eastern Aleutians. The island is part of the Aleutians East Borough (AEB). Figure A2-1 shows the location of Akutan.

[1] Much of this information is from from a publication from the Aleutians East Borough, as well as information from the Alaska Department of Community and Regional Affairs (DCRA) website. Information was also gathered during a site visit to Akutan in June 1998.



Source: Adapted from Microsoft ExpediaMaps, available online http:\\www.expediamaps.com.

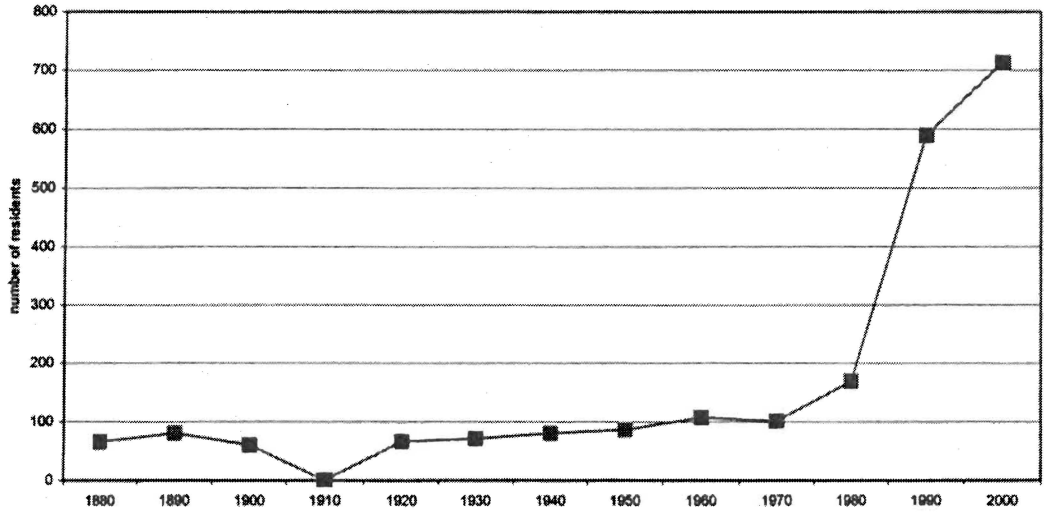
FIGURE A2-1 —*Akutan Vicinity Map*

The city of Akutan is 35 miles east of Dutch Harbor/Unalaska and 766 air miles southwest of Anchorage. The city and the adjacent processing plant owned by Trident Seafoods are on the northeastern corner of the island, on the north shore of a large, well-protected bay that opens to Akutan Bay and the Bering Sea.

1.3 Population

There are two components to Akutan's residents. The traditional village is inhabited predominantly by Aleuts. The 2000 census reported 112 Native residents in Akutan, out of a total population of 713. The majority of the reported population of Akutan is comprised of transient fish processing workers that live in group quarters at the Trident Seafoods facility west of the Aleut village. Figure A2-2 depicts trends for the combined Native and transient populations at Akutan from 1940 through 2000.

Figure A2-2: Population of Akutan: 1880-2000



Sources: Population estimates for 1880–2000 are from the U.S. Census.

The 2000 population of Akutan was 713, a combination of 112 village residents living in 38 households, and 601 workers residing in Trident group quarters. The number of workers varies with the time of year. In recent years, according to Trident, the number of processing workers has rarely been less than 100 and has approached 1,000 during peak processing periods in February, March, and April. Shore plant operations began in 1982; by the late 1980s Trident employed between 600 and 650 people annually, with an average of 400 onsite at any one time.

1.4 Government

Akutan is a second-class city incorporated in 1979. There are seven city council members, including the mayor. There are no sales or property taxes, but the city collects a 1 percent raw fish tax, and the borough collects a 2 percent raw fish tax.

1.5 Services

Utilities. The City of Akutan provides residents with electricity, water, sewage treatment, garbage, and cable television service. The Akutan Electric Utility has a hydropower source with a diesel backup. Generator capacity is 380 kilowatts. The city charges residents 12 cents per kilowatt-hour. Water from a stream and a dam constructed in 1927 is treated and piped into all homes. Sewage is piped to a community septic tank, with effluent discharge through an ocean outfall. Funds have been requested to develop 2 new water sources and construct a new, 125,000-gallon water storage tank and treatment plant. Garbage is burned in an incinerator, and a new landfill site and incinerator are under construction.

Trident Seafoods operates its own electricity and water treatment facility. The city and Trident each own one fuel storage tank, with capacities of 65,000 and 1,666,000 gallons, respectively.

Communication services in Akutan include in-state telephone service by Pacific Telecommunications Inc., long-distance telephone service by AT&T Alascom and General Communications, Inc.; ARCS television programming; and teleconferencing provided by Alaska Teleconferencing Network.

Law Enforcement and Fire Services. One Village Public Safety Officer (VPSO) is provided jointly by the city and state. The city maintains a jail. Fire services are provided by the city, the VPSO, and volunteer firemen.

Health Care. The city-owned Anesia Kudrin Memorial Clinic built in 1991 is operated by the city and the East Aleutian Tribes (EAT), Akutan's Native health organization. Akutan First Responders offers flights to Dutch Harbor/Unalaska or Anchorage for alternative health care. Itinerant employees of the Public Health Service make dental visits. The EAT addresses mental health and substance abuse issues and provides shelters. The Akutan Traditional Council takes responsibility for suicide prevention in the city.

Education. Akutan's one school serves children in preschool through twelfth grade. Akutan School has 20 students, 3 certified teachers, and 5 Advisory School Board members. The Aleutians East School District, operated by the AEB, contains 6 schools.

Transportation. Boats and amphibious aircraft are the only means of transportation into Akutan. There is a dock but no harbor. An Alaska Marine Highway System (AMHS) ferry operates from Kodiak bimonthly between May and October. Cargo is delivered weekly by freighter from Seattle. Akutan has a seaplane base, but no airstrip because of the area's steep terrain. Peninsula Airways provides daily air service from nearby Dutch Harbor/Unalaska, but high waves may limit accessibility, particularly during winter.

Recreation. The City of Akutan provides a youth center and a multipurpose recreation building, and the school gym has basketball courts. The city maintains a public library, and the school library is available to the public. The Akutan Traditional Council sponsors bingo and a museum.

1.6 Employment

Commercial fish processing dominates Akutan's cash-based economy. Eight residents hold commercial fishing permits. The Trident Seafoods plant processes primarily pollock, Pacific cod, and crab. None of the plant workers live in the village: they live in company dormitories and eat in the company mess hall. Although the village and the plant operate independently, it appears that their mutually beneficial relationship is acknowledged. Much of the community's operating budget is supported by fish taxes paid by the processing facility. Other than the processing facility, the village does not have a significant economic engine. Business license data as of January 2001 indicate that there are six small businesses in Akutan.

According to a 1990 study by the Alaska Department of Fish and Game (ADF&G), all village residents used subsistence resources, and 96 percent participated in subsistence harvests. The average gross household income was $37,753, and the average earned household income was $27,807. An estimated 102 jobs were held, and the average number of weeks worked by the 62 adults was 35.8. Local government accounted for 55 percent of the jobs, and 35 percent were in commercial fishing. Only 2.4 percent of jobs worked by villagers were in the fish processing facility.

There are two new areas of the Akutan economy that may be developed if the proposed project is completed. Several residents are interested in developing a small boat commercial fishery to take advantage of the State waters Pacific cod fishery. One quarter of the allowable harvest of Pacific cod is set aside for harvest by small boats. Residents are not able to take advantage of this regulatory advantage because they are unable to moor vessels in their community. Residents are also interested in tourism development and providing services to fishing vessels as areas to add employment opportunities. These options will require the use of a small boat harbor. Potential tourism attractions in Akutan include an active volcano, hot springs, Steller sea lion and seabird rookeries, easily accessible sportfishing for halibut and rockfish, and the natural beauty of the island.

1.7 Trident Seafoods

The Akutan plant is one of Alaska's largest fish processing plants and Trident's largest facility. In 1997 approximately 250 million pounds of pollock, 95 million pounds of Pacific cod, and 60 million pounds of crab were delivered to Trident plants in Akutan, Sand Point, and St. Paul combined; the majority was delivered to Akutan. These 3 plants accounted for approximately 28 percent of pollock and 50 percent of Pacific cod delivered to Bering Sea and Aleutian Islands (BSAI) and western Gulf of Alaska (GOA) inshore plants. Trident also operates several floating processors.
The top five U.S. ports in terms of commercial fishery landings are shown in TABLE A2-1. Trident produced a total of 405 million pounds of fish products in 1997. The majority of the products were produced in Akutan, placing Akutan well within the top five commercial fishing ports in the nation. Akutan is not included in the list of U.S. ports because of restrictions on revealing confidential information.

TABLE A2-1: *Top 5 U.S. ports in terms of commercial fishery landings, 2000*

National Ranking	Port	Commercial Fishery Landings (Millions of Pounds)
1	Dutch Harbor/Unalaska, Alaska	699.8
2	Cameron, Louisiana	414.5
3	Empire-Venice, Louisiana	396.2
4	Reedville, Virginia	366.8
5	Intercoastal City, Louisiana	321.7

Source: National Marine Fisheries Service, *Fisheries of the United States*, 2000.

1.8 Community Development Quotas

The Community Development Quota (CDQ) Program was established by the North Pacific Fishery Management Council (NPFMC) to provide Native communities in western Alaska the opportunity to engage in and profit from commercial fishing and processing for halibut, groundfish, and crab in waters adjacent to their communities.

In 1999, the western Alaska CDQ communities will, for the first time, receive allocations of at least 7.5 percent of all groundfish species managed by the National Marine Fisheries Service (NMFS) and NPFMC. Before 1998, the CDQ program involved only pollock, blackcod, and halibut. In 1998, three percent of the total allowable catch (TAC) for crab was added to the program. In 1999 CDQ pollock allocations were increased from 7.5 to 10 percent of the TAC, and CDQ crab allocations increased to 5 percent of the TAC. With its expanding scope and size, the CDQ program will affect a growing number of western Alaskan residents.

Akutan residents participate in the CDQ program through the community's association with the Aleutian-Pribilof Islands Community Development Association (APICDA). APICDA provides harvesting and processing opportunities on the *F/T Starbound* (a Trident-owned offshore processor) for APICDA community residents. The APICDA community development plan for Akutan is based on development of a harbor in Akutan. In the plan, APICDA has pledged a grant of $1 million to the community for harbor-related economic development.

APICDA is also helping residents of Akutan and other communities through a vessel purchase program. APICDA arranges financing through the program for small but commercially viable fishing vessels that typically range in length from 30 to 58 feet. To date, one Akutan resident has worked with APICDA to purchase and operate a fishing vessel. This 42-foot vessel is too large to operate off the beach (as other Akutan vessels do), but too small to operate in Akutan Bay without a protected harbor. The vessel operates out of Atka, where APICDA has a halibut processing facility. When the vessel is not on the fishing grounds, it uses harbors in Atka or Dutch Harbor/Unalaska. The owner spends much of the year outside Akutan because of the cost of airfare between Akutan and Dutch Harbor/Unalaska.

2 MARINE RESOURCE ASSESSMENT

2.1 General Overview of Fishery Resources

The eastern Bering Sea, from which Akutan draws most of its commerce, is a broad shallow shelf area that is one of the most productive marine areas on earth. The annual harvest of all fish species from the eastern Bering Sea is in excess of 2 million metric tons. (Hiatt and Terry 1999).

The most productive region of the Bering Sea is the southeast Bering Sea-Bristol Bay region, which covers the area from the continental shelf to Bristol Bay between the Pribilof Islands and Unimak Pass. Within this area are the largest fisheries resources in North America. The rivers of Bristol Bay have produced extremely large harvests of sockeye salmon since the mid 1970s. Along the coast of Northern Bristol Bay herring returning to spawn each spring form the basis of the largest herring harvest in Alaska. Small herring populations occur in the bays on the north and south side of the Alaska Peninsula and a summer herring fishery occurs at Dutch Harbor.

In the offshore waters are enormous stocks of pollock, cod, and flatfish. The region produced large harvests of king and tanner crab through the 1960s and 1970s, how ever these species are currently at a very low level of abundance declined through a combination of overfishing and environmental change.

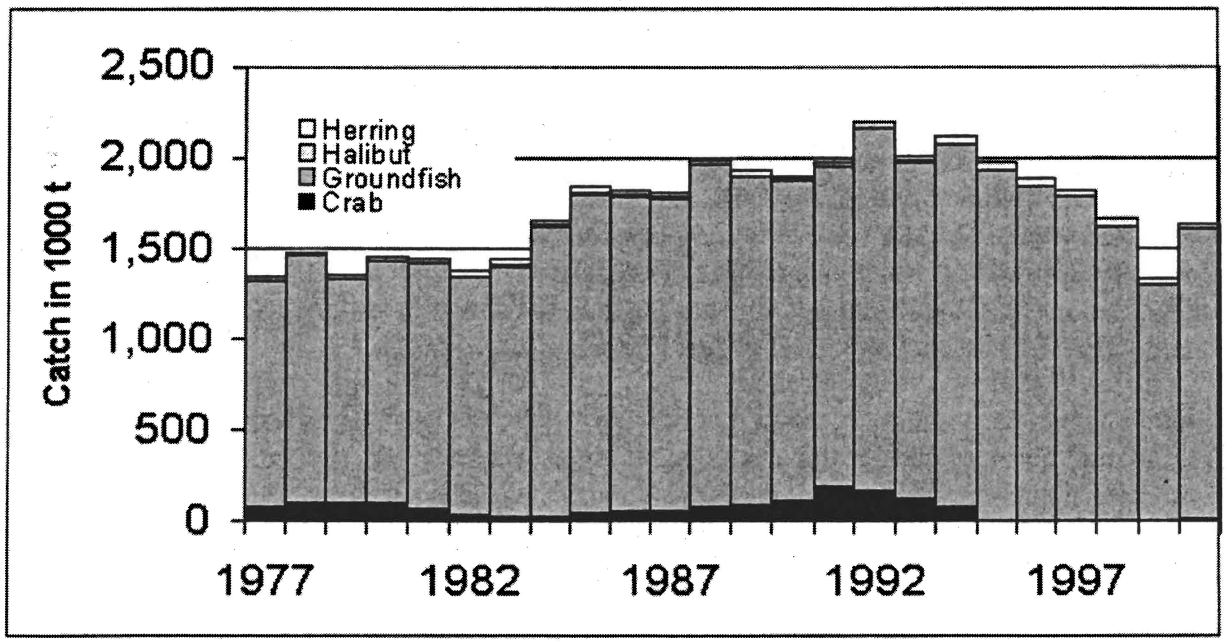


Figure A2-3. Catch history of groundfish, crab, herring and halibut in the eastern Bering Sea (EBS), 1977-2000.

To the north of the Pribilof Islands on the North Bering Sea outer continental shelf occur abundant concentrations of pollock and flatfish, primarily arrowtooth flounder. This area is not as productive as the southeastern Bering Sea, and winter ice cover limits fishing in the

area to summer-autumn. In the coastal water from Cape Newenham to Norton Sound occur small spawning stocks of herring, and salmon runs in coastal rivers. The most abundant salmon species is chum salmon, and the largest runs are in the Yukon and Kuskokwim rivers, however, these runs are much less abundant than in other areas to the south. In this region of the Bering Sea an unutilized species, saffron cod, occurs in coastal waters. This species, which is harvested and utilized in Asia, appears to be abundant enough to support a localized fishery centered on Norton Sound.

The Aleutian Islands Region that extends from 170° W to the U.S.-Russian Convention Line has a limited fishery resource. This is likely due to the very narrow shelf surrounding the islands of the archipelago and the steep drop into the abyssal plains of the North Pacific deep. There is very little in the way of salmon or herring through the Aleutian Islands. Groundfish resources are also limited, with relatively low populations of pollock, cod and flatfish. The largest fisheries in the Aleutian Islands region are pollock in the eastern Aleutians, and Atka mackerel in the central and western Aleutians.

Salmon are not major fisheries in the Dutch Harbor area. Sockeye, chum and pink salmon are harvested in relatively low numbers in the Fish and Game Aleutian Islands District, with runs of even year pink salmon accounting for over 90% of the catch.

2.1.1 Fisheries

Alaska has a long history of fisheries exploitation, beginning with the Russian sea otter and fur seal hunts of the early 18th Century. Today, large harvests of salmon, crab, shrimp, herring, and groundfish are taken within the internal waters of the state, and from the U.S. EEZ. Within the past 40 years the greatest developments and changes have been in the groundfish fisheries in the EEZ off Alaska. Pacific cod was the earliest commercial fisheries harvest in Alaska. In 1854, a U.S. sailing brig en route to Russia to trade found large concentrations of cod while anchored of the Alaska Peninsula (Cobb 1928). These fish were salted and taken to San Francisco for sale. In the 1850s, regular annual trips for cod fishing were started by vessels fishing out of San Francisco (Cobb 1922).

The domestic salt cod fishery continued into the 1950s, but was soon dwarfed by the large salmon and herring fisheries that developed in the later part of the 19th century. Halibut became a significant commercial groundfish species in the early part of the 20th century when refrigeration made it possible to bring to market. Salmon, herring and halibut were the mainstay of the Alaska fisheries into the 1950s, at which time crab and shrimp fisheries began to develop and grow. Groundfish, other than halibut, were largely unexploited.

In 1954, this changed as Japan resumed high seas fisheries following the signing of a Peace Treaty with the U.S. High seas salmon fisheries began then, as did Japanese mothership operations began in the eastern Bering Sea targeting yellowfin sole (Bakkala et al 1985). By the late 1960s Japanese operations had expanded, and the first Soviet vessels began operations off Alaska. In the mid 1960s the Japanese and Russian factory trawler fleets

moved into the Gulf of Alaska. By the mid 1970s vessels from Korea, Taiwan, and Poland joined the large groundfish fisheries off Alaska (Megrey and Wespestad 1989).

U.S. fishermen were not harvesting groundfish, but were concerned that the foreign groundfish fisheries were effecting the abundance of U.S. target species, such as crab, halibut, and salmon. Efforts were made through negotiations to enforce closed areas and catch restrictions. These measures provided some relief and opportunities to U.S. fishers, and the fishing fleet expanded, primarily larger crab vessels operating from Kodiak and Dutch Harbor.

When the Magnusson Act came into force in 1977, there was little immediate effect on the fisheries off Alaska. Foreign vessels continued to harvest the bulk of the groundfish, and U.S. vessels continued to fish their traditional fisheries. There was increased oversight of the foreign vessels with the placement of catch monitoring observers, and periodic boarding by the Coast Guard and NMFS enforcement.

In the early 1980s traditional crab and shrimp fisheries declined, forcing American fishermen to turn to other species to exploit. Under terms of the Magnusson Act foreign vessels were given favorable access to fish in "joint venture" operations that employed foreign processing vessels and American fishing vessels. Limited operations had started in the 1970s, but joint venture operations accelerated in the early 1980s when a policy of "Americanization" of the fisheries was instituted which reduced access to fisheries of nations not involved in joint ventures.

The policy of "Americanization" also opened up markets, particularly in Japan, that had been controlled by fishing and trading companies. Import restrictions were reduced, and trade was initiated with American companies in order to maintain access to fish products. This opened the door to increased opportunities for American entrepreneurs, who were aided by U.S. loan programs which provided highly favorable guaranteed loans for construction of fishing vessels. In a few short years the groundfish fleet grew from several dozen catcher boats of 105-135' size range to a fleet of nearly 70 large (250-300') factory trawlers.

The "Americanization" program developed much faster than even the most optimistic observer imagined. Directed foreign fishing had been phased out by 1987 and replaced by joint ventures (Figure 3). The joint ventures, which had been expected to continue until near the turn-of-the century by some, were over by 1991. The 1980s were a very profitable period for all segments of Alaskan fisheries, but especially so for groundfish, for which ex vessel values increased from $21.5 in 1982 to $475 million in 1990. The profitability of the fisheries coupled with easy loans, and decreased landings in crab and shrimp lead to an influx of vessels and new companies.

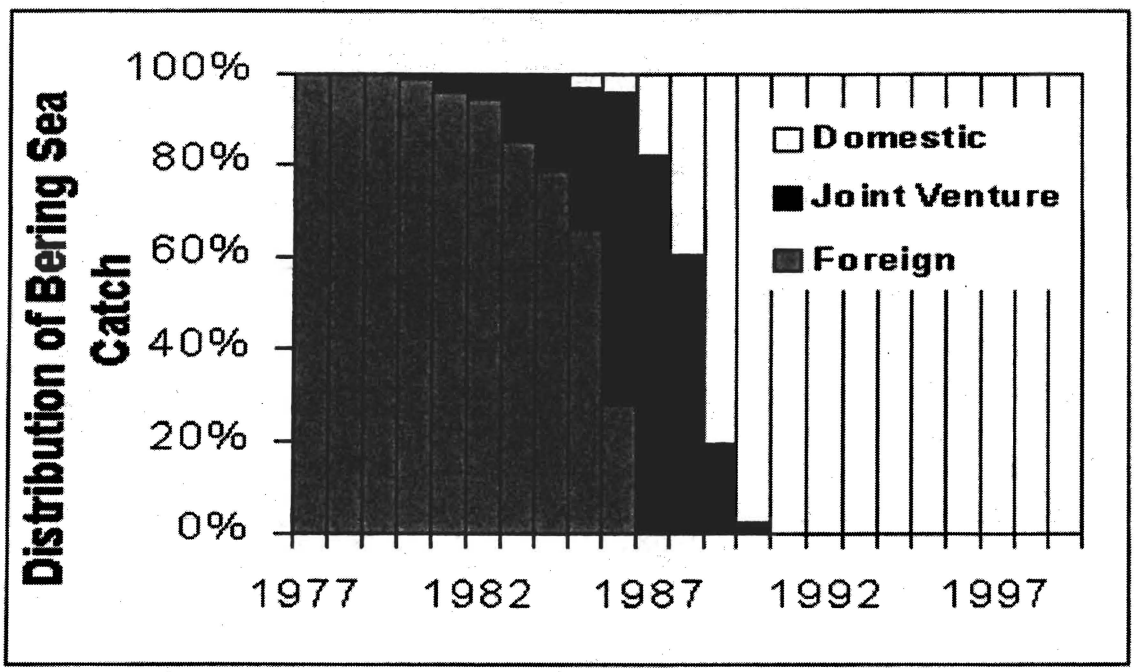


Figure A2-4 Transition of Bering Sea fisheries expressed as portion of the Bering Sea TAC allocated to foreign, joint venture, and domestic fisheries.

By the early 1990s it was clear that the "Americanization" program had been too successful, and there was an excess of capacity. This is clearly illustrated in the eastern Bering Sea pollock fishery, in which catch has averaged 1.2 million metric tons since 1964. While it was foreign dominated the fishery operated year-around, and joint venture fisheries took the harvestable quota in 8-9 months. With the advent of the domestic factory fleet, with tremendous harvesting and processing capacity, the fishing time was reduced to two fishing periods, which by 1997 lasted a total of 55 days in the inshore fishery, and 77 days in the offshore fishery (Table A2-2).

The growth in excess capacity gave rise to a host of management problems, primarily allocative in nature. These have included allocations to gear groups, quota divisions between shore based processors and off shore factory trawlers, by-catch restrictions and area closures to reduce the take of species taken in pre-existing non-trawl fisheries, such as crab, halibut, herring, and salmon; and attempts to develop limited entry programs.

Table A2-2. Fishing periods for eastern Bering Sea pollock and length of periods, 1990-1998.

Year	A Season						B Season					
	Inshore			Offshore			Inshore			Offshore		
	Start	End	Days	Start	End	Days	Start	End	Days	Start	End	Days
1990	1-Jan	15-Mar	74	1-Jan	15-Mar	74	1-Jun	13-Oct	134	1-Jun	13-Oct	134
1991	1-Jan	22-Feb	52	1-Jan	22-Feb	52	1-Jun	4-Sep	95	1-Jun	4-Sep	95
1992	20-Jan	6-Mar	46	20-Jan	6-Mar	46	1-Jun	22-Sep	113	1-Jun	28-Jul	57
1993	20-Jan	24-Mar	64	20-Jan	22-Feb	33	15-Aug	3-Oct	49	15-Aug	22-Sep	38
1994	20-Jan	2-Mar	42	26-Jan	18-Feb	23	15-Aug	4-Oct	50	15-Aug	24-Sep	40
1995	20-Jan	1-Mar	41	26-Jan	21-Feb	26	15-Aug	23-Sep	39	15-Aug	20-Sep	36
1996	20-Jan	2-Mar	42	26-Jan	25-Feb	30	15-Aug	17-Oct	63	30-Aug	17-Oct	48
1997	20-Jan	19-Feb	30	26-Jan	20-Feb	25	1 Sep	16 Oct	45	1-Sep	2 Oct	32
1998	20-Jan	26–Feb	37	26-Feb	20-Feb	25	1-Sep	29-Oct	58	1-Sep	19-Oct	49

The domestic groundfish fishery off Alaska is an important segment of the U.S. fishing industry. With a total catch of 1.8 million metric tons, a retained catch of 1.6 million metric tons and an ex-vessel value of $565 million in 2000, it accounted for 44% of the weight and 16% of the ex-vessel value of total U.S. domestic landings as reported in Fisheries of the United States, 2000. The value of the 2000 catch after primary processing was approximately $1.3 billion (Haitt et al. 2001). In Alaska, groundfish accounted for about half the value of all landings, followed by salmon, shellfish and halibut (Figure A2-5).

The groundfish fishery is currently stable, and economics has begun to remove some of the excess effort, primarily through bankruptcy or transfer to other fisheries. The process of rationalization of fisheries through effort reduction, and/or privatization of fishing rights will be a major feature of Alaska groundfish management for years to come. At the current time the North Pacific Fisheries Management Council is dealing with several issues related to capacity reduction. These issues are discussed further in later sections of this report.

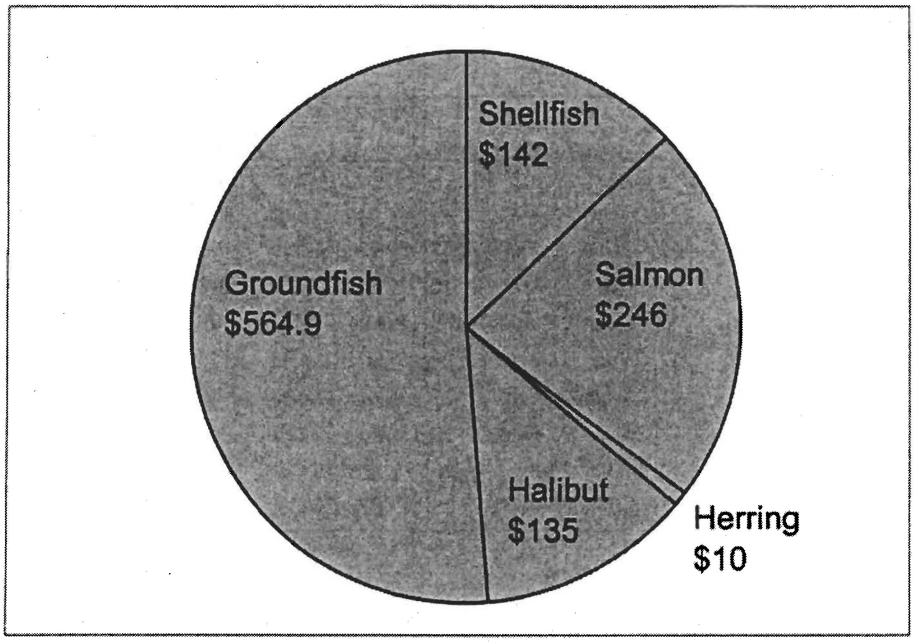


Figure A2-5. Ex-vessel value, in million dollars, of fisheries off Alaska in 2000.

2.1.2 Fisheries Resources

2.1.2.1 Groundfish

The groundfish fisheries accounted for the largest share of the ex-vessel value of all commercial fisheries off Alaska in 2000 (51%), while the Pacific salmon *(Oncorhynchus* spp.) fishery was second with $247 million or 22% of the total Alaska ex-vessel value (Hiatt et al. 2001). The value of the shellfish catch amounted to $143 million or 13% of the total for Alaska.

Walleye (Alaska) pollock *(Theragra chalcogramma)* has been the dominant species in the commercial groundfish catch off Alaska. The 2000 pollock catch of 1.21 million t accounted for 67% of the total groundfish catch of 1.82 million metric tons. The pollock catch was up approximately 11% from 1999. The next major species, Pacific cod *(Gadus macrocephalus)*, accounted for 245,600 metric tons or 13.5% of the total 2000 groundfish catch. The Pacific cod catch was up about 1% from a year earlier. The 2000 catch of flatfish, which includes yellowfin sole *(Pleuronectes asper)*, rock sole *(Pleuronectes bilineatus)*, and arrowtooth flounder *(Atheresthes stomias)* was 228,200 metric tons up over 22% from 1999. Pollock, Pacific cod, and flatfish comprised almost 93% of the total 2000 catch. Other important species are sablefish *(Anoplopoma fimbria)*, rockfish *(Sebastes and ebastolobus* spp.), and Atka mackerel *(Pleurogrammus monopterygius)*.

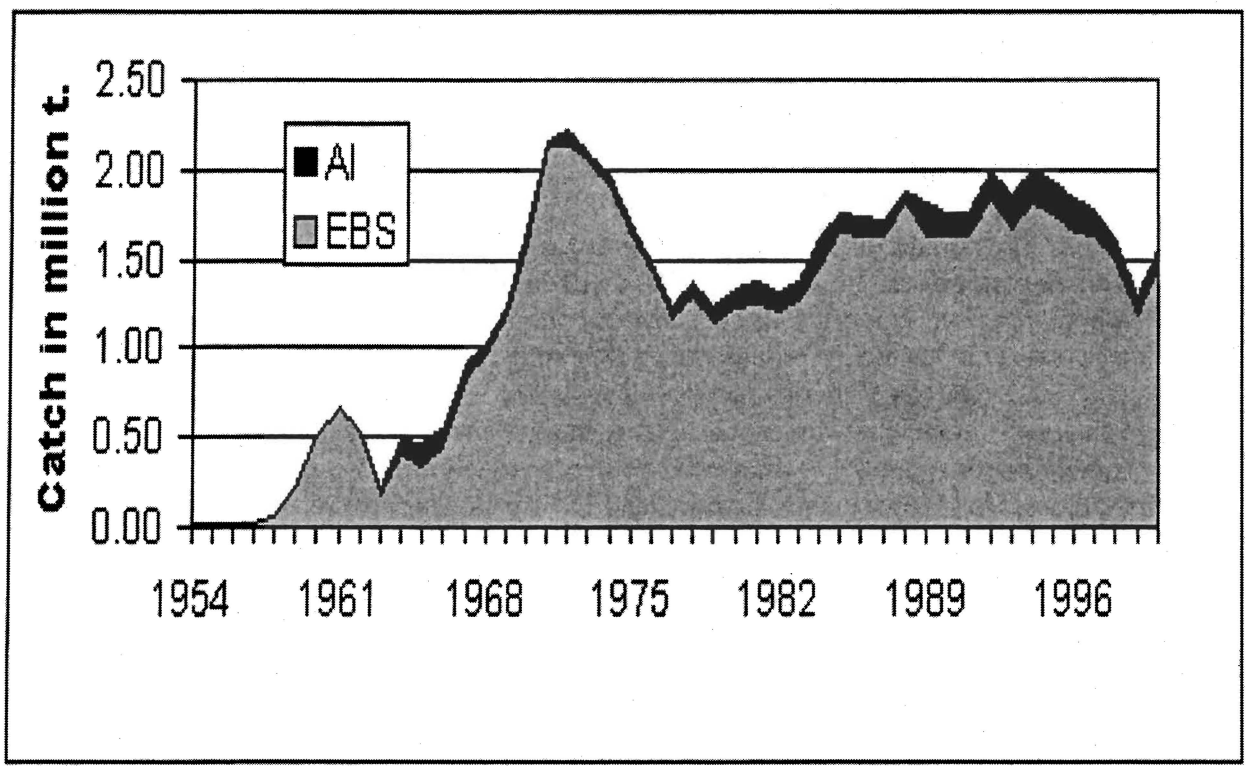


Figure A2-6. Total catch of groundfish in the Aleutian Islands (AI) and eastern Bering Sea (EBS).

Domestic groundfish fish harvesting, which began in the mid 1980's, has grown to be the largest sector of all the Bering Sea fisheries. Since 1988 groundfish landings at Dutch Harbor-Akutan has averaged 304 thousand metric tons with an exvessel value of $66.6 million (Table A2-3).

Table A2-3. Groundfish tonnage and exvessel value of groundfish delivered to Dutch Harbor-Unalaska, 1988-1999. **source: PACFIN**

Year	Metric tons	Revenue
1988	170,523.16	$35,465,193
1989	218,888.27	$43,995,075
1990	284,431.54	$57,184,372
1991	320,778.18	$73,055,587
1992	441,164.04	$124,973,439
1993	358,317.73	$59,987,702
1994	390,790.35	$70,171,972
1995	390,283.70	$95,799,359
1996	357,812.37	$79,931,854
1997	249,225.56	$63,469,927
1998	230,758.55	$40,828,849
1999	236,734.75	$54,602,004
Average	304,142.35	$66,622,111

The following Information on status and trends of major Bering Sea groundfish resources were taken from NPFMC 2000 and Witherall 2000.

2.1.2.2 Walleye Pollock

Walleye Pollock *(Theragra chalcogramma)* is the most abundant groundfish species in the Bering Sea. The population has varied between 4 and 12 million metric tons. since the mid 1970s, but harvest has remain nearly constant with an average slightly greater than 1 million. The pollock resource supports a large part of the Bering Sea fleet. In 1998 there were 100 catcher vessels and 38 catcher-processors participating in the fishery. However, with the passage of the American Fisheries Act (See Regulatory Issues) and the formation of pollock fishery coops the number of vessels partipating in the fishery has decreased. Under the American Fisheries Act, 50% is allocated to catcher vessels delivering inshore, 40% to catcher processors for processing offshore, and 10% to catcher vessels delivering to motherships. Ten percent of the TAC is allocated to CDQ groups. The remaining TAC has been divided between inshore and offshore harvesters. The pollock quota is apportioned to four seasonal periods to reduce a perceived potential for competition with Steller sea lions through depletion of sea lion forage.

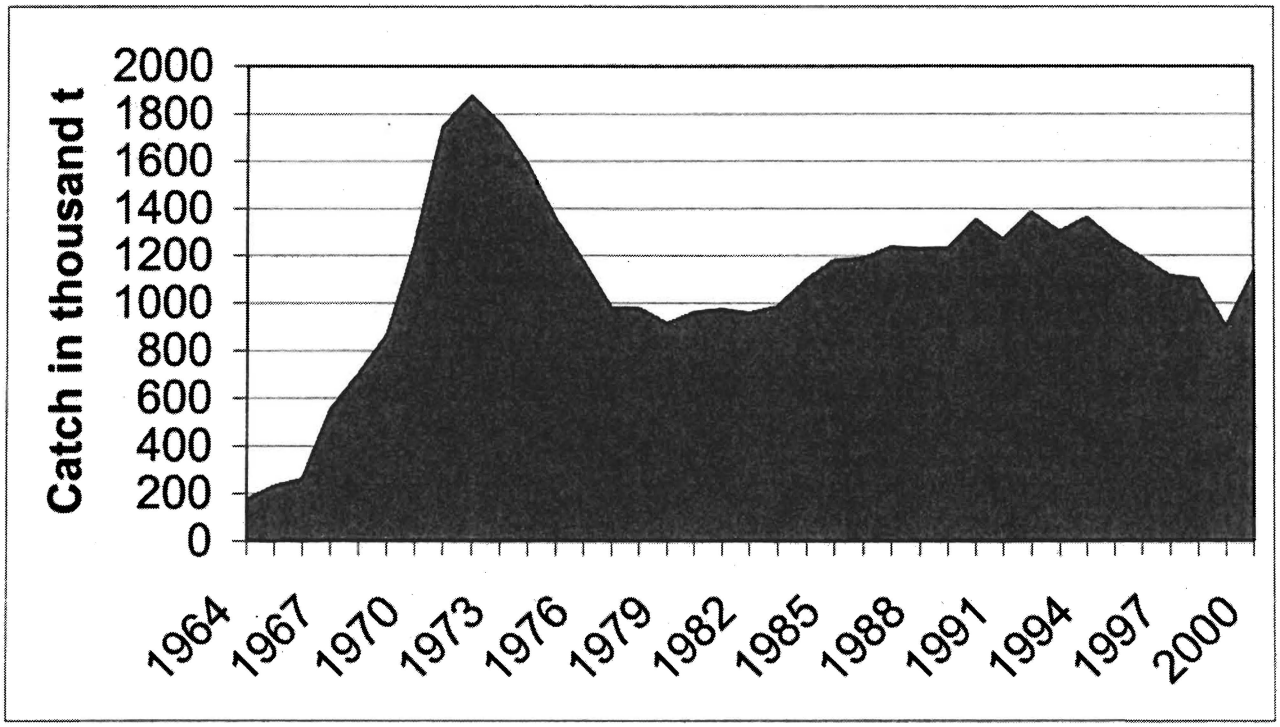


Figure A2-6. Catch of walleye pollock in the eastern Bering Sea, 1964-1999.

The Bering Sea pollock fishery grew in the mid 1960s when at-sea surimi processing was developed (Figure A2-6). Catches increased to over 1 million metric tons from 1970-1976 when Japanese and Russian distant water fleets prosecuted the fishery. By 1991, a domestic fleet phased out joint ventures developed in the early 1980's. Catches have remained relatively stable for the past 20 years. Pollock is primarily utilized for surimi and fillets with mince, roe, and meal as secondary products.

The pollock resource is currently near average levels of abundance. The estimated exploitable biomass in 2001 is about 10 million metric tons. Stocks are expected to stay in this range in the near term with average recruitment expected in coming years. The 2000 catch was 1,132,000 metric tons and it increased to 1,382,417 metric tons. in 2001. Catches are expected to be in the same range for the next several years as good recruitment of pollock passes through the fishery.

Pacific Cod

Pacific cod *(Gadus macrocephalus)* are taken with trawl, longline, pot and jig gear. Most trawling and pot fishing occurs north and west of Unimak Island, whereas most effort by longline vessels occurs along the slope north and west of the Pribilof Islands. In the 1998 fishery cod was harvested by 58 hook and line vessels, 78 pot vessels, and 121 trawl vessels. The Pacific cod TAC is allocated among gear types (51% to longline and pot gear, 47% to trawls, and 2% to jig gear). Of the trawl gear allocation, a 50/50 split is made for catcher vessels and catcher-processors. Seven and one-half percent of the TAC is allocated to CDQ groups.

The ex-vessel value of Bering Sea cod was $137 million in 1997. In 1998, 195,000 metric tons of cod were caught, of which about 98% was retained. Average ex-vessel price was about $0.25 per pound. Primary products produced are H&G and fillets, and to a lesser extent salted, whole fish, and other products (roe, mince, etc.).

Pacific cod is one of the oldest fisheries in Alaska. U.S. dory boat fisheries began in the 19th century that caught and processed salt cod for delivery to San Francisco and Seattle. The dory fishery ended in the early 1950s, but foreign fleets began fishing about the same time. Pacific cod were taken by Japanese longline and trawl operations beginning in the early 1960's. By 1970, catches had reached 70,000 metric tons. Vessels from the USSR entered the fishery in 1971, and together these two countries harvested an average of 50,000 metric tons from 1971-1976. Foreign fisheries were replaced by joint ventures in the early 1980's, which were phased out by domestic fleet by 1988. Catches have fluctuated at about 170,000 metric tons since 1985.

Pacific cod appears to have been at low abundance until the early 1980s when the population increased sharply due to a very strong 1977 year class. Cod abundance has remained high through most of the 1980s and 1990s. The 2000, exploitable biomass was projected to be 1.300 million metric tons. and the TAC set at 193,000 metric tons. The stock has been undergoing a slightly declining trend due to a series of weak year classes in the mid 1990s. An above average 1996 year class has increased the population in the near term. A strong 1999 year class is expected to enter the fishery in coming years and maintain cod production for the next several years.

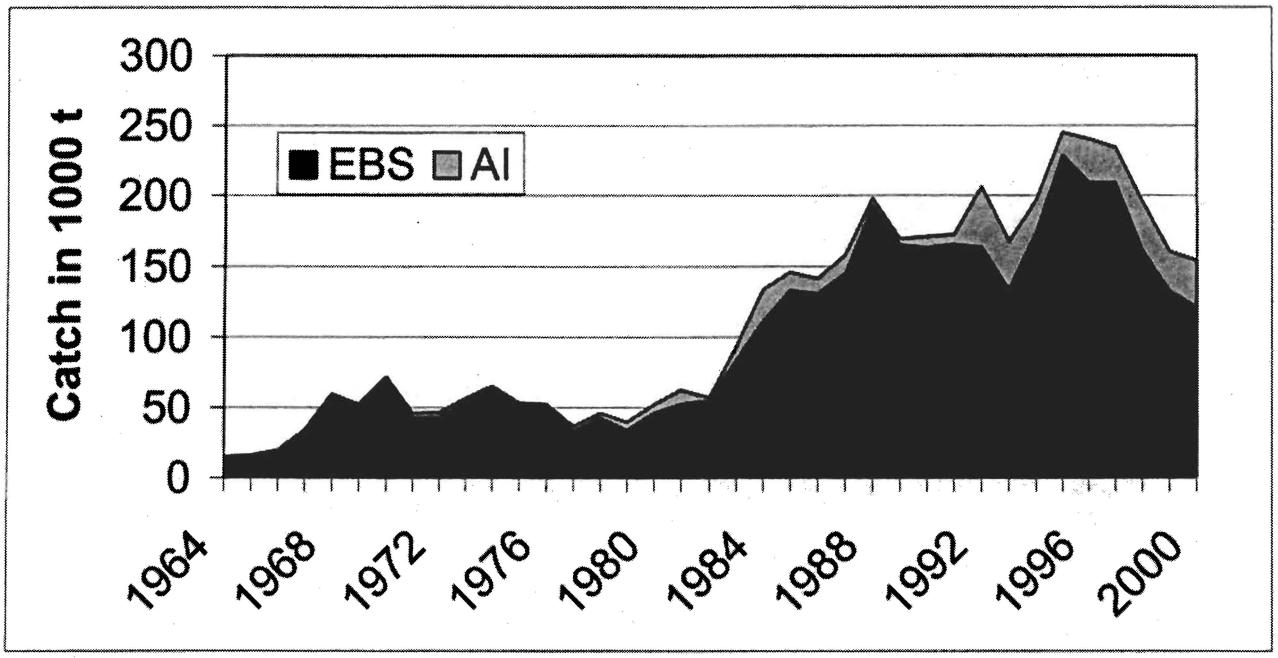


Figure A2-7. Catch of Pacific cod in the eastern Bering Sea (EBS) and Aleutian Islands (AI), 1964-2000.

Flatfish

The Bering Sea contains an enormous flatfish resource with an aggregate biomass of nearly 6 million metric tons. in 1998 (NMFS.1998). The flatfish include the shelf species of which Yellowfin sole (Limanda aspera), Rock sole (Lepidopsetta bilineata), Flathead sole (Hippoglossoides ellassodon) are the most abundant and form the basis of trawl fisheries. Greenland turbot (Reinhardtius hippoglossoides) and Arrowtooth flounder (Atheresthes stomias) occur in deeper water along the continental slope with turbot the target species in the fishery.

The shelf flatfish are harvested by catcher processors. During the winter months roe bearing flatfish are sought, primarily rock sole, and yellowfin sole are harvested during the summer months. Most fishing effort for rock sole occurs in outer Bristol Bay and the area north of Unimak Island. The product form is primarily headed and gutted fish block frozen.

Flatfish harvests produced a total ex-vessel value of $55 million in 1997. In 1999, 67,000 metric tons of yellowfin sole were caught, of which about 55,000 metric tons were retained. Average ex-vessel price for flatfish was about $0.13 per pound.

Greenland turbot has been targeted by trawl and longline gear. The 1997 directed fishery was prosecuted longline vessels from May 1-September 15 in the Bering Sea. Significant amounts are also retained as bycatch in other fisheries. Most fishing occurs along the shelf edge and slope, as well as along the Aleutian Islands.

The flatfish complex of the Bering Sea is lightly exploited; the average harvest since 1980 has been about 209 thousand metric tons per year (Figure A2-8). The average biomass is 4.9 million metric tons and the average TAC has been 407 thousand metric tons. Comparing catch to biomass shows that less than 5% of the resource is utilized, and on average only 50% of the TAC is harvested. The primary reason for the low utilization is that the fisheries for flatfish operate on a bycatch limit for halibut and crab, and when the limit is reached fisheries are terminated.

With the low level of exploitation placed on Bering Sea shelf flatfish the population is expected to remain stable near current levels for the next several years. The aggregate TAC for 2001 is nearly 400 thousand metric tons. Greenland Turbot is the only flatfish that is not productive at the moment, recruitment appears to have been low for a number of years and harvest has been restricted. The 2001 TAC is 8,100 metric tons.

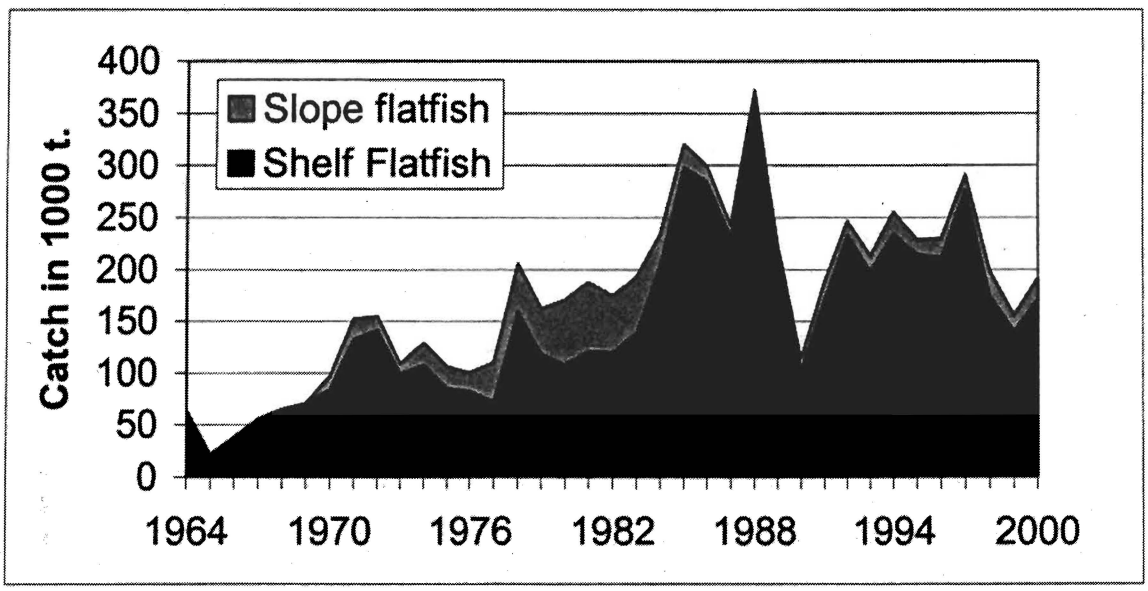


Figure A2-8. Catch of shelf and slope flatfish in the eastern Bering Sea, 1964-2000.

Sablefish

Bering Sea Sablefish is a high valued resource worth $62 million ex-vessel in 2000. In 2000, 1,700 metric tons was caught with an average ex-vessel price was about $2.03 per pound for fixed gear fisheries, and $1.01/lb for trawl fisheries. The primary product produced is fish that are headed, gutted (H&G) and frozen round.

Sablefish are primarily harvest by longline, and pot gear and is fished concurrent with halibut. Twenty percent of the BSAI fixed gear sablefish quota is allocated to CDQ communities.

Sablefish was targeted by Japanese freezer longliners since 1959. Bering Sea catches peaked in 1962 when 28,500 metric tons were harvested. From 1963 to 1972, an average of about 13,000 metric tons of sablefish were caught, with the USSR entering the fishery in 1967.

Catches dropped to less than 5,000 metric tons in 1974. A small peak occurred in 1987 when 8,000 metric tons were landed. Landings have since been reduced.

Exploitable biomass in 2002 is estimated to be 67,000 metric tons in the eastern Bering Sea - Aleutian Islands. The 2000 TAC is 1,930 metric tons in the eastern Bering Sea and 2,550 metric tons in the Aleutian Islands. The stock had declined due to low recruitment from 1982 though the mid 1990's, but now appears to be increasing.

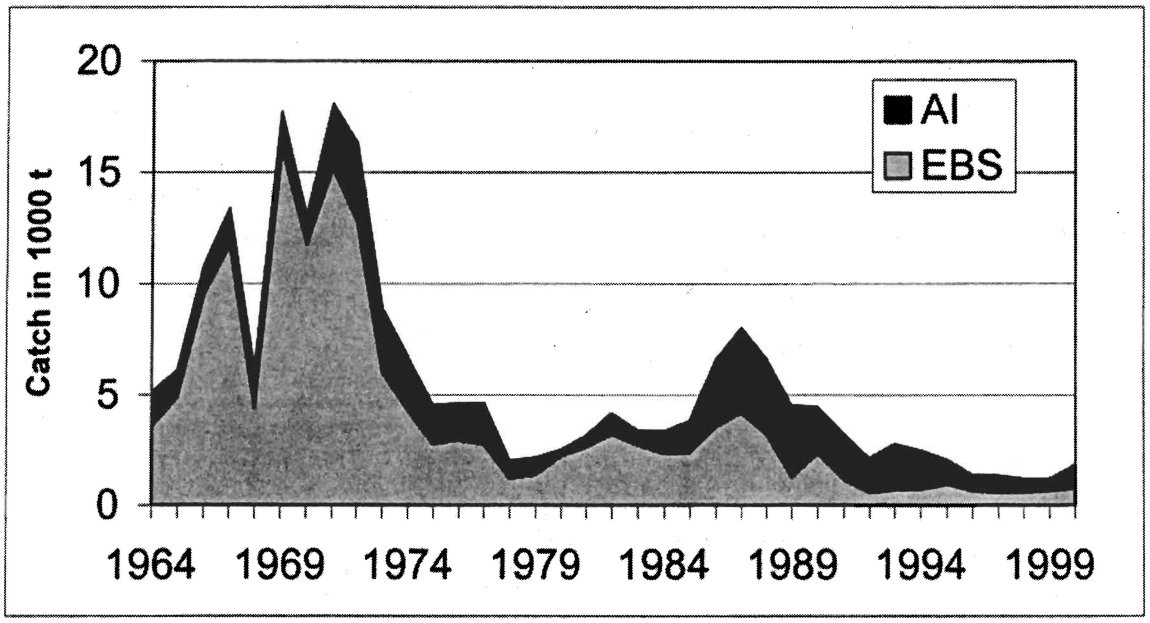


Figure A2-9. Catch of Sablefish in the eastern Bering Sea (EBS) and Aleutian Islands (AI), 1964-2000.

Rockfish

Several species make up the "rockfish complex". The major species is Pacific ocean perch *(Sebastes alutus)* which occurs in deep water along the continental slope and has its greatest abundance in the Aleutian Islands. Other commercially harvested rockfish are northern rockfish, rougheye rockfish, shortraker rockfish and sharpchin rockfish and shorttspine thornyheads *(Sebastolobus alascanus)*, the later species is primarily harvested by longline.. Rockfish are long-lived and have low productivity.

Pacific Ocean perch (POP) and other rockfish are a relatively high-valued resource. In 2000, 15,597 metric tons of POP were caught along with about 840 metric tons of other red rockfish was caught. Average ex-vessel price of rockfish was about $0.18 per pound. Primary products produced are H&G and whole fish.

Major Japanese and Soviet trawl fisheries heavily fished Pacific Ocean perch in the 1960's. In the Bering Sea, catches peaked in 1961 (47,000 metric tons); the Aleutian Islands catch peaked in 1965 (109,000 metric tons). Stocks and catches declined reaching their lowest

levels in the mid-1980s. Since 1977, catches have been sharply reduced and maintained near 12,000 - 20,000 metric tons per year to rebuild the stocks.

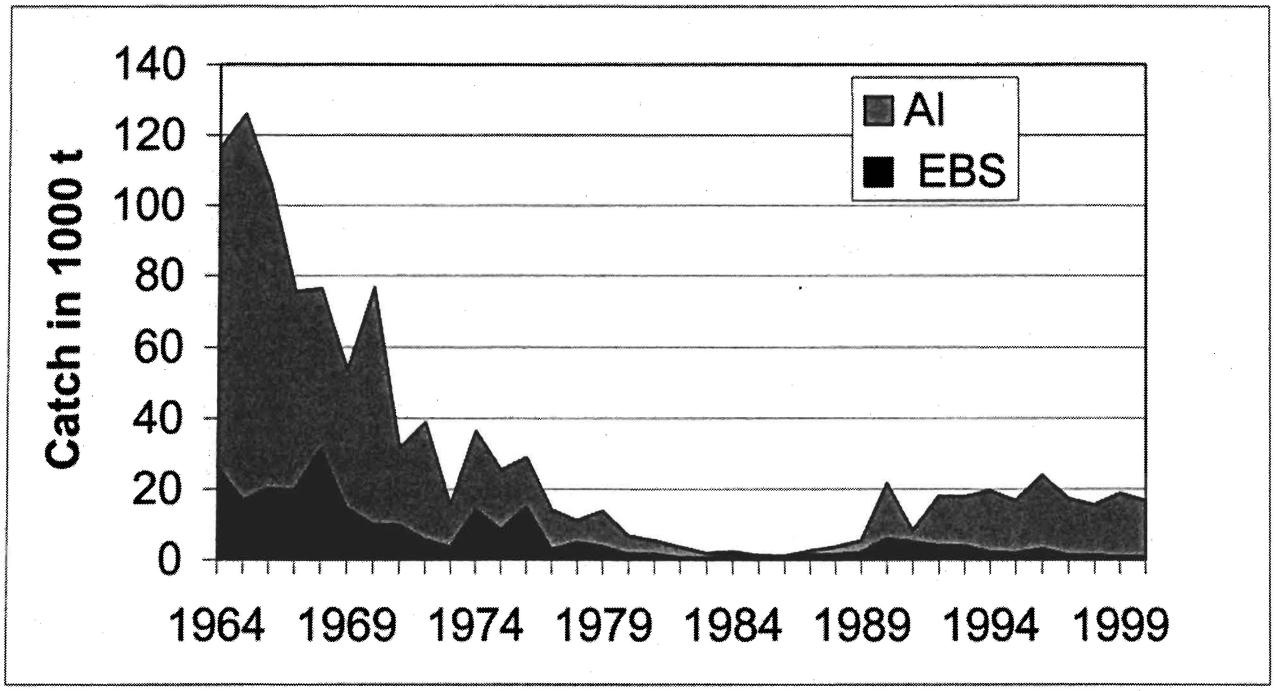


Figure A2-10. Catch of rockfish in the eastern Bering Sea (EBS) and Aleutian Islands (AI) 1964-1996. Pacific Ocean perch (POP) comprised 92% of rockfish catch.

The exploitable biomass of POP in 2002 is 377,000 metric tons in the EBS-AI, and the TAC is 14,800 metric tons. Several above average year-classes were produced during the 1980s that is increasing stock size. For other rockfish the 2002 biomass is estimated at 8,825 metric tons with most of the expected catch from the Aleutian Islands.

Atka Mackerel

Atka mackerel are concentrated on very discrete areas, such as Seguam Bank, Tanaga Pass, Oglala Pass, and Tahoma Reef in the Aleutian Islands. Vessels from USSR, Japan, and Korea targeted Atka mackerel during the 1970's. Catches peaked at 24,000 metric tons during this time period. Foreign fisheries were replaced by joint-ventures during the 1980's. The fishery has been fully domestic since 1990, and catches have fluctuated in response to TACs. Atka mackerel is targeted by catcher processor trawlers. Participants in the 1998 fishery included 14 catcher processors. Since 1994, the TAC has been apportioned among AI subareas. In 1999, as a mitigation measure for sea lions, TAC began to be allocated inside and outside of Steller sea lion critical habitat to reduce potential competition.

In 2000, 47,239 metric tons of Atka mackerel was caught in the EBS-AI area. Average ex-vessel price was about $0.10 per pound. Primary products produced are H&G (headed and gutted) and whole fish.

Biomass of Atka mackerel peaked in 1991, bolstered by strong year-classes produced in 1984-1986 and a very strong 1988 year-class. The most recent assessment indicates that this stock is on a downward trend. The 1992 year class was above average, but more recent year-classes have been small. For 2002, the exploitable biomass was estimated to be 439,700 metric tons and TAC 49,000 metric tons.

Bering Sea Crab

Crab stocks in the Bering Sea and Aleutian Islands are managed by the State of Alaska through a federal king and Tanner crab fishery management plan (FMP). Under the FMP, management measures fall into three categories: (1) those that are fixed in the FMP under the North Pacific Fisheries Management Council's oversight, (2) those that are frameworked so the State can change them following criteria outlined in the FMP, and (3) those measures under complete discretion of the State.

Five types of crab occur in the Bering Sea: Red King crab*(Paralithodes camtshaticus*), Blue King crab*(Paralithodes platypus*), Golden King Crab *(Lithodes aequispinus*), Tanner crab *(Chionoecetes bairdi*), and snow crab *(Chionoecetes opilio*).

Three discrete stocks of red king crab are actively managed in the BSAI region: Bristol Bay, Norton Sound, and Aleutian Islands stocks. The Aleutian Islands stock consists of Adak and Dutch Harbor populations. Two discrete stocks of blue king crab occur: the Pribilof Islands and St. Matthew Island stocks. Golden king crab, or brown king crab, are most abundant in the Aleutian Islands where it is managed as one stock. Tanner crab *(C. bairdi*) are managed into 3 separate stocks: eastern Bering Sea, eastern Aleutian Islands, and western Aleutian Islands. Snow crabs are thought to be one stock throughout the Bering Sea.

Crab harvest is managed under guideline harvest levels established from surveys, or from fisheries performance. A minimum legal size, carapace width exists for each harvested species. Pot limits have been established based on vessel size and guideline harvest level and vary by crab fishery. Observers are required on all vessels processing crab in the Bering Sea and Aleutian Islands area. Season opening dates are set to maximize meat yield and minimize handling of softshell crabs.

Red King Crab

Mean age at recruitment is 8-9 years and the State sets guideline harvest levels of 20% for mature male red king crab. In 1996, the harvest rate for red king crabs was reduced to 10% of the mature males to allow stock rebuilding. A threshold of 8.4 million mature females, equating to an effective spawning biomass of 14.5 million pounds, has been established as a minimum benchmark for harvesting this stock.

The season opening date for Bristol Bay red king crab fisheries is November 1. The Aleutian Islands area (formally Adak and Dutch Harbor) opens September 1.

After declining abundance throughout the 1960s and reaching a low during the years 1970-1972, recruitment to the Bristol Bay red king crab stock increased dramatically in the mid- and late 1970s. Recruitment was much lower during the 1980s and 1990s. By 1994, recruitment was about 1/20th of what it was in 1977. Since then, stock assessments indicate a slight but steady increase in the abundance of small males and females.

At the fishery's peak record landings were established in each year from 1977 to 1980 (peaking at 129.9 million pounds) (Figure A2-11). This was followed by a stock collapse in 1981 and 1982 leading to a total closure of the Bristol Bay fishery in 1983. In 1984, the stock showed some recovery and a limited fishery was reestablished. Between 1984 and 1993, the fishery continued at levels considerably below those of the late 1970s. Annual landings during this period ranged from 4.2 million to 20.4 million pounds.

After 1993, the stock declined again, and no fishery occurred in 1994 and 1995, but reopened in 1996 with a catch of 8 million pounds. The fishery has remained open with catch averaging near 10 million pounds.

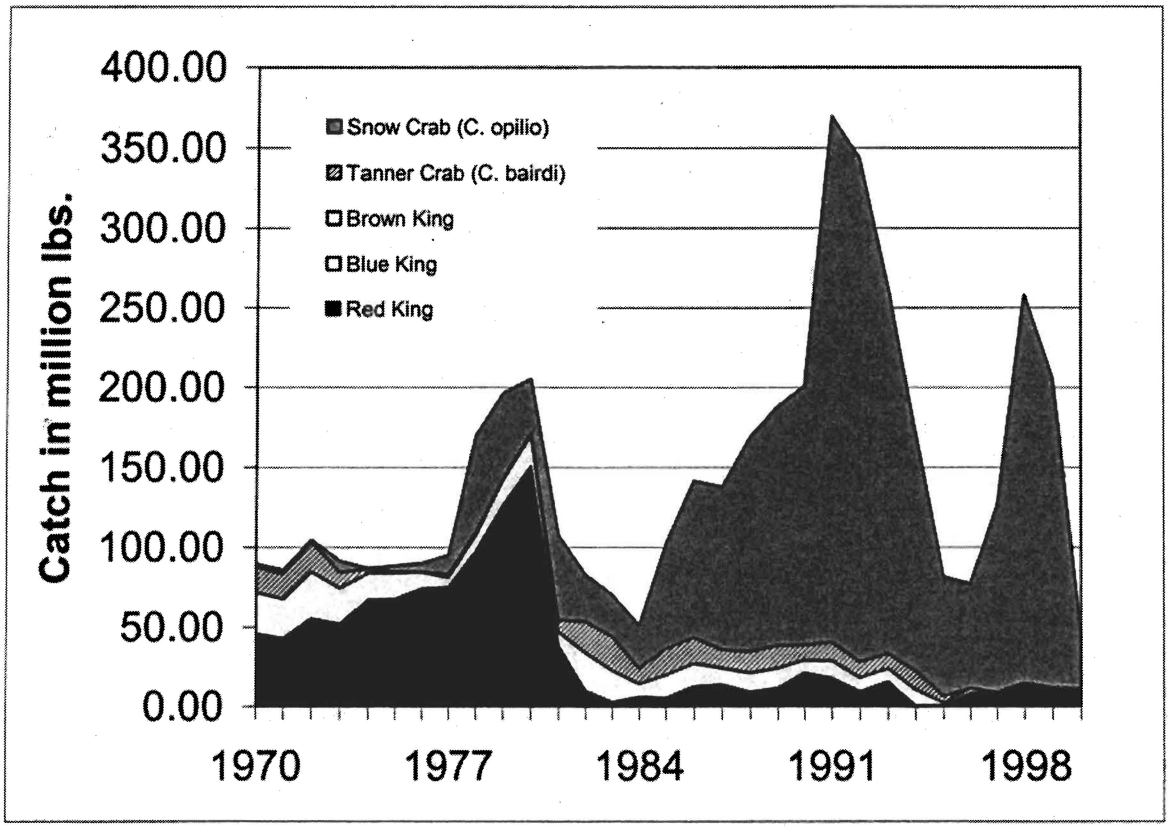


Figure A2-11. Catch of king and tanner crabs in the Bering Sea, 1970-2000.

Over 280 vessels participated in the Bristol Bay red king crab fishery. The season begins on November 1, and generally has lasted less than 10 days in recent years. These crab average about 6.5 pounds and fetch a high ex-vessel price; $3 to $5 per pound was paid during the 1989-1993 fisheries. Total ex-vessel value ranged from $40,000,000 to $100,000,000 in those years.

Red king crab were harvested from the Dutch Harbor area beginning in 1961, and peaked at 33 million pounds in 1966. Thereafter, harvests declined, averaging about 11 million pounds annually through 1976. A secondary peak harvest occurred in 1980 with 17.7 million pounds taken, after which the stock collapsed and has not recovered. No red king crab fishery has been allowed in this area since 1983. A second red king crab fishery occurs in the Aleutian Islands region, the Adak fishery. Began in 1960, it peaked at 21 million pounds in 1964, and continued until 1972 with catches near 16 million pounds. From 1977 to 1993, landings were low (about 1 million pounds annually) but stable. Since then the stock has declined. Currently, red king crab in this area is harvested by golden king crab vessels with single line pots in a directed fishery. The 1995 fishery was prosecuted by 10 vessels, which harvested 36,000 pounds of red king crab with an ex-vessel value of $5.50 per pound. Average weight of landed crab was 7 pounds. No fishery was allowed in 1996 or 1997.

Blue King Crab

The State generally sets pre-season guideline harvest levels for blue king crab based on a mature male harvest rate of 20%. Threshold levels have been established for these stocks, below which a fishery will not occur. A threshold level of 0.77 million crabs >119 mm carapace length has been established for the Pribilof stock; the St. Matthew threshold is 0.6 million males >104 mm carapace length.

NMFS survey data indicate a series of good recruitment in the early 1970s. Recruitment fell off in the early 1980s, but improved signs of recruitment were observed in the early 1990s. Recent survey data indicate that total stock size has generally increased over the past 10 years. During the late 1970s, landings of blue king crab from the Pribilof stock increased to peak at 11 million pounds in the 1980-81 season (Figure A2-11). This was followed by a rapid decline in the early 1980s, leading to a total closure of the fishery in 1988. No fishery occurred from 1988-1994. By 1995, stock conditions had improved such that a combined GHL for red and blue king crab of 2.5 million pounds was established.

In 1995, 119 vessels participated in the Pribilof red and blue king crab fishery. The season began on September 15 and lasted 7 days. Blue king crab fetched $3 per pound exvessel, making the total fishery worth $3.6 million. Average weight of blue king crab harvested was 7.3 pounds. For 1997, 48 vessels, including one catcher-processor, fished Pribilof blue king crabs. The 1997 season lasted 14 days and yielded crabs with an average weight of 7.5 pounds, valued at $2.82 per pound exvessel.

At St. Matthew Island, high numbers of juvenile males crabs recruited to the fishery in the early 1980s. Harvest of blue king crab from the St. Matthew fishery began in 1977, peaking at 9.5 million pounds in 1983. This was followed by reduced harvests in the late 1980s. By the early 1990s, abundance of large males had increased and GHLs were increased to over 3 million pounds. In 1995, a total of 90 vessels (1 catcher-processor, 89 catcher vessels) participated in the St. Matthew blue king crab fishery. The season began on September 15 and lasted 5 days and 3.2 million pounds were landed. Blue king crab sold at $2.32 per pound exvessel, making the total fishery worth $7.1 million. The average crab size was 4.8

pounds. In 1997, 117 vessels participated and harvested 4.6 million pounds in 7 days. Crab averaged 4.9 pounds each and brought $2.21 per pound exvessel, making the total fishery worth $9.8 million.

Golden King Crab

Golden king crab occur at depths from 200 m to 1,000 m primarily in the Aleutian Islands. Pot surveys and fishery performance are utilized as indices of abundance, however. A total of 34 vessels, averaging of 500 pots, participated in the 1994-1995 Adak golden king crab fishery. The fishery lasted 288 days, with a total harvest was 6.4 million pounds. Average weight of golden crab harvested was 4.1 pounds in the Adak area. These crab were worth $3.33 per pound exvessel, for a total season value of $20.3 million. The 1995 Dutch Harbor golden king crab fishery was prosecuted by 17 vessels. The season opened on September 1, and lasted 38 days. A total of 2 million pounds were landed at an exvessel price of $2.60 per pound. Average weight of Dutch Harbor golden king crab was 4.6 pounds.

Tanner Crab

Tanner crab are distributed on the continental shelf of the Bering Sea and concentrated around the Pribilof Islands and immediately north of the Alaska Peninsula

The State sets pre-season guideline harvest levels for Tanner crab based on a mature male harvest rate of 40%. The season opening date for the Bering Sea Tanner crab fishery is November 1. In years when no GHL is established for the Bristol Bay red king crab stock, the Tanner crab fishery is restricted to the area west of 163° W longitude.

The eastern Bering Sea Tanner crab *(C. bairdi)* stock is currently at very low abundance. The 1995 NMFS bottom trawl survey indicated relatively low levels of juveniles, pre-recruits, females, and large males and poor recruitment occurred in following years. The Bering Sea Tanner stock has undergone two large fluctuations. Catches increased from 5 million pounds in 1965 to over 78 million pounds in 1977 (Figure 8). After that, the stock declined to the point where no fishery occurred in 1986 and 1987. The fishery reopened in 1988, and landings increased to over 40 million pounds in 1990. Another decline ensued, and the 1995 Tanner crab season produced only 4.2 million pounds. The 1995 fishery was prosecuted by 196 vessels and lasted 15 days. Average weight of crab landed was 2.3 pounds valued at $2.80 per pound exvessel. Total value of the 1995 fishery was $11.7 million. In 1994 and 1995, fishing was prohibited east of 163° W to reduce bycatch of red king crab. In 1996, 196 vessels harvested 1.8 million pounds of Tanner crab in the directed fishery (12 days) and incidental to a red king crab fishery (4 days). Average weight was 2.5 pounds valued at $2.50 per pound. Due to the depressed nature of the stock and predominance of old shell crab, no fishery has been allowed since 1996.

Snow Crab

Snow crabs are distributed on the continental shelf of the Bering Sea at depths less than 200 meters Abundance of large male snow crab increased dramatically from 1983 to 1991, but has since declined. The 1993 NMFS Bering Sea trawl survey indicated the total abundance of

large males (over 4 inches) at 135 million crab, a 48% decrease from 1992. Small (3-4") legal-size males also declined in abundance, consistent with the decline in large males observed since 1991. The 1995 NMFS bottom trawl survey indicated relatively low levels of large male crab. However, the survey indicated an 88% increase in the numbers of pre-recruits, and a 44% increase in the number of large females. These signs of strong recruitment were apparent in the 1996 survey, as survey results indicated the number of large crab doubled.

Catch of Bering Sea snow crab increased from under 1 million pounds in 1974 to over 315 million pounds in 1992. The 1992 peak catch was followed by reduced landings thereafter (Figure A2-11). The 1995 opilio fishery was prosecuted by 253 vessels. The season began on January 15 and lasted 33 days. A total of 74 million pounds were landed. Average weight of crab retained was 1.2 pounds worth $2.43 per pound exvessel. Total value of the 1995 snow crab fishery was $180 million exvessel. Increased landings occurred in recent years due to good recruitment of sublegal males. In 1997, 119.4 million pounds of snow crab were harvested. Average weight of crab taken was 1.2 pounds. A total of 226 vessels have participated. Exvessel price was $0.79/lb, for a total fishery value of $92.5 million. The 1998 fishery opened with a GHL of 234 million pounds, of which 3.5% was allocated as community development quota, CDQ.

2.1.2.3 Pacific Herring

Herring fisheries begin in the Bering Sea in the late 1920s when stock abundance was low in the traditional fisheries of central Alaska. A saltery was developed at Dutch Harbor that operated until the Second World War. In 1959 Russian exploratory fleets located the wintering grounds of herring northwest of the Pribilof Islands and began a winter trawl fishery. In 1968 the Japanese also began fishing for herring on the winter grounds, and developed a gill net fleet that operated in coastal areas harvesting spawning herring. The fishery developed on strong year classes from the late 1970s, and as these year classes died out the catch plummeted.

In the late 1970s, with the establishment of the U.S. EEZ, the foreign fisheries were removed, and domestic roe herring fisheries developed in coastal spawning areas. The largest of the current fisheries is the Togiak fishery in Northern Bristol Bay, followed by Norton Sound (Figure A2-12). Several small fisheries occur along the western Alaska coast between Togiak and Norton Sound.

In 1981 a food and bait fishery redeveloped at Dutch Harbor. This fishery primarily harvests feeding herring migrating from the Togiak spawning grounds to the winter grounds. The herring arrive in the Dutch Harbor area from mid July to early August. By that time they are in good condition and have a high fat content of 16-20%. The quantity of the Dutch Harbor catch is limited because the fishery is operating on Togiak herring. Each year the Dutch Harbor fishery is limited to 7% of the Togiak biomass. The average catch since 1981 has been about 2,700 metric tons.

The Dutch Harbor food and bait fishery usually starts in mid July. The historic record from the old saltery and from foreign fisheries suggests that a herring fishery could be pursued in the Dutch Harbor area from July to late September-early October.

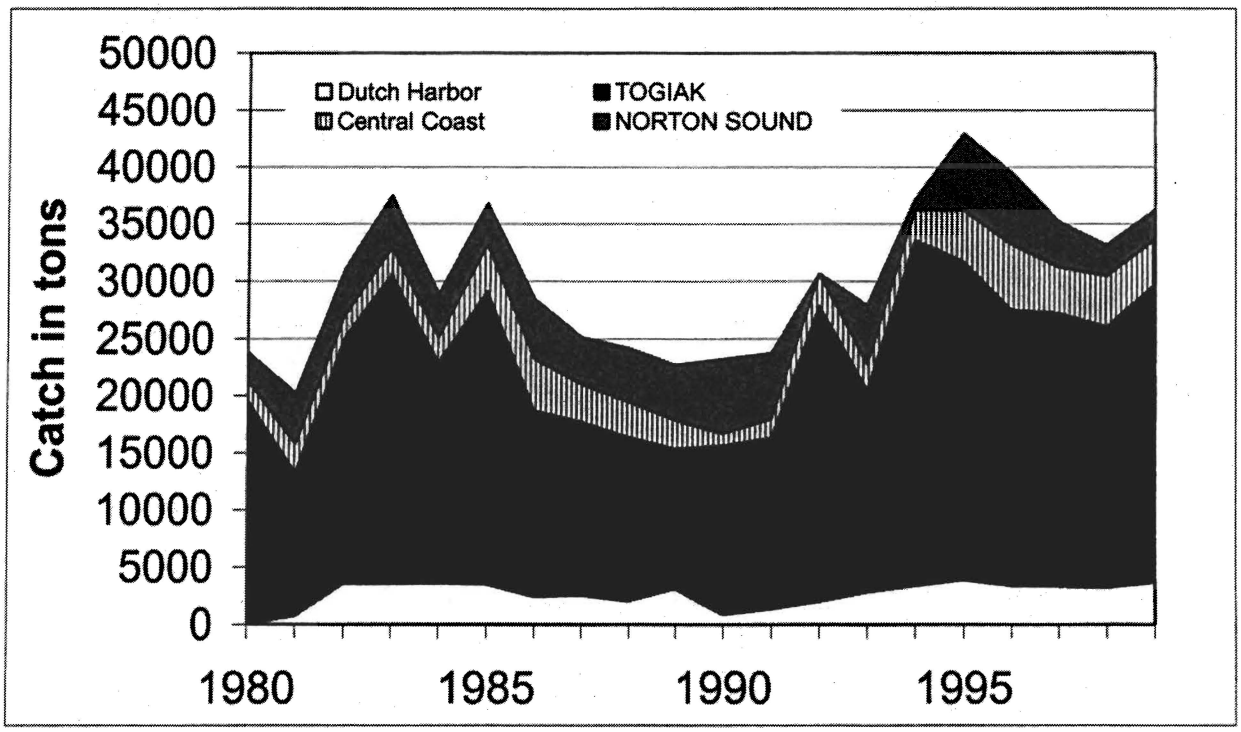


Figure A2-12 Catch of Pacific herring in the eastern Bering Sea by major fishing areas. 1980-1999.

Pacific Halibut

Pacific halibut is found from the Bering Sea to Oregon, though the center of abundance is in the Gulf of Alaska. The resource is considered as one large interrelated stock but is regulated by subareas with catch quotas and time-area closures. The fishery has a long tradition extending back to the late 1800's. There is an active recreational fishery as well. Stock assessment and management advice is provided by the International Pacific Halibut Commission (IPHC) that assesses halibut throughout its range.

The total 1996 Pacific halibut catch in Alaska was 17,064 metric tons. Other catches were 3,106 metric tons taken in the recreational fishery, 103 metric tons taken for personal use, wasted mortality of 480 metric tons due to fishing by lost gear and discard, and incidental catch mortality of 5,719 metric tons by fishermen targeting other species.

The IPHC recently recalculated the exploitable stock of the Pacific halibut. The new calculations indicated that stocks peaked near 275 thousand metric tons in 1992. In recent years the population has shown a slight decline, and a further decline is expected, but halibut numbers are currently high by historical standards.

The catch of halibut is small relative to other groundfish, such as pollock or cod, but it and king crab influence the ground fish harvest greatly. This is because these are species with a long history of domestic utilization. Also they are important species to Alaska small boat fishermen. All through the period of foreign exploitation of groundfish the major effort of government (both State and Federal) was to protect "species of interest to the U.S.", primarily Pacific halibut and king crab. When domestic vessels took over the groundfish fishery the rules of the foreign fisheries were applied to them. A major reason is that most of the trawl fleet is owned by non Alaskans and therefore are viewed as "foreigners".

Halibut bycatch will likely continue to act as a limitation on groundfish development. Recently individual transferable quotas (ITQ) were allotted for halibut. In theory these should be freely transferable and respond to economics. However the NPFMC has limited ITQs to small blocks that can only be harvested by longline. If ITQs were freely transferable, it is likely that trawl vessels would pay the highest value to increase access to groundfish. It is likely that U.S. and Canadian halibut fisherman will increase pressure on the NPFMC to further reduce halibut bycatch since reductions in the trawl catch will accrue to them under the current ITQ structure. According to the IPHC, halibut bycatch is nearly a third of the commercial harvest.

2.1.3 Management Structure

The State of Alaska is responsible for management of fishery resources within the territorial waters (0-3 nm.) of Alaska. The Alaska Board of Fisheries is the policy body that establishes fishery policy, although some aspects of fisheries management is by stature established by the State legislature. The Alaska Department of Fish and Game (ADFG) is the regulatory agency that establishes harvest quotas and regulations for the State managed fisheries.

In the U.S. EEZ (3-200 miles) the North Pacific Fisheries Management Council (NPFMC) is the primary policy and regulatory body. The NPFMC establishes harvest quotas and regulations for the EEZ, which are administered by the National Marine Fisheries Service (NMFS) Alaska Region. Although the NPFMC has jurisdiction over all fish harvests in the EEZ, it has delegated management of species for primary interest to the State of Alaska to ADFG. These species are all species of Pacific salmon, Pacific herring, and shellfish, which includes all crab, shrimp, and scallops. With the delegation of these species the primary focus of the NPFMC and NMFS are the groundfish resources of the Gulf of Alaska and the Bering Sea.

The commercial fisheries management within the State of Alaska is within the Commercial Fisheries Management Division (CFMD) of ADFG. CFMD is organized into four regional offices: Southeastern Alaska, Central Alaska, Western Alaska, and Arctic-Yukon-Kuskokwim. These offices are responsible for the harvest management of resources within their geographic area.

The NPFMC manages through established fishery management plans (FMP's). Two regional groundfish plans are in effect: Gulf of Alaska Groundfish, and Bering Sea Aleutian Islands

Groundfish. The Gulf of Alaska is divided into 3 regulatory areas, southeastern, central, and western. The Bering Sea is subdivided into Aleutian Islands area and eastern Bering Sea management areas. All of these management areas are further subdivided into various regulatory areas.

The NPFMC also have management plans for King Crab, Tanner Crab, and Salmon, but effective management has been delegated to the State.

2.1.3.1 Regulatory Issues

The Bering Sea groundfish fishery has been in a constant state of evolution ever since the passage of the Magnuson Act and institution of the 200 mile EEZ. Through the late 1970s and early 1980s the foreign fishing fleet was restricted and effort placed on utilizing foreign processing capacity in conjunction with U.S. catcher vessels, the so called "joint venture" (JV) fisheries. Joint venture fisheries introduced U.S. firms to processing technology and international marketing of production tied up by foreign firms. Beginning in the mid 1980s U.S. catcher processors began catching and processing fish at sea which began the phase out of the joint ventures, which ended in 1989.

During the 1990s there was a great built up in U.S. catching and processing capacity as entities sought to gain the greatest share of the resource in the then open access fishery. The race for fish caused friction between shoreside processors that were able to employ the catcher vessels that operated in the JV fisheries. The at-sea catcher processors had greater mobility than the shore plants and could fish further offshore than the shorebased vessels. The greatest concentration of groundfish, principally pollock, occurs on the continental shelf edge just north of Dutch Harbor. With all sectors competing for the same concentration of fish there was a strong movement for doing something to separate the shoreside and at-sea sectors. In 1992, The NPFMC instituted what came to be known as "Onshore-Offshore" in which groundfish, primarily pollock, was allocated on a ratio of 35% onshore and 65% offshore.

The NPFMC continued to adjust the percentages and sector participants through the 1990s. The fishery management and development policies for federally managed fisheries off Alaska has shifted from open access to control of effort and minimizing adverse effects of fishing. Programs that have been developed, or under consideration are: the licence limitation program, individual fishing quota (IFQ) program for the fixed gear sablefish fishery, the community development quota (CDQ) program for BSAI groundfish, and the American Fisheries Act (AFA). These programs are eliminating the race for fish as the allocation mechanism and replacing it with a market-based allocation mechanism that decrease harvesting and processing costs, increase the value of the groundfish catch, and, in some cases, decrease the cost of providing more protection for target species, non-target species, marine mammals, and seabirds.

2.1.3.2 License Limitation Program

The Council approved license limitation programs for the groundfish and BSAI crab fisheries under its jurisdiction on June 17,1995.The proposed rule received SOC approval on September 12,1997 and the final rule was published in the Federal Register on October 1,1998.The LLP became effective January 1, 2000, replacing the Moratorium program which expired on December 31,1999.

The LLP limits the number, size, and specific operation of vessels that may be deployed in certain groundfish and BSAI crab fisheries under the Council 's jurisdiction. By limiting the number of vessels that are eligible to participate in the affected fisheries, the LLP limits capitalization in those fisheries.The LLP was intended to identify and limit the number of participants in the groundfish and crab fisheries, as an interim step toward a more comprehensive solution to the conservation, management, and economic problems in an open access fishery,

The American Fisheries Act (AFA)

The American Fisheries Act (AFA) specifies the allocation of the directed pollock fishery annual Total Allowable be divided among the inshore component, the offshore component, and the mothership component at 50%, 40%, and 10% respectively. The Act specified by name 20 catcher processors (offshore sector), owned by nine different companies eligible to continue participating in the pollock fisheries. The Act also removed nine catcher processors from future participation in any US fishery. The Act listed seven catcher vessels eligible to fish and deliver a suballocation within the offshore sector allocation. Three motherships are eligible to process the mothership allocation with 19 catcher vessels eligible to fish and deliver to motherships. For the inshore sector, the Act did not list the eligible plants and catcher vessels by name; rather, it stipulated a landing/processing history necessary for eligibility. For catcher vessels that is >250 metric tons delivered onshore in 1996, or 1997, or 1998 through September 1, or >40 metric tons for vessels under 60'. Approximately 113 catcher vessels eligible in the mothership and inshore categories (92 for inshore delivery, 7 for mothership delivery, and 14 which qualify for both).

A shoreside processor must have processed >2,000 metric tons in both 1996 and 1997 to be eligible, except that processors who did less than 2,000 metric tons in both 1996 and 1997 are eligible, but restricted from processing more than 2,000 metric tons in the future. Eight plants, owned by 7 companies fall under these definitions.

An important aspect of the Act is the provisions for the creation of pollock 'co-ops', or what some refer to as quasi-IFQs. The at-sea catcher-processor sector has formed a cooperative of all the companies known as the Pollock Conservation Cooperative. In it's first year of operation, 1999, the PCC negotiated an allocation of the sectors quota among the member companies. The result of the coop was that the race for fish was over and the vessels could fish slower and achieve a higher product yield and conduct a more targeted fishery with lower bycatch. A secondary result was that fewer boats were needed to harvest and the PCC

only operated 16 of the eligible vessels in the first half of 1999 and only 14 in the second half. The 19 vessels eligible to deliver to the at-sea processors also formed a cooperative in 1999, as did motherships and associated catcher vessels fishing. Shorebased processors and catcher vessels formed coops in 2000 among the seven companies authorized to process pollock inshore.

Another aspect of the AFA is the provision for protection of other fisheries (non-pollock sideboards) It was feared that adverse impacts could result from the exclusive rights to harvest and process pollock, coupled with the opportunity to develop co-ops, which could allow co-op harvesters and processors to maximize opportunities in non-pollock fisheries. This would include harvesters and processors of Bering Sea non-pollock groundfish and crab, as well as non-pollock groundfish and pollock harvested or processed in the Gulf of Alaska. Also, the AFA establishments a definition of excessive share limits on harvesters and processors in Bering Sea/Aleutian Islands (BSAI) fisheries, for pollock as well as other groundfish species and crab. The Act specifies pollock excessive share limits for harvest of BSAI pollock (at 17.5%), but does not specify the limits for other species, or for pollock processing; rather, it mandates that the Council establish such caps.

The NPFMC is currently establishing harvester sideboards for AFA qualified vessels that limit their take of non-pollock groundfish. The NPFMC is also addressing the question of excessive shares and attempting to establish definitions of excessive shares for non-pollock species.

Community Development Quota (CDQ)

During the debate over the inshore-offshore allocation, representatives from Western Alaska successfully argued that the evolving division of the resource should consider the interests of the coastal communities of Western Alaska. The result was the allocation of 7.5% of the overall pollock TAC to "community development quotas" (CDQs). This translated into approximately 100,000 tons of pollock in each of the first four years of operation of the CDQ program. To date, 65 eligible communities have organized themselves into 6 regional CDQ Groups. CDQ Groups, incorporated under Alaska law as nonprofit corporations, have formed partnerships with fishing companies that participate in the Bering Sea fishery. The royalties received from these partnerships are the source of funds for the fishery related development projects.

The original program was successful and The NPMFC extended the community development quota to halibut and sablefish in Amendment 15 to the of the Bering Sea and Aleutian Islands Fishery Management Plan for the Groundfish Fishery Area in 1993. In 1995, the Council announced guidelines that would set aside 7.5% of all remaining federal Bering Sea resources, including crab and all remaining groundfish species, for CDQs. Amendments to the Magnuson Act enacted in 1996 require the Council to phase in any crab CDQ over the period 1998 to 2000. And as part of the American Fisheries Act the pollock CDQ portion was increased to 10% of the pollock TAC.

The CDQ program is providing some restructuring of Bering Sea fisheries and providing entry of western Alaskan's into the groundfish and crab fisheries. So far, some CDQ groups have purchased shares of existing fishing companies, while others have invested in small boat fisheries and community fisheries related infrastructure.

Crab rationalization

At its June 2001 meeting, the North Pacific Fishery Management Council (Council)adopted a suite of alternatives, elements and options for analysis of a rationalization program for the Bering Sea/Aleutian Islands (BSAI)crab fisheries for review at the February 2002 meeting.

Crab abundance off Alaska has fluctuated due to natural variation and exploitation. High abundance in the 1970s resulted in good fishing, which brought excess fishing effort into the fishery. With a reduction in abundance and catch many of the vessels entered other fisheries, however, with a resurgence of crab abundance in the early 1990s lead to a doubling of the number of vessels and tripling of the number of pots compared to the numbers employed in 1986 (NPFMC 2001). Access conditions and overcapitalization had also reduced the Bristol Bay king crab season to a mere seven days in 1991.During this period, the number of vessels also increased in the bairdi and opilio Tanner crab fisheries since many crabbers operated in both the king and Tanner crab fisheries.

The NPFMC is examining the potential of reducing crab effort through either coops, similar to the AFA pollock coops, or through an IFQ program. Additionally, under the Consolidated Appropriations Act of 2001 (P.L.No.106-554), congress established a license and vessel buyback program and vessel eligibility criteria in order to reduce fishing capacity in the BSAI crab fisheries. The enactment of the buyback program is, in part, the result of industry-led efforts to provide relief for the crab fleet. An ad hoc industry group considered several approaches to rationalizing the BSAI crab fisheries, including a vessel buyback program, cooperatives, IFQs and the status quo. In order to move more quickly on the development of the buyback program, in early 2000 the industry group split into two smaller ad hoc industry committees, one committee focused on the buyback program and the other focused on cooperatives.

It is too early to determine what the results of on going efforts to control effort in the Bering Sea fisheries will be; however, based on results of the AFA and longline IFQ programs there will likely be a consolidation and net reduction of the number of vessels in the crab fleet.

Steller Sea lions-Fisheries Interaction

The Steller sea lion population of western Alaska has been found to have been in constant decline since the late 1970s. The Steller sea lion was listed as threatened in 1990. The listing followed severe declines of the species throughout the Gulf of Alaska and Aleutian Islands

region, which was the center of its range in the North Pacific. In the 1990s,the species has continued to decline and, since the late 1970s, counts of Steller sea lions in this region have dropped by more than 80%. In 1997, NMFS recognized that the Steller sea lion consisted of two distinct populations, split at the 144EW long. line, and reclassified the western population as endangered. The cause of this decline is not clear, but marine mammal biologists have equated the decline with fishing activities, primarily the pollock fisheries of the Bering Sea and the western Gulf of Alaska.

On December 3, 1998, the National Marine Fisheries Service (NMFS) issued a Biological Opinion on the pollock fisheries of Bering Sea/Aleutian Islands. The Opinion found that the fisheries could reduce the survival and recovery of the western population of Steller sea lions in the wild by reducing their reproduction, numbers, and could diminish the value of critical habitat for the survival and recovery of Steller sea lions.

With the "jeopardy" opinion, NMFS developed reasonable and prudent alternatives (RPAs), as required by the Endangered Species Act, which identified ways to modify proposed actions to avoid jeopardizing the species and adversely modifying critical habitat. NMFS developed framework RPAs to concentration of the fisheries over time and space increased the potential for localized depletion of prey relative to the needs of sea lions; i.e., competition. The RPAs excluded fisheries within 10-20 miles of rookeries and major haulouts, set up four fishing periods to disperse the fisheries temporally to avoid locally-depleting the pollock resource, reduced the amount of fishing within "critical habitat" which encompasses most of the southeastern Bering Sea and the major pollock spawning grounds. Also, the RPA's closed the Aleutian Islands to directed pollock trawling.

The Biological Opinion was challenged in the United States District Court for the Western District of Washington. The Court upheld the conclusions of the Opinion, but ruled that the RPAs were arbitrary and capricious, for lack of sufficient explanation. NMFS was instructed to develop revise and resubmit the RPA's to the Court. At the same time several environmental groups filed suit in United States District Court for the Western District of Washington that NMFS had long ignored the decline of the Steller Sea lion and that the environmental impact statement (EIS) for the Bering Sea Aleutian Islands Fisheries Management Plan was inadequate and did not provide for the protection of Stellers. On July 20, 2000, Judge Zilly ruled in favor of the environmental groups and ordered that all trawl fisheries in the Bering Sea be halted in sea lion critical habitat effective August 8, 2000 and continue until NMFS presents the Court with an acceptable EIS.

The issue of fisheries and sea lions is on going. NMFS is allowing the fishery to continue under RPAs for 2001. New research is showing that there is less interaction between fisheries and sea lions than first supposed. NMFS is still preparing a EIS to meet the requirements of Judge Zilly. Environmental groups have told the Court that they will not be challenging the 2002 RPAs that allow the fishery to go forward. The issue of sea lion critical habitat will take several years to resolve. However, the end result of sea lion mitigation measures that will result from the current research appear to be less draconian that earlier measures. It is more likely that restrictions will be largely limited to around rookeries and haul outs, and large area of the Bering Sea north of Dutch Harbor may be delisted as critical

habitat. If this occurs there will be only minimal impacts on the Bering Sea trawl and longline fleets, as it has been shown that they can harvest the TAC even under the current more restrictive RPAs.

2.1.4 Outlook for Bering Sea Fisheries and Fisheries Resources

The future of fisheries in the Bering Sea is uncertainty due to the situation of litigation over the impact of fisheries on Steller's sea lion. Until NMFS produces an environmental impact statement that addresses the overall impact of the fishery on the recovery of the sea lion there will continue to be restrictions on the fisheries. However, research has accelerated on this problem with a significant infusion of directed funding from Congress.

The interest of environmental groups in the Bering Sea is growing, with an increasing number of groups entering the management arena. Governor Knowles Chief of Staff recently resigned to head the Alaska office of Oceanus, an environmental group funded by several large foundations (REF). The longline cod fishery is under scrutiny from environmental groups for bycatch of endangered Short-tailed albatross. The World Wildlife Fund, in testimony before the NPFMC, has requested that the Aleutian Islands be set aside as a marine reserve, and that fishing be prohibited. Environmental groups are also challenging the exploitation strategy employed to manage fishery resources, arguing that they are too high and reducing the amount needed to maintain "ecosystem productivity".

The increasing presence of environmental groups and the need to rationalize fishing effort will lead to profound changes in the way Alaska fisheries are conducted in future years. However, the fishing industry has shown it self to be flexible and able to adapt readily to the challenges it is continually being faced with.

Crab fisheries are at all time low levels, and the crab fishing industry is searching for methods to reduce the size of the fleet to maintain economic viability. Proposals have been brought forth to develop crab cooperatives similar to those developed for the pollock fishery, and to institute a vessel buyback program. However, to date these proposals have not been successful.

On a positive note, the fishery resources of the Bering Sea, other than crab, are in good condition and no species of fish is overfished, unlike other major fishing areas of the world. The Bering Sea has maintained a near constant production of fish since the late 1970s. Indications are that this condition will continue into the near future due to the conservative levels of exploitation. The question of crab recovery is an open question. It is not clear whether the decline in crab abundance is due to overfishing, climate change (regime shift), or predation. There is evidence that all factors may in someway be responsible. However, the fact that king crab in the Kodiak region, which were greatly reduced through fishing over 20 years ago, have failed to recover with no fishing since 1982 indicates that long term environmental or ecosystem effects may be operating.

The North Pacific has been in a warm regime since the late 1970s. In this warm regime there has been some significant changes in the survival and growth of various biota. Historically, regime shifts appear to occur at 18 year intervals, and the current warm regime has been anomalously long (Ingraham et al. 1998). There are some indications that we are beginning to enter a cold regime. It this is true then changes should begin to appear in the survival pattern of different species groups. For instance, capelin, which have been in very low abundance, and an important food for Steller's sea lions, should begin to increase. Conversely, salmon abundance may decrease due to colder winters an lower survival in streams, as was apparent in the cold years of the early 1970s. Therefore, it is a strong possibility that crab stocks will begin to recover since historic data indicate that they were more abundant in the years of the previous cold regime.

Assuming that the NPFMC's License Limitation Program and regulatory regime established by the American Fisheries Act continues beyond the 5-year period specified in the Act, then it is likely that there will be no further increases in the number of vessels or plants currently operating at Dutch Harbor-Akutan. If some sort of effort rationalization scheme goes into effect then there will be a reduction in the number of vessels fishing for crab.

The overall outlook is favorable, withstanding short term problems, with a the prospects for continuation of the development of a more efficient fleet size and stable to slightly increasing harvests. Most of the resources are very conservatively managed due to concerns of excessive harvesting capacity and sector allocation of resources. Reduced effort will remove impediments to potential increases in harvests, secondarily the flatfish resources has great capacity for increased harvest. Increases in flatfish could come about in two ways. One, is the development of harvest gear that reduces the bycatch of crabs and halibut that is currently restricting the fishery. Another, is the implementation of fully transferable quotas, which are currently prohibited under the Magnusson-Stevens Act. Halibut and crab have a higher value as bycatch in the trawl fishery since the ration of flatfish to crab/halibut is low and the offsetting costs would make it possible for a trawler to pay a higher price than what a crab or halibut fishermen could get as an exvessel price for these species.

3 EXISTING CONDITIONS

This section describes the existing moorage facilities at Akutan and other western Alaska ports and the vessels that pursue fisheries in the BSAI, some of which will utilize the proposed small boat harbor at Akutan. The section provides a description of the existing marine facilities in Akutan, a brief summary of the moorage available in other ports to the vessels operating in the Bering Sea and Aleutian Islands. It also provides a description of the general operating practices of these vessels, a description of fleet characteristics, and a summary of fleet operating costs.

3.1 Existing Marine Facilities

3.1.1 Akutan

There are two primary marine facilities in the Akutan city area, the city dock and the Trident Seafoods dock. Vessels also use moorage facilities in other ports in Alaska and the Pacific Northwest. FIGURE A2-13 is an aerial photo showing Akutan Bay, the city dock, the Trident Seafoods plant, and the layout of the town.

Source: City of Akutan and Trident Seafoods, 1989 photo.

FIGURE A2-13.—*Aerial photo of Akutan city area and adjacent Trident Seafoods plant*

City Dock. In 1989 the City of Akutan built a new dock at the location where a private processing plant once had a timber dock, which had been crushed by a barge. The new dock, the first city-owned dock in Akutan, is constructed of steel sheet-pile bulkhead, with part concrete-surfaced solid fill. Two breasting dolphins on the upper side in line with the face are connected by a 3-foot-wide, steel catwalk. The dock is fronted by a rubber-cushioned, timber-and-steel fender system. The unlighted dock is 100 feet by 100 feet, with a depth of -40 feet MLLW and a berthing space of 200 feet with the dolphins. The deck is 20 feet high at MLLW and has an open apron.

Because the design of the dock does not adequately account for the water depth, the dock will require continuous maintenance. In 1992 repairs were made to the dolphins, and a new fendering system was installed. Currently the dock is in good repair.

The city dock is operated by the city and Western Pioneer, Inc., a transportation company that operates coastal freighters. The dock is used to receive conventional general cargo and petroleum products and as a landing for the AMHS passenger and vehicle ferry. There are no mechanical handling facilities, railway connections, or highway connections at the dock. Electricity is not available. Water is supplied through a 2-inch line. Western Pioneer operates one 4-inch pipeline that extends from the wharf to 8 steel fuel-storage tanks at the rear of the dock. The tanks have a combined total capacity of 1,300 barrels.

Rafting and congestion do not appear to be issues. The dock is operated on a first-come, first-served basis, and there is no limit on the time a vessel can be there. Akutan residents' skiffs do not moor at the dock, but are pulled up onto the beach. The vessels that deliver to Trident may occasionally use the city dock for loading or offloading supplies. Freighters also deliver supplies for the community to the city dock.

Trident Seafoods Dock. The Trident Seafoods dock is used for receiving and shipping seafood, receiving and shipping containerized and conventional general cargo for the processor, receiving petroleum products, fueling vessels, and handling supplies for fishing vessels. One 8-inch fuel pipeline extends from the wharf to 5 steel storage tanks with a total capacity of 40,500 barrels. The seafood processing plant is at the rear of the dock. The dock is constructed of steel sheet-pile bulkhead with part concrete-surfaced solid fill and fronted by rubber tires and a timber fender system. The dock face is made up of 556-foot, 414-foot, 445-foot, and 185-foot sections, providing a total lighted berthing area of 1,600 linear feet. The depth at MLLW ranges between 15 and 30 feet.

Mechanical handling facilities at the dock include one 50-ton, diesel crawler crane with a 100-foot boom; one 17-ton, diesel mobile crane with a 75-foot boom; one 31-ton mobile, toplift truck; three 7-ton electric-hydraulic derricks with 50-foot booms; and fourteen 2- to 3-ton forklift trucks. There are no railway or highway connections to this dock. Water is provided to the vessels through a 2-inch line. Electricity is not available.

Vessels are not permitted to tie up for long periods or to raft at the dock because freighters and other vessels need regular access. The dock sustained approximately $500,000 in damage during a December 1997 storm because a vessel was tied to it. Trident officials have indicated that they would like to add 800 feet of dock space for offloading but have not made definite plans to do so.

There is a great deal of seasonal fluctuation in processing activities at the Trident processing plant. The fluctuations are a function of the fishing seasons (identified in Section 2, Marine Resource Assessment) imposed on all operators through the fishery management regimes.

3.1.2 Other Western Alaska Harbors

For many years, fishing vessels operating in the BSAI generally have crowded into the extremely limited moorage available in Dutch Harbor/Unalaska and traveled to other ports when moorage was not available. Over time, additional moorage for large vessels operating in the BSAI has been constructed at Kodiak, Sand Point, and King Cove. Additional public and private moorage facilities have also been constructed in Dutch Harbor/Unalaska.

Vessels unable to obtain moorage in Dutch Harbor/Unalaska, generally the preferred site for BSAI fishing vessels, try to obtain moorage in the next closest harbor. If a harbor were constructed at Akutan, vessels operating from Akutan or supported by the Trident plant probably would first seek moorage in Akutan. Because of Akutan's proximity to Dutch Harbor/Unalaska, other vessels that operate in the BSAI but do not deliver fish to Akutan would seek moorage at Akutan if space were not available in Dutch Harbor/Unalaska. Vessels unable to find moorage in Akutan would then travel to other ports seeking moorage. If space is not available in Dutch Harbor/Unalaska, King Cove, Sand Point, or Kodiak, vessels owned by residents of other states typically return to their homeports in the Pacific Northwest. Vessels owned by Alaska residents typically return to their homeports.

Table A2-4 presents an estimate of the number of long-term moorage spaces generally available in western Alaska to the large catcher vessels operating from Akutan and elsewhere in the BSAI fishing area. The table shows the total numbers of long-term moorage spaces available for large catcher boats by community, the numbers of moorage spaces where vessels have preferential or permanent berthing arrangements, the historical demand for moorage by other boats (not large catcher vessels) at facilities capable of accommodating large catcher vessels, and the resulting available moorage spaces. These estimates were obtained from interviews with port directors and harbormasters in these communities and from evaluation of moorage records. While there are a relatively high number of dock face temporary tie up spots in Unalaska/Dutch Harbor, most of these are for provision of services to fishing vessels and are not available for long or even short-term moorage. Moorage in other communities, such as Sand Point, King Cove and Kodiak tend to fill quickly during peak periods, making them unavailable to other Bering Sea vessels seeking moorage.

The Corps of Engineers is currently evaluating a proposed small boat harbor at Unalaska/Dutch Harbor that would provide moorage to fishing vessels operating in Bering Sea waters. As currently designed, the Unalaska/Dutch Harbor project would provide moorage for 75 vessels.

The proposed harbor in Unalaska/Dutch Harbor could provide secure moorage for up to 75 vessels. This project is in review, and whether or not the without-project condition will ultimately include a harbor in Unalaska/Dutch Harbor is uncertain. However, the study team believes that the moorage demand for the Akutan dock would be not be changed, whether or not the Unalaska/Dutch Harbor proposed harbor is eventually built.

The without-project condition in Akutan includes the following characteristics:

- Akutan supports one of the most valuable commercial fisheries in the U.S., with the largest and most modern fishing fleet in the world. The fishing conditions in the Bering Sea are some of the most difficult fishing conditions encountered by commercial fishers anywhere in the world.

- Trident Seafoods pioneered pollock processing in the region with construction of their Akutan plant in the 1980's. They are now one of the largest and most successful seafood companies in the world. Akutan is one of the largest commercial fishing ports in the U.S. based on value of product landed, processed and shipped to market. However, it has very little infrastructure. The fishing industry and the Aleutians East Bough have worked together for many years to provide some of the needed support infrastructure.

- The resource base the activities in the region are based upon conservatively managed fisheries, which should not be subject to boom and bust cycles that have occurred elsewhere in the nation. The North Pacific Fishery Management Council has managed the fishery resources in the region since 1977, and the fishery resources are maintaining very good abundance levels. Even with conservative management, however, there are still dynamic changes that occur. The American Fisheries Act fixed the total number of pollock fishing vessels, and individual quotas for the crab fishery may also affect the numbers of vessels in the near future.

- Even if radical changed come as a result of crab rationalization and the proposed port in Unalaska/Dutch Harbor is completed, the number of vessels seeking moorage will still exceed the available moorage in the region. In Unalaska/Dutch Harbor, there are docks, with dock frontage used for temporary moorage. The only real moorage is at the spit dock in Dutch Harbor. Capacity of the spit dock is approximately 20 vessels, assuming they raft three deep. If the Unalaska/Dutch Harbor is completed, the use of the spit dock will change, with a focus on large shipping vessels instead of mixed shipping and fishing vessels.

The demand for moorage in Akutan is based on the needs of the core fleet that is associated (i.e. makes deliveries to) the Trident Seafoods plant. Other vessels fishing the area, seeking secure moorage to wait out closed periods between fishing seasons will utilize any moorage space available in the harbor.

Pollock fishing in the Bering Sea is centered on the 100 fathom depth contour that extends northwest from Unimak Pass northwest past the Pribilof Islands. Akutan has a locational advantage of approximately three hours travel time to these grounds over Unalaska/Dutch Harbor. Akutan's existing infrastructure, the location of the fisheries resources harvested by the Bering Sea fleet and processed in Alutan will ensure future demand at the proposed harbor.

TABLE A2-4.—*Available long-term moorage in western Alaska for large catcher vessels*

	Moorage Spaces by Community				
Moorage Spaces	**Dutch Harbor/ Unalaska**	**King Cove**	**Sand Point**	**Kodiak**	**Total**
Total	[1]	**33**	**47**	**70**	**150**
Less: Permanent/preferential Moorage	[1]	5	4	60	**69**
Available moorage	[1]	**28**	**43**	**10**	**81**

Source: Estimate calculated from interviews with port directors and harbormasters and of moorage records. The figure for Sand Point includes improvements projected for 2005. The False Pass harbor may add up to 6 moorage slips for large vessels.

[1] There are 23 docks in Unalaska/Dutch Harbor that provide approximately 145 moorage tie-ups. However, with the exception of the Spit dock, which offers transient moorage, all the moorage slips in Dutch Harbor/Unalaska are dock frontage for fish processors or fisheries service businesses. The 145 slips in Dutch Harbor/Unalaska are not available long-term moorage by fishing vessels.

3.2 Fleet Operating Activities

Five major BSAI fisheries contribute to demand for a commercial fishing harbor at Akutan: pollock, Pacific cod, flatfish, king and tanner crab, and halibut. This subsection describes these fisheries in terms of gear types used to prosecute them. The information is presented as general background on fleet operating practices that affect moorage demand at Akutan.

Separate and identifiable fleets of vessels have developed around these fisheries. The pollock, Pacific cod and flatfish fisheries are primarily pursued by vessels operating trawl gear. Vessels using hook-and-line gear account for the halibut harvest, and a portion of the total harvest of Pacific cod. Most of the hook-and-line-caught Pacific cod is harvested by catcher processors. Vessels fishing pot gear pursue the crab fisheries, with some effort on Pacific cod and other species. Trawl and pot vessels are anticipated to account for the majority of moorage demand at the proposed Akutan harbor (See Section 3.4, Moorage Demand).

Subsections 3.2.1, 3.2.2, and 3.2.3 focus on the operating practices of catcher vessels that use trawl, hook-and-line, and pot gears. Catcher processors are not included because they are not anticipated to generate any significant demand for the proposed harbor at Akutan. This conclusion is based on the following factors developed from interviews with catcher processor owners and representatives of various associations:

- The catcher processors are generally larger than vessels that would likely be accommodated in a harbor at Akutan.
- Most of the pollock fillet and surimi catcher processors are also involved in the Pacific whiting fishery off the coasts of Washington and Oregon. This fishery takes place during late spring and summer.

- Catcher processors have large crews that are primarily from the Pacific Northwest. It is generally more cost-effective to transport the crews by vessel than to use air transportation to and from Dutch Harbor/Unalaska.
- Maintenance requirements are more intensive for catcher processors than for catcher vessels. Most of this maintenance is conducted during nonfishing periods and takes place in Seattle or Dutch Harbor/Unalaska, where technicians are available.
- Catcher processors produce finished product that is often shipped from Seattle to other ports. Transporting the product to Seattle on the catcher processor vessel rather than by other means results in savings on shipping costs.
- Smaller factory trawlers, one class of catcher processors, are seldom at moorage for extended periods, unlike trawl catcher vessels that are often left unattended in a safe moorage until the next fishing season opens.
- Offshore Systems Incorporated (OSI) in Dutch Harbor/Unalaska is dedicated to servicing the factory trawl fleet. The company can provide in-season moorage to a small number of vessels at one time, and other short-term moorage is available at public facilities in Dutch Harbor/Unalaska.

3.2.1 Trawl Vessels

The BSAI trawl catcher vessel fleet focuses its effort on pollock and Pacific cod. Pollock is the primary fishery for these vessels, with Pacific cod providing a supplementary fishery following the pollock seasons. Flatfish are generally pursued by smaller catcher processors using trawl gear.

In general, pollock trawl catcher vessels have exclusive and often long-term delivery arrangements with processors. In turn, processors guarantee that they will buy the vessels' pollock and often provide a market for Pacific cod as well. The number of large-scale processors of pollock that rely on deliveries from catcher vessels is limited. In addition to Trident in Akutan, there are three shore-based processors in Dutch Harbor/Unalaska: Unisea, Alyeska, and Westward. Two shore plants in the GOA also take deliveries of pollock harvested in the BSAI: Peter Pan in King Cove and Trident in Sand Point. There are also two floating processors usually operating in Beaver Inlet, south of Dutch Harbor/Unalaska Bay: the *Northern Victor* and the *Arctic Enterprise*. There are three motherships currently operating in the Bering Sea pollock fishery: the *Ocean Phoenix*, the *Excellence*, and the *Golden Alaska*.

Seasons. Trawlers make 2- to 3-day trips to the fishing grounds during the season, and—depending on catch rates—may spend 1 to 2 days tied to the processing plant or on anchor in Akutan Bay or near processing facilities around Dutch Harbor/Unalaska. Vessels spend more time in port when catch rates are high than when catch rates are low because of the longer time required to unload large catches and the shorter time required to harvest. Catch rates are normally higher during the winter months (January through March) when pollock are spawning, and lower in the fall months (August through November).

The majority of the shore-based pollock fishery occurs in the Bering Sea within about 80 miles of the Aleutian Islands and the Aleutian Peninsula, from Dutch Harbor/Unalaska Island

east to Cold Bay and Izembek Lagoon. In some seasons, substantial harvest effort occurs 80 to 120 miles offshore, nearer to St. Paul and St. George Islands than to Dutch Harbor/Unalaska and Akutan. Shore-based processors require their vessels to deliver pollock within 12 to 18 hours of when it was first brought onboard, so there is a limit on how far the vessels can travel and still remain within this time.

Processors generally determine the number of vessels a given plant uses by assuming relatively low expected catch rates. A greater number of vessels will keep the plant operating at maximum capacity even when catch rates are low. If catch rates are high, then the number of vessels employed is greater than is optimally necessary, and vessels spend more idle time in port.

After the 1999 A1 pollock season, which ended on February 15, trawl catcher vessels typically tied up until the A2 season began on February 20. The time between seasons can be as short as 5 days, so crews seldom moor and fly home. Trawl catchers typically attempt to find moorage in Dutch Harbor/Unalaska or other nearby harbors and resupply the vessels, conduct minor repairs, and provide the crew with rest and relaxation. Following closure of the A2 pollock season (as late as April 15) some vessels tie up in Dutch Harbor/Unalaska or other nearby ports, while others switch to harvesting Pacific cod until that season ends, usually around the end of April.

Unless the trawl catcher vessels have moorage available at the Dutch Harbor/ Unalaska processing plant docks, most are unlikely to find moorage in Dutch Harbor/ Unalaska or other nearby ports—crab vessels would have taken most of the moorage spaces when the crab season ends, usually in March. Trawl catcher vessels have few options for alternative work during summer, so most seek moorage in King Cove, Sand Point, Kodiak, or Pacific Northwest ports if space is not available in Dutch Harbor/Unalaska. Some vessels may travel to shipyards elsewhere in Alaska or in the Pacific Northwest for haulout, inspection, and repairs during summer.

Recent management changes will result in the BSAI pollock trawl fishery reopening August 1. This B season could extend until September 15, but the quota will likely be reached before then. A new C season will open September 15 and could last until November 1. However, the C season quota probably will be attained before November 1. In-season operations for the fall pollock fishery are similar to those in the A1 and A2 seasons. However, it is more likely that pollock catch rates will be low in the fall season, because the pollock are not aggregating for spawning and are disbursed over a wide area. More vessels may be employed in the fall than in winter.

A typical trawl catcher vessel delivering to the Trident Akutan plant would leave its homeport in the Pacific Northwest in early January and travel to Akutan for the pollock season that opens in mid-January. The boat would deliver to the Trident plant at Akutan during the season. Following the end of the pollock season in March, the boat would switch to harvesting Pacific cod until that fishery closed in April. The vessel would then return to its homeport. In late July the vessel would return to Akutan for the pollock season that starts on August 1. After the B season closes, the vessel would moor in Dutch Harbor until the start of the C season on September 15. Following closure of the C season in October, the boat would return to its homeport and await the January pollock opening.

Moorage-related Issues. Trawl catcher vessels face limited moorage availability in March and October, because the winter and early fall crab seasons typically end before the fall pollock season. Crab vessels take most of the publicly available moorage, and the trawl vessels must travel to more distant ports to seek moorage.

Trawl catcher vessels are not permitted to moor for extended periods at the Trident dock or to moor during periods of inclement weather. During periods of inclement weather the vessels typically anchor in Akutan Bay, with all crewmembers onboard to maintain anchor watches. The boats keep their main engines running to prevent grounding in case the anchor drags, and wait for the weather to subside before returning to the dock.

When trawl vessels that deliver to Trident are seeking moorage they attempt to use public moorage or the dock that Trident leases in Dutch Harbor/Unalaska. (Trident leases a dock in Dutch Harbor/Unalaska for use by vessels delivering regularly to its plants. The dock can accommodate two vessels at the dock face and four additional vessels rafted out.)

Vessels using moorage in Dutch Harbor/Unalaska incur damages from rafting and additional costs due to congestion. For example, at the Unalaska Spit Dock vessels are rafted three deep during peak periods. A lengthy time is required to untie, move, and tie other vessels when moving a vessel away from an inside berth. This maneuvering may require up to a half-hour each time the vessel is moved, or longer if crews are not onboard to move the vessel under power and lines must be used.

In addition, frequent storms often result in substantial wave action at Dutch Harbor moorage facilities, with subsequent damage to vessel hulls and equipment. Other damages occur as vessels are positioning for moorage at the docks, and human error or equipment failure results in collisions at velocities sufficient to cause damage.

Interviews with vessel owners indicated that the annual damages per vessel incurred while mooring or at moorage range from $1,000 to nearly $10,000, depending on the size of the vessel and the weather. The most frequently cited amount was $2,000. Larger vessels fare better, incurring less damage. Damages typically include damaged rub rails, scratched and dented hulls, bent anchors, lost or deflated buoys used for cushioning between vessels, and snapped mooring lines. These damages are typically repaired when the vessel is dry-docked for inspections and other maintenance.

When vessels are moored for extended periods, vessel owners typically hire firms or individuals in Dutch Harbor/Unalaska to check on the vessels. This observation is particularly important when vessels are rafted or moved frequently and significant wind loads can strain or snap mooring lines. Some vessel owners retain a crewmember to live onboard during the nonfishing period to provide better monitoring.

3.2.2 Pot Vessels

The number of pot vessels participating in the BSAI crab fisheries varies from year to year, depending primarily on the guideline harvest levels (GHLs) set by fishery managers from ADF&G. In years with higher GHLs, more vessels participate. In recent years, GHLs for the

Bristol Bay red king crab fishery have been at historically low levels, and therefore relatively fewer vessels have been participating.

Most crab vessels delivering to Trident store their pots at the Trident pot storage facility across the bay during winter. In the weeks immediately before the fishing seasons open, crab vessels begin to arrive in Akutan. The vessels pick up their pots and make necessary repairs before the fishing season begins. Some repairs require work on land. Most of this work takes place on limited space on the Trident plant delivery docks. This space is available on a first-come, first-served basis before the season begins. During the season, space for repair at the delivery dock is very limited. The limited availability of space for gear repair results in vessels and crews arriving in Akutan earlier than would otherwise be necessary to ensure that they can complete the repairs before the season begins.

Seasons. Pot vessels begin harvesting opilio tanner crab on January 15, and the length of the season varies considerably with allowable harvests. For example, the fishing season was 33 days in 1995, 45 days in 1996, and 65 days in 1997. The opilio fishery occurs near the Pribilof Islands, with many vessels fishing near the edge of the seasonal ice pack as it moves south during late winter. In some years the ice pack moves south of the Pribilof Islands, and the small ports at St. Paul and St. George are closed. Crab catcher vessels and crab processing vessels operating near the Pribilof Islands are then forced to operate from the Aleutian Islands.

Following the opilio season, many crab vessels return to Akutan Bay to unload pots at the pot storage facility. Without a harbor at Akutan, many independently owned crab vessels make their last deliveries to a processor near other existing harbors, most likely Dutch Harbor/Unalaska, so that they can obtain moorage. This situation results in lost income to the Akutan plant, lost tax revenues to the community, and lost tax revenues to the AEB.

A few crab vessels continue operating in the Bering Sea following the opilio season, fishing for Pacific cod with pot gear. Two such vessels currently deliver Pacific cod to Trident at Akutan. Many crab vessels register to tender salmon. An Alaska Crab Coalition representative indicated that about 50 percent of the crab fleet operate as tender vessels in the salmon fisheries, and the remainder either undergo maintenance or tie up for the summer where space is available. Travel to ports in the Pacific Northwest may be required.

The St. Matthew and Pribilof Island king crab fisheries open September 15 near those islands. These fisheries are relatively short—usually 1 week—and vessels typically make only one landing during the season. Then they typically return to a port where moorage is available.

Most crab operators try to find a safe harbor in Alaska. Some go as far as Kodiak between the September and November crab fisheries, but few, if any, return to the Lower 48 between the two fisheries because the time between the two fisheries is so short.

On November 1, the Bristol Bay red king crab fishery opens. The opening for the Bering Sea bairdi tanner crab fishery typically occurs November 1, but the fishery was closed in 1998 because of low stocks. These two fisheries have been relatively short in recent years,[2] with

[2] The Bristol Bay red king crab fishery was closed in 1994 and 1995 and was reopened in 1996. In 1997 and 1998 the season lasted 4 days.

vessels making only one delivery during the season. The Bristol Bay red king crab fishery occurs in the outer waters of the bay. The bairdi tanner crab fishery generally occurs further west of the Bristol Bay fishery, with harvest areas ranging from about 20 to 100 miles north of the Aleutian Peninsula and Aleutian Islands.

A typical pot vessel delivering to Trident leaves its homeport in early January and travels to Akutan for the mid-January opening of the opilio fishery. After arriving in Akutan, the vessel loads pots onboard and makes preparations for the season. The vessel fishes until the season closes in March, delivering to the Trident plant in St. Paul, as well as the Trident plant in Akutan. The boat offloads its pots at Akutan, and moors in Dutch Harbor/Unalaska. The crew flies home. Three members of the crew return in mid-June and travel to Naknek to load equipment for a charter to operate as a salmon tender during the Bristol Bay salmon season. The boat offloads the tender equipment in mid-July and returns to Dutch Harbor/Unalaska for moorage. The crew flies home in late July. All crewmembers fly back to Dutch Harbor in early September to begin preparations for the St. Matthew and Pribilof Island king crab fisheries, which start on September 15. The vessel travels to Akutan to load its pots and then returns to Akutan at the end of the season to deliver the catch. Moorage space is available in Sand Point, so the pots are left on the boat. The vessel travels to Sand Point at the end of the season for moorage. Three crewmembers return home for the three to four weeks before the November 1 opening, while the remainder stay onboard and save money by avoiding the travel cost. At the end of October the crew returns to the vessel and prepares for the November 1 fisheries. At the end of the season the boat delivers its catch to Trident's Akutan plant and offloads its pots because moorage is unavailable. The vessels then travel to its homeport and remains there until early January, when it departs for Alaska again.

Moorage-related Issues. In the opilio fishery, vessels make 3- to 5-day trips. Sometimes vessels make longer trips, but the mortality rate for crab held in the hold increases over time. Increasing mortality constrains the ability to undertake longer trips. Occasionally, crab vessels stay in Akutan for a day or two to make repairs or obtain rest for crews. During these lay-ups, vessels are either tied to the delivery dock at the plant or anchored in the bay. The lack of a harbor requires some crewmembers to remain onboard or on-call to care for the vessel.

Following the November fisheries, crab vessels unload their pots and look for available harbors in Alaska or return to ports in Washington and Oregon.

Pot catcher crab vessels incur damages similar to those that trawl catcher vessels incur while moored at Dutch Harbor/Unalaska.

3.2.3 Hook-and-line Vessels

Hook-and-line catcher vessels as defined in this document include vessels operating longline gear, and vessels operating jig gear for groundfish. Hook-and-line catcher vessels target primarily halibut and blackcod, but also harvest Pacific cod. The fixed-gear and hook-and-line fisheries are relatively low-volume fisheries that require only a small portion of the available capacity at the processing facilities in Akutan and Dutch Harbor/Unalaska. The hook-and-line (longline and jig) vessels typically are much smaller than trawl and pot vessels.

Seasons. The halibut longline fishery and the blackcod fishery currently are managed under an Individual Fishing Quota (IFQ) management regime, which allows participants to catch a predetermined amount at any time during the open season from March 15 through November 15. This regime allows landings and other port calls to be spread over a long period. A total of 23 landings were made in Akutan in 1997, accounting for 64,130 pounds.

The fishing season for Pacific cod begins in January, but hook-and-line catcher vessels traditionally have started their seasons in more protected waters and moved north and west as the weather improves, arriving in the Bering Sea in May and June. The vessels generally return to more southerly waters in the fall.

A typical longline catcher vessel starts its year by traveling to Southeast Alaska just prior to March 15 and after that date harvesting the halibut and blackcod IFQs that the skipper and crew possess. The vessel then moves north to the central Gulf of Alaska, fishing from Seward or Homer during late March and early April. The crew supplements the halibut and blackcod IFQs with bycatch of Pacific cod. When the quota for this area is reached, the vessel moves west of Kodiak in early to mid-April and harvests the IFQs that the skipper and crew possess, delivering to Kodiak. By early May the vessel and crew travel to the Aleutian Islands to start harvesting their IFQs for this region. The vessel typically spends a week at sea, delivering to local processing plants throughout the Bering Sea, and then taking two to three days for rest and relaxation for the crew and maintaining the gear. In late May or early June the crew typically returns home for two to four weeks. The crew returns in late June, finishes harvesting any halibut and blackcod IFQs that remain, and then focuses on Pacific cod during the remainder of its time in the region. Sometime in August or early September the vessel departs for its homeport.

Moorage-related Issues. Because of their relatively small size, the hook-and-line vessels must have very protected waters for moorage and are limited by fuel and water capacity (among other items) in the amount of time that they can spend at sea. As a result, most of these vessels operate in the proximity of communities that can offer safe moorage, as well as fuel and supplies.

The hook-and-line vessels that operate in the vicinity of Akutan and Dutch Harbor typically use the small vessel harbor in Iliuliuk Harbor (Dutch Harbor/Unalaska) for long-term moorage and obtain shorter-term moorage at docks controlled by the shore plants in the community. At times, hook-and-line vessels moor at the Unalaska Spit Dock, generally on the shore side of the dock, where they do not have to raft with larger vessels. The CDQ groups have purchased a number of small hook-and-line vessels that are used by their members and are operated from Dutch Harbor/Unalaska, Atka, and Adak during periods of better weather. Vessels operating in the vicinity of Akutan generally travel to Dutch Harbor/Unalaska to seek moorage.

Hook-and-line vessels seeking moorage in Dutch Harbor/Unalaska incur less damage than the larger vessels because of the availability of slips at the small boat harbor and the more protected waters of Iliuliuk Harbor, where the Alyeska and Unisea docks are typically used for moorage after deliveries. Interviews with vessel owners indicate that annual damage values typically range from none to about $1,000, although several events resulted in damages of $3,000 to $5,000. The most frequently cited damage amount was $500.

Hook-and-line vessels unable to use the small boat harbor are allowed to tie up at the docks owned by processors. However, they are often asked to move away from the dock face when other vessels must deliver product or freighters call at the plant. Each of these hook-and-line vessels typically moves once or twice a day if other major fisheries are under way. During summer, hook-and-line vessels generally can use the docks with little need to move, because major fisheries are not being conducted.

3.3 Fleet Characteristics

Currently two distinct fleets of vessels use Akutan and Akutan Bay regularly: vessels owned by village residents (Akutan resident fleet) and vessels delivering to Trident (Akutan nonresident fleet). Other vessels that use the bay infrequently or deliver to Trident less than regularly are defined as the transient fleet. These fleet definitions are used to describe vessel groups that would have different use patterns for an Akutan harbor and to aid in estimating Akutan moorage demand. The following subsections describe selected characteristics of each fleet. Additional information on length overall (LOA) and beam and draft is presented in Section 3.4 (Moorage Demand).

3.3.1 Akutan Resident Fleet

In this analysis, the Akutan resident fleet is defined as vessels owned by residents of the Native village of Akutan. The Akutan resident fleet includes about 20 skiffs, one larger (36-foot) fishing vessel, and a landing craft owned by the City of Akutan.

The 36-foot fishing boat owned by an Akutan resident is used to fish salmon in Chignik and is kept there because moorage is not available in Akutan. Section 3.4.1 provides additional details pertaining to the Akutan resident fleet.

The city-owned landing craft is used to transport supplies and materials between Akutan and Dutch Harbor/Unalaska. Because moorage is not available in Akutan, the vessel is often moored in Dutch Harbor/Unalaska or anchored up at the end of Akutan Bay. When the landing craft is in Dutch Harbor/Unalaska, the skipper must fly between there and Akutan about once a month, at a roundtrip cost of $160. However, the city is trying to sell the landing craft.

Residents are unwilling to purchase larger vessels that could be used safely in open ocean because operating the vessel and caring for it adequately would require moving to a community with a harbor. Residents store their skiffs on the beach because no harbor is available. It is most likely that skiffs must be replaced once every four to five years because of the damage done by the dragging the skiffs up on the beach. An Akutan resident-fleet skiff typically is operated by a single skipper who resides in Akutan.

The skiffs are used primarily for subsistence activities, but also provide residents a limited ability to participate in selected commercial fisheries. Residents have expressed interest in increasing their participation in commercial fishing, and the CDQ program has provided a means to this end. The program is projected to be the primary factor that will affect this fleet in the future.

With CDQ program expansion, it is likely that more Akutan residents will wish to participate in the vessel-purchase program (or other similar programs) of the APICDA overall economic development plan. The cost of participation will probably include decisions to live for several months of each year in communities with harbors.

The CDQ program provides an opportunity for residents to become active commercial fishers. However, the lack of a local harbor may mean that the choice to do so leads to increased out-migration of younger residents, many of whom currently support elders and other family members through part-time employment and subsistence activities.

3.3.2 Akutan Nonresident Fleet

In this analysis, the Akutan nonresident fleet consists of vessels that regularly deliver crab or trawl-caught groundfish to the Trident plants at Akutan or St. Paul. Vessels delivering to St. Paul are included because Trident has indicated that these vessels are currently supported out of Akutan and will use the Akutan harbor, if and when it is built. Vessels that deliver groundfish, crab, or halibut less regularly to Trident are included in the transient fleet (Section 3.3.3).

The Akutan nonresident fleet contains about 86 vessels that regularly deliver to Trident plants. Of these vessels, 22 are owned by Alaska residents who prefer to use harbors in their hometown if space exists and if there is sufficient time for the vessels to travel to and from the homeport between fishing openings. There are 64 vessels in the nonresident fleet that would seek long-term moorage in Akutan. These vessels range from 91 feet to 166 feet in length, with an average LOA of about 111 feet. Of these 64 vessels, 11 owned wholly by Trident and 6 owned in part by Trident will use Akutan because of the company's commitment to making such a harbor feasible, and in order to reduce expenses. The 47 vessels owned by residents of Washington and Oregon would attempt to use an Akutan harbor to reduce expenses.

According to Trident, all of the vessels that the company owns, or in which it has an ownership interest, would regularly use a harbor in Akutan between fishing seasons. In addition, many, if not all, remaining members of the nonresident fleet would use Akutan for moorage during at least one off season within the fishing year.

The non-Alaskan vessels in the Akutan nonresident fleet are split about evenly between pot and trawl vessels, although a number of vessels have used both gear types. Section 3.4.2 provides additional detail on the Akutan nonresident fleet.

3.3.3 Transient Vessels

The vessels classified as transient in this document typically deliver to the Akutan Trident plant only on occasion, or during summer, when plant activity is low. Akutan Bay's location adjacent to some of the world's most productive fishing grounds suggests that a harbor would be used by vessels other than those delivering to Trident if existing area harbors cannot accommodate their need. Thus the demand for additional harbor space in Akutan depends not only on vessels that operate in the area, but also on existing harbors currently in use.

The transient fleet includes trawl and pot catcher vessels, with characteristics similar to those for these gear types in the Akutan nonresident fleet, and hook-and-line vessels. These vessels generally deliver to shore-based plants or floating processors operating elsewhere in the Bering Sea. The trawl and pot vessels would seek moorage in Akutan between major fishing seasons if moorage were not available in Dutch Harbor/Unalaska. A few hook-and-line vessels would use the harbor during their fishing seasons. No hook-and-line vessels (other than vessels owned by Akutan residents) are expected to seek long-term moorage in the harbor. The numbers and types of transient vessels using Akutan may fluctuate substantially because the availability of moorage in Dutch Harbor/Unalaska will determine the number of vessels seeking moorage in other ports, including Akutan. Section 3.4.3 provides additional information on the transient fleet.

3.4 Moorage Demand

This section describes the current demand for moorage in Akutan. Estimates of potential demand have been developed from existing conditions for the Akutan resident fleet, Akutan nonresident fleet, and transient vessels. There are ambiguities in the source data in terms of numbers and definitions, making it difficult to arrive at estimates. The numbers of vessels that create moorage demand as presented in this section are considered the most reliable estimates.

The demand estimate assumes that a harbor in Akutan would be equipped with minimal service levels, including access by road, electricity for moored vessels, boat watching and security services, and uplands sufficient to meet requirements for minor gear and vessel maintenance. The estimate also assumes that moorage rates are comparable with rates at Dutch Harbor facilities and that access is unconstrained by preferential use agreements.

The following discussion summarizes existing demand by vessels currently using Akutan Bay, including the Akutan resident fleet, the Akutan nonresident fleet delivering to Trident, and occasional users (transient fleet). The demand from these three sectors is combined in a summary section that provides an overall estimate of demand for moorage space in Akutan.

3.4.1 Akutan Resident Fleet

The Akutan resident fleet was defined in Section 3.3.1 as vessels owned by residents of Akutan. Table A2-52 is a summary of the Akutan resident fleet by vessel length, and Table A2-6 lists each vessel in the Akutan resident fleet.

TABLE A2-52.—*Demand for permanent moorage space by the Akutan resident fleet*

Vessel Length (Feet)	Number of Vessels
32 or less	20
33-60	1
61-125	1
Greater than 125	0
Total	**22**

All 20 of the vessels that are less than 32 feet LOA would be expected to use the Akutan Harbor on a permanent basis. The 36-foot vessel is used to fish for salmon and is homeported in Chignik. This vessel is not expected to homeport in Akutan because it targets salmon, not groundfish or crab. The 71-foot vessel is a landing craft that is owned by the City of Akutan moors at the end of Akutan Bay. The city is trying to sell the landing craft. Therefore, only the 20 vessels under 32 feet LOA are considered the Akutan resident fleet that creates moorage demand for an Akutan harbor.

TABLE A2-6.—*Akutan resident fleet*

Vessel Name	Vessel Length (feet)	Hull Type	Engine Type	Horsepower
	15	Wood	Gas	25
	16			
	16			
Island Girl	16	Wood	Gas	40
	16			
My Skiff	16	Aluminum	Gas	40
Lil Mutt	16			
Kas Kar	16			
	18			
	18			
Sea-Nile	18			
Mrs. T	18			
Miss Hali	18			
Kay-Kay	18	Aluminum	Gas	45
Annette K	18	Aluminum	Gas	40
Ms Agnes	19	Aluminum	Gas	115
Gambler	20	Aluminum	Gas	112
Bear	20	Aluminum	Gas	115
Ugamak	24			
Lady Di	28	Aluminum	Gas	260
Aleut Sister	36	Fiberglass	Diesel	250
Akutan Bay	71	Steel	Diesel	640

Sources: Alaska Commercial Fisheries Entry Commission 1997 Vessel Registration Files, and Akutan Fishermen's Association vessel list

3.4.2 Akutan Nonresident Fleet

The vessels in the nonresident fleet, vessels that regularly deliver to Trident in Akutan, are listed in Table A2-7. The LOA, beam, and draft for 64 of the 86 vessels in the Akutan nonresident fleet are included in the table.

TABLE A2-7.—*Akutan nonresident fleet vessels*

Akutan Harbor - Design Fleet Characteristics					
vessel name	**length**	**registered length**	**breadth**	**draft**	**homeport**
Lady Ann	106	93.4	27.2	9.6	Anchorage, AK
Lady Helen	90	43.2	n/a	9.3	Juneau, AK
Providence	70	57.9	22.1	6.8	Juneau, AK
Reliance	165	157.5	36.0	12.0	Juneau, AK
Alaska Spirit	98	81.6	24.0	11.7	Kodiak, AK
Lady Alaska	138	124.0	32.0	11.8	Kodiak, AK
Lady Kodiak	126	111.9	32.0	11.8	Kodiak, AK
Northwest Enterprise	162	143.7	38.0	16.0	Kodiak, AK
Northwestern	125	n/a	n/a	n/a	Kodiak, AK
Saga	107	94.3	30.0	11.1	Kodiak, AK
Cougar	96	79.9	24.2	11.3	Newport, OR
Pacific Ram	82	69.7	27.0	13.3	Newport, OR
Perseverance	87	n/a	n/a	n/a	Newport, OR
Predator	90	80.9	34.0	12.5	Newport, OR
Raven	92	84.7	33.0	10.8	Newport, OR
Seeker	98	87.1	26.0	13.0	Newport, OR
Trailblazer	134	n/a	n/a	n/a	Newport, OR
Theresa Marie	93	83.3	30.8	11.8	Petersburg, AK
Golden Pisces	90	81.6	24.0	11.7	Portland, OR
Pegasus	96	88.7	26.9	12.8	Portland, OR
Destinatión	99	98.6	32.2	13.0	Sand Point, AK
Silent Lady	150	139.2	36.1	14.4	Sand Point, AK
Alaskan Beauty	97	91.4	26.1	12.8	Seattle, WA
Aldebran	132	119.0	32.0	13.5	Seattle, WA
Aleutian Ballad	107	97.1	26.0	8.0	Seattle, WA
Aleutian Beauty	98	79.6	27.6	12.3	Seattle, WA
Aleutian Lady	165	154.7	38.1	11.5	Seattle, WA
Aleutian Rover	125	109.3	32.8	13.1	Seattle, WA
Arctic I	115	98.9	30.0	10.5	Seattle, WA
Arctic III	180	166.0	40.0	14.0	Seattle, WA
Arctic IV	155	139.7	36.0	n/a	Seattle, WA
Arctic VI	124	112.8	30.0	n/a	Seattle, WA
Arcturus	132	119.0	32.0	13.5	Seattle, WA
Autumn Dawn	128	106.0	30.1	12.1	Seattle, WA
Barbara J.	110	96.4	30.0	15.7	Seattle, WA
Billikin	132	116.2	31.1	11.2	Seattle, WA
Bountiful	165	n/a	n/a	n/a	Seattle, WA
Brittany	100	100.2	26.0	8.7	Seattle, WA

Columbia	123	106.9	30.2	13.7	Seattle, WA
Deborah D.	101	n/a	n/a	n/a	Seattle, WA
Dominator	124	111.7	41.9	13.6	Seattle, WA
Dona Lilliana	152	149.6	38.0	13.0	Seattle, WA
Dona Martita	152	149.6	38.0	13.0	Seattle, WA
Dona Paulita	152	149.6	38.0	13.0	Seattle, WA
Farwest Leader	110	100.6	26.0	8.8	Seattle, WA
Flying Cloud	124	111.7	42.0	13.6	Seattle, WA
Golden Dawn	149	132.6	30.9	14.3	Seattle, WA
Karin Lynn	127	113.8	29.5	12.7	Seattle, WA
Kodiak Queen	145	144.6	29.1	14.0	Seattle, WA
Majesty	106	90.7	30.0	14.2	Seattle, WA
Metrofania	95	n/a	n/a	n/a	Seattle, WA
Northwind	105	81.6	30.0	11.7	Seattle, WA
Notorios	119	119.6	32.0	12.2	Seattle, WA
Pacific Viking	130	112.4	28.2	13.0	Seattle, WA
Polar Lady	105	87.7	34.0	10.8	Seattle, WA
Royal Viking	108	91.9	27.3	9.3	Seattle, WA
Sea Rover	108	91.8	27.3	9.3	Seattle, WA
Sultan	111	113.3	30.0	11.5	Seattle, WA
Tanya Rose	90	71.6	23.0	12.1	Seattle, WA
Tempest	112	82.6	26.0	9.4	Seattle, WA
Valiant	111	104.7	26.0	10.1	Seattle, WA
Viking Explorer	125	111.5	32.0	10.7	Seattle, WA
Wizard	156	150.7	30.1	13.1	Seattle, WA
Last Frontier	88	88.7	26.0	8.0	Ugashik, AK
mean	*118.5*	*106.5*	*30.7*	*11.9*	
median	*111.5*	*102.6*	*30*	*12.1*	
range	*110*	*122.8*	*19.9*	*9.2*	
minimum	*70*	*43.2*	*22.1*	*6.8*	
maximum	*180*	*166*	*42*	*16.0*	

Source: ResourcEcon, February 2000. Data from Trident Seafoods, the U.S. Coast Guard and the Alaska Commercial Fisheries Entry Commission

note: n/a indicates that data were not available. The draft was also omitted For the Arctic VI and Arctic VI because the data appeared to be in error.

Residence and ownership are important determinants of demand for a harbor in Akutan. Vessels owned by Alaska residents are likely to use harbors in their hometowns if space exists. Eleven vessels owned wholly by Trident and six vessels owned in part by Trident will be very likely to use Akutan because of Trident's commitment to making such a harbor feasible. Vessels that are owned by residents of other states would attempt to use an Akutan harbor when practicable in order to reduce expenses. Interviews with vessel owners of the Akutan nonresident fleet did not identify any vessels with permanent moorage in other

locations. Table A2-8 shows the Akutan nonresident fleet by the vessel owner's region of residence

TABLE A2-8.—*Summary of Akutan Design Fleet owner's area of residence*

Vessel Owner's Region or State of Residence	No. of Vessels	percent
Washington	41	64.1
Oregon	9	14.1
Kodiak	6	9.4
Sand Point	2	3.1
Southcentral/Southeast Alaska	5	7.8
Other	1	1.5
Grand Total	**64**	**100**

Sources: Trident Seafoods vessel list and 1999 Alaska Commercial Fisheries Entry Commission Vessel Registration Files

Akutan nonresident fleet moorage demand is expected to vary by season, with peaks expected to occur between November 15 and January 15 and between April 15 and August 15 (for both trawl and pot vessels), when pollock and crab seasons are closed.

According to Trident Seafoods representatives, all company-owned vessels (17) would regularly use a harbor in Akutan between fishing seasons. A conservative moorage demand estimate for the Akutan nonresident fleet is the demand created by the non-Alaskan-owned vessels (64) in the nonresident fleet. The 50 non-Alaskan vessels include the 17 Trident-owned vessels.

3.4.3 Transient Fleet

The transient fleet is defined as those vessels that participate in the BSAI fisheries but do not make regular deliveries to Trident. To determine the number of vessels in the transient fleet, the number of Akutan nonresident vessels (those making regular deliveries to Trident) was subtracted from the number of vessels that participate in the BSAI fisheries and do not have preferential moorage arrangements.[3] The resulting number (222) includes trawl, pot, and other vessels.

There are 42 trawl vessels, without permanent moorage, that deliver to offshore processors, floating processors, and motherships. These 42 vessels are part of public demand for moorage space. Another 29 trawl vessels deliver pollock to Trident's Akutan plant, and

[3] Twenty-eight trawl vessels are able to moor at the processing plants where they make deliveries.

20 vessels fish for pollock out of King Cove, Sand Point, and Kodiak. The BSAI pollock fishery involves a total of 91 trawl vessels (42 + 29 + 20) that seek public moorage in western Alaska ports.

There are several other vessel types that participate in the BSAI fisheries on occasion and add to the public moorage demand. However, these vessels, such as hook-and-line vessels, do not contribute consistently to moorage demand because they generally return to their homeport at the end of the season and are difficult to quantify. The analysis of the transient fleet quantifies only the trawl and pot catcher vessels participating in the BSAI fisheries.

Table A2-9 summarizes the overall moorage demand by the trawl and pot vessels that participate in the BSAI fisheries. The table delineates the approximate split between Alaskan- and non-Alaskan-owned vessels.

TABLE A2-9.—*Bering Sea and Aleutian Islands fleets*

3.4.3.1

	Catcher Vessel Type	Typical Length Overall (Feet)	Vessel Owner Residence	Number of Vessels
Pollock	Trawl	90-150		**91**
			Alaska	14
			Not Alaska	77
Crab	Pot	90-155		**250**
			Alaska	105
			Not Alaska	145
Total				**341**
			Alaska	119
			Not Alaska	222

Source: Commercial Fisheries Entry Commission vessel registration files.

The 341 pot and trawl vessels identified above as the total BSAI fleet include the Akutan design fleet nonresident fleet. Table A2-10 shows the Akutan nonresident and transient fleet components for the BSAI fisheries.

TABLE A2-10.—*Akutan nonresident and transient fleet components for BSAI fisheries*

Fleet	Trawl	Pot	Total
Akutan nonresident fleet	**37**	**49**	**86**
Alaskan-owned	6	16	**22**
Non-Alaskan-owned	31	33	**64**
Transient fleet	**54**	**201**	**255**
Alaskan-owned	8	89	**97**
Non-Alaskan-owned	46	112	**158**
BSAI participants	**91**	**250**	**341**
Alaskan-owned	14	105	**119**
Non-Alaskan-owned	77	145	**222**

Source: Commercial Fisheries Entry Commission vessel registration files.

The 97 Alaskan-owned vessels in the transient fleet have preferential moorage in Alaska or at least a preference for moorage in proximity to the owner's residence. Therefore, only the non-Alaskan-owned vessels in the transient fleet are expected to create demand for public moorage at Akutan. Table A2-11 summarizes the non-Alaskan-owned vessels that contribute to the demand for public moorage.

TABLE A2-11— *Moorage demand by transient fleet*

Vessel Type	Number of Vessels
Trawl	46
Pot	112
Total	**158**

3.4.4 Summary of Moorage Demand

Combining the components of demand for moorage results in a peak estimate of 242 vessels. This number includes 20 Akutan resident vessels, 64 non-Alaskan vessels in the Akutan nonresident fleet, and 158 trawl and pot vessels in the transient fleet. The Akutan resident fleet and the non-Alaskan boats in the Akutan nonresident fleet would prefer some type of preferential moorage arrangement, although the cost of such moorage will be a factor in the decision to select permanent or preferential moorage as opposed to transient moorage. Peak demand occurs during off-season period between November 15 and January 15. The type of moorage during the off-season is long-term, with vessels moored on a continual basis. Table A2-12 shows the total peak season demand.

TABLE A2-12.—*Peak moorage demand summary by fleet*

Fleet	Number of Vessels
Akutan resident	20
Akutan nonresident, non-Alaskan-owned vessels	64
Transient	158
Total Peak Demand	**242**

Note: Peak demand occurs between November 15 and January 15.

Vessels seeking moorage during the fishing season are tied to the dock for short periods for minor repairs and for restocking supplies. The entire Akutan resident fleet and portions of the Akutan nonresident and transient fleets create demand for short-term moorage during the fishing seasons.

3.4.5 Vessel Response to Available Moorage Space

There are 222 non-Alaskan-owned vessels in the BSAI fishing fleet that seek public moorage in Alaska. Their general preference is for moorage in Dutch Harbor/Unalaska. If Dutch Harbor/Unalaska is filled, the next-closest alternative for Bering Sea vessels is King Cove, followed by Sand Point and Kodiak respectively. If all moorage spaces are filled in these four harbors, the vessels generally travel south to Seattle or other Pacific Northwest ports for moorage.

The number of vessels seeking moorage must be adjusted to account for trips made to other ports for inspection and maintenance. Currently, trawl vessels unable to find moorage in Dutch Harbor/Unalaska must make two trips to other ports: in March or April at the end of the winter fisheries, and again at the end of the fall fisheries in October. In addition to long-term moorage needs at about these same times, crab vessels need shorter-term moorage between the September and October crab openings. Crab vessels unable to find moorage in western Alaska ports during this short period seldom travel to Pacific Northwest ports because of the time and expense required to travel these distances. The vessels will anchor in different bays, and crewmembers will remain on board to monitor the boat and perform routine maintenance.

4 DESCRIPTION OF ALTERNATIVE PLANS

4.1 Non-Structural Alternatives

Under without project conditions in Akutan, the fishing industry will continue to operate without adequate moorage. The results of this will include:

- Damage to vessels and docking facilities from overcrowded conditions
- Vessels will be constrained in achieving full fishing effort as they compete for limited mooring space
- The local small boat fleet will not have access to secure moorage. This will result in reduced subsistence production and will constrain opportunities for development of small vessel groundfish operations
- Economic benefits to the fleet of commercial vessels fishing within the region will continue to incur substantial annual expenses associated with travel to alternate ports.

4.2 Structural Alternatives

There is a detailed description of the alternatives considered in Appendix A, section 6.0 (Alternatives Considered). In addition to the no-action alternative, several alternative sites were considered for the proposed project. The sites included: Akutan Point, North Shore Area 1, North Shore Area 2, Salthouse Cove, North Creek, Head of the Bay,Whaling Station, South Shore Area 1, South Shore Area 2 and South Shore Area 3. Table 6-1 in Appendix A details the respective advantages and disadvantages for each of the site considered.

4.3 Summary of Alternatives

A preliminary site assessment for the project recommended the North Creek site as the most likely site for consideration in the feasibility study. Subsequent studies revealed that the North Creek site was unsuitable because of the steeply sloping terrain. Development on the site was limited to a long narrow harbor of approximately nine acres, which was not likely to be an economically viable harbor.

The focus of the project shifted to the head of the bay, and several types of alternative harbor designs were considered: an offshore harbor, an onshore/offshore harbor and a dredged inland harbor. The basin sizes evaluated were 12 acres, 15 acres and 20 acres. Detail on the specific design considerations and constraints are presented in Appendix A, Section 6. Due to engineering design, cost, and environmental considerations, the inland harbor was selected as the best choice for the harbor design. The proposed harbor will provide protected moorage for 38, 48 or 60 Bering Sea fishing vessels (12 Acre Basin, 15 Acre Basin and 20 Acre Basin, respectively) as well as the 20 skiffs owned by Akutan residents. Moorage inside the harbor will be at parallel slips, allowing vessels quick arrivals and departures and preventing rafting and other wave-induced vessel damage.

5 WITHOUT-PROJECT CONDITIONS

The absence of moorage in Akutan causes large vessels to move to other harbors in an effort to secure protected moorage, and causes local residents to haul their small vessels from the water to be stored onshore. These actions cause increased maintenance and repair requirements for vessels and facilities, require vessels to be moved about the congested mooring areas in other ports, and require operators to take special precautions during storms. These activities consume time and labor and raise operating costs, causing operators to incur additional expenses, thereby reducing net income.

Vessels that operate primarily from Akutan, or are supported by the local processing plant, incur significant damage from rafting at ports that are more distant. When one vessel needs to move, vessels to the outside have to be untied and then the raft must be reassembled. This process requires the time and effort of several people and can be lengthy if these large vessels must be moved by physical labor, which is difficult to accomplish in windy conditions. All of these problems cause increased operating costs and loss of time for the vessels' crew.

Most vessels in the Bering Sea fleet, including vessels delivering to Akutan or supported by the local plant, will continue to seek moorage western Alaska that is available on a first-come, first-served basis. As a result, some vessels will travel to Seattle or other Pacific Northwest ports for moorage because they will be unable to find moorage in western Alaska.

The proposed harbor would be designed to accommodate smaller boats owned by local residents as well as larger vessels delivering to the local processing plant. The presence of a harbor would reduce out-migration from the community by enabling local residents to obtain vessels larger than their current skiffs and participate in local fisheries. A harbor would also reduce the potential for damage to local docks and vessels during storm conditions.

The number of commercial vessels seeking moorage in Akutan harbor is projected to remain at the levels presented in this document over the 50-year period of the analysis. The number of vessels is based on information from documents supporting the most recent management changes. Although there will be minor increases and decreases as marginal operators move in and out of the industry, and as additional management changes occur, the overall trend is for no significant increase or decrease.

5.1 Vessel Operating Costs

The cost of operating a vessel is an important factor considered by a vessel owner when evaluating options at the end of a fishing season. Many vessels might not travel to Pacific Northwest ports during the off season if harbor space were available in Akutan. The reduced operating costs and the time available to the crewmembers for other activities are benefits that may result from a harbor in Akutan. The *Fleet Survey Project* report prepared by Northern Economics and ResourcEcon in 1997 provides vessel operating costs and the

opportunity cost of time for crewmembers based on trawl or pot vessel type and length overall Information from that study is presented here for trawl and pot vessels.

The trend is toward fewer trawl fishing days per year, reflecting the movement to shorter seasons that has occurred over the past decade. Recent regulatory changes are expected to decrease the number of vessels participating, but increase the length of the fishing season.

The vessel operating costs presented in the 1997 *Fleet Survey Project* are characterized by vessel type in Tables A2-13 and A2-14.

TABLE A2-13.—*Trawl vessel cost profile*

	Cost for Line Items by Vessel Group ($)			
Item	**100 feet or less**	**101 feet to 130 feet**	**131 feet to 160 feet**	**Greater than 160 feet**
Fuel, lube and hydraulic oil	115,452	213,540	338,512	$462,031
Vessel and machinery maintenance	69,021	217,413	406,475	593,339
Fishing gear maintenance and repair	28,316	28,316	28,316	28,316
Bait	5,887	5,887	5,887	5,887
Food	12,778	12,778	12,778	12,778
Other stores and supplies	5,434	21,686	84,357	245,201
Licenses	3,509	9,435	16,985	24,448
Freight cost	1,042	1,713	2,791	4,096
Hull and machinery insurance	51,101	79,354	115,350	150,928
Moorage or storage	6,449	10,392	15,415	20,380
Business expenses[1]	386,382	507,142	661,000	813,068
Crew costs:				
Crew share	45,811	54,326	65,175	75,897
Crew salary and benefits	29,695	40,282	53,770	67,101
P&I[2] insurance and other	16,648	29,704	46,339	62,780
Total[3]	**$702,019**	**$1,137,361**	**$1,734,206**	**$2,423,252**

Source: Northern Economics and ResourcEcon, *Fleet Survey Project,* 1997.

Notes:

[1] Business expenses include observer fees and assessments/fish taxes

[2] P&I = Liability protection and indemnity

[3] Total operating costs do not include crew salary and benefits or P&I insurance and other.

TABLE A2-14.—*Pot vessel cost profile*

Item	Cost for Line Items by Vessel Group ($) 100 feet or less	101 feet to 130 feet	131 feet to 160 feet	Greater than 160 feet
Fuel, lube and hydraulic oil	34,716	57,217	87,854	107,442
Vessel and machinery maintenance	66,203	113,623	204,029	278,890
Fishing gear maintenance and repair	32,336	36,309	41,718	45,176
Bait	15,722	23,627	34,390	41,272
Food	11,273	14,117	17,989	20,465
Other stores and supplies	3,486	11,737	61,305	176,400
Licenses	1,963	2,403	3,002	3,385
Freight cost	1,086	1,642	2,569	3,263
Hull and machinery insurance	54,627	70,105	91,181	104,655
Moorage or storage	6,741	10,012	14,466	17,314
Business expenses[1]	58,924	59,340	59,907	60,270
Crew costs:				
Crew share	261,138	410,571	670,435	871,102
Crew salary and benefits	46,442	53,506	63,125	69,275
P&I[2] insurance and other	27,375	36,028	47,809	55,341
Total[3]	**$548,216**	**$810,703**	**$1,288,845**	**$1,729,632**

Source: Northern Economics and ResourcEcon, *Fleet Survey Project,* 1997.

Notes:

[1] Business expenses include observer fees and assessments/fish taxes

[2] P&I = Liability protection and indemnity

[3] Total operating costs do not include crew salary and benefits or P&I insurance and other.

Pot and trawl vessels that are unable to find moorage in Akutan or Dutch Harbor must travel to more distant ports when major fishing seasons are closed and they have no other activities in which to engage.

Most hook-and-line vessels operating in the BSAI management areas return to their homeports or go to other fishing areas during winter to undertake repairs and maintenance or pursue other fisheries. Because most of the hook-and-line vessels are not traveling to other ports to seek moorage in the off season, they do not substantially contribute to moorage benefits. The vessels will make a minimal contribution to moorage demand while they are operating near Akutan during the fishing season, but their demand is not readily quantifiable.

There are other factors that may affect harbor demand. Insurance underwriters require that large catcher vessels be inspected twice during a 5-year period. The vessel must be dry-docked for the inspections, and vessels generally have a 2-year period and a 3-year period between inspections. Vessels smaller than about 95 feet in length can be hauled at the Walashek Shipyard in Dutch Harbor/Unalaska, but larger boats must travel to Seward or Ketchikan in Alaska, or to shipyards in the Puget Sound and Portland areas. Over a 5-year period, vessels will use 2 of the 10 semiannual (summer or late fall) fishing closures to travel to a shipyard for inspections.

5.1.1 Vessel Travel Costs

The trawl and pot vessels that must travel to other harbors in Alaska and the Pacific Northwest to find moorage incur travel costs for the vessel and crew. The majority of expense incurred by the vessel during travel between harbors is for fuel and oil. For this analysis, fuel costs were estimated at $1.31 per gallon (an average of the 2001 fuel costs in Akutan and the Pacific Northwest) and oil costs were estimated at 7 percent of total fuel costs. The 1997 *Fleet Survey Project* data indicate that there are relatively small differences in fuel consumption and speed between the average trawl and pot vessels. Therefore, travel costs for these vessel types have been averaged for this analysis. The fuel consumption per hour was calculated by the estimated regression line for pot and trawl vessels matching the Akutan harbor design fleet (Average length 118 feet) from the 1997 Fleet Survey. The estimated fuel use for these calculations is an average of 42 gallons per hour. Table A2-15 summarizes the roundtrip travel costs.

TABLE A2-15.—*Estimated roundtrip travel costs from Akutan to other harbors for trawl and pot vessels*

	Harbor				
Travel Cost Item	**Dutch Harbor**	**King Cove**	**Sand Point**	**Kodiak**	**Juneau**
Distance (nautical miles)	58	268	394	1002	2,158
Average speed (knots)	9.5	9.5	9.5	9.5	9.5
Time (hours)	6.1	28.2	41.5	105.5	227.2
Fuel consumption (gallons)	256	1,185	1,742	4,430	9,541.0
Fuel/oil costs[a]	$359	$1,661	$2,442	$6,209	$13,372

Source: *Fleet Survey Project,* 1997.
Notes:
[a] Based on estimated fuel cost of $1.31 per gallon
[b] Estimated at 7 percent of total fuel costs

TABLE A2-15 (con't).—*Estimated roundtrip travel costs from Akutan to other harbors for trawl and pot vessels*

	Harbor		
Travel Cost Item	**Petersburg**	**Seattle**	**Portland**
Distance (nautical miles)	2,250	3,336	3,408
Average speed (knots)	9.5	9.5	9.5
Time (hours)	236.8	351.2	358.7
Fuel consumption (gallons)	9,947	14,749	15,067
Fuel/oil costs[a]	$13,943	$20,673	$21,119

Source: *Fleet Survey Project,* 1997.
[a] Based on estimated fuel cost of $1.31 per gallon and oil use estimated at 7 percent of total fuel costs

5.2 Opportunity Cost of Time

Travel results in additional costs for vessels and crew. If fishers are traveling between ports, they are not receiving crew share because they are not pursing harvesting activities and are not able to pursue other work or leisure activities. The opportunity cost of time is the value of other work or leisure activities foregone during the time the vessel is traveling between ports or experiencing work interruptions (for example, when congestion delays vessel movement). The more time the crew would spend traveling from Akutan to another harbor, the greater the benefit from establishing a harbor in Akutan.

In calculating the opportunity cost of time, the value of the next-best alternative use of the worker's time is employed. For this report, the value of leisure time is considered the most appropriate measure. According to Engineering Regulation (ER) 1105-2-100, in lieu of a project-specific estimate of the opportunity cost of leisure, a value equal to one-third the wage rate is used.

Based on the 1997 fleet survey by Northern Economics and ResourcEcon, one-third the hourly wage rate for Alaska commercial fishers working in the BSAI fisheries is $14.67, or approximately $15.00.

The estimated opportunity costs for crews traveling between Akutan and other harbors are presented in Table A2-16 for the reduced number of crew typically used for vessel travel.

TABLE A2-16.—*Estimated crew opportunity costs per vessel for roundtrips from Akutan to other harbors*

	Harbor		
Vessel Operating Cost Item	**Seattle**	**Portland**	**Average**
Number of crewmembers	3	3	
Distance (nautical miles)	3,336	3,408	
Average speed (knots)	9.5	9.5	
Time (hours)	351.2	358.7	
Opportunity cost of crewmembers' time[a]	$ 15,802	$16,143	$15,973

Source: Estimated from data presented in *Fleet Survey Project,* 1997.
Note: [a] Opportunity cost of crewmembers' time computed at $15 per hour

5.3 Expenses Under Existing Conditions

5.3.1 Expenses Related to Rafting and Congestion

Rafting causes damages to vessels through minor collisions from other vessels and bumping against the dock cause scratches and dents, and damages to rails, guards, hardwood, and vessel fixtures. Annual damages vary depending on the size and type of vessel. In interviews, owners of large catcher vessels cited annual damages averaging $5,000.

5.4 Subsistence Activities

Under the without project conditions, local residents have limited access to secure, year-round moorage for their skiffs. As discussed in Section 8 of this report, residents' harvests of subsistence foods are constrained by lack of moorage, particularly during the winter months. As a result, residents are forced to use import substitution for culturally preferred subsistence foods. The alternative is to purchase meats, predominantly at the local Akutan Store.

6 WITH-PROJECT CONDITIONS

6.1 NED Benefits for the Proposed Project

The proposed Akutan harbor National Economic Development (NED) benefits for each of the basin sizes. The with-project benefits are described in the sections below. The with-project conditions reflect changes that will result to Bering Sea commercial fishing businesses and residents of Akutan as a result of the project. The constraints project will help to address the constraints identified in the without-project conditions. However, there will still be unmet demand for moorage in the region, even with completion of this project.

6.2 Benefits from Dredged Materials

The productive use of dredged material from the harbor site will result in a greater economic benefit than at-sea disposal. The three harbor alternatives will result in substantial quantities of dredged materials that are valuable for uses in other projects in the region. Sand for building and construction projects is a scarce commodity in Akutan, Unalaska/Dutch Harbor and other communities in the region. The proposed project will produce a relatively scarce material: coarse to fine grained sand. Once drained, this material will be suitable for use in construction projects.

In a recent contract with South Coast Construction in Unalaska/Dutch Harbor (South Coast construction, personal communication, December 2001), it was revealed that old concrete was being collected and broken up to obtain the necessary fines for new concrete. In another instance, sand was barged in to Unalaska/Dutch Harbor from Nelson Lagoon. The contractor estimated the value of sand on-site in Unalaska Dutch Harbor to be $20 per ton.

The alternatives will produce the following volumes of dredged sand:

12 Acre Basin	850,000 cubic yards
15 Acre Basin	990,000 cubic yards
20 Acre Basin	1,175,000 cubic yards
Reconfigured 12 Acre Basin	843,000 cubic yards

Using a factor of 1.62 tons of sand per cubic yard, and assuming that 425,000 cubic yards (72,000 cubic yards for the reconfigures 12 acre basin) will be needed for the Akutan project to develop uplands, the alternatives will have surplus amounts for each alternative shown in Table A2-17.

A spreadsheet model was developed to calculate the value of the dredged sand, net of transportation costs from Akutan to Unalaska. The dredged materials were assumed to be sold in four equal increments over time, at the end of five years, ten years, fifteen years and twenty years. The present value of the sand at the end of each of those periods was calculated, using the current Corps of Engineers discount rate of 5.625 percent. The present value for the sand was calculated, and then the annual benefits were calculated over the 50 year life of the project to arrive at a benefit from use of the dredged materials.

Table A2-17: Value of Dredged Sand for Akutan Project Alternatives

harbor size/alternative	12 acre inland	15 acre inland	20 acre inland	reconfigured 12 acre
total dredged cubic yards	850,000	990,000	1,175,000	843,000
amount needed on site	425,000	425,000	425,000	72,000
available sand	425,000	565,000	750,000	771,000
convert yards to tons	688,500	915,300	1,215,000	1,249,020
value of sand @$20/ton	$13,770,000	$18,306,000	$24,300,000	$24,980,400
cost of transportation (2.13/ton)	$1,466,505	$1,949,589	$2,587,950	$2,660,413
gross value of dredged sand	$12,303,495	$16,356,411	$21,712,050	$22,319,987
present value of dredged material sales over 20 years	$6,502,125	$8,644,001	$11,474,338	$11,795,620
annual benefit over 50 years	$391,092	$519,922	$690,163	$709,487

6.3 Damage to Vessels

Vessels mooring in the Akutan harbor will not incur rafting damage and the resulting annual cost associated with that damage. In designing the inner-harbor configuration for the Akutan dock, a parallel moorage configuration was selected to take best advantage of the available space in the basin while still providing secure moorage for harbor users. The parallel moorage within a wave-protected harbor should prevent any vessel damage while moored within the Akutan Harbor. However, these vessels will spend at least part of the year operating in other areas, and may continue to incur mooring damage in those other locations. An average annual rafting damage of $5,000 was reduced by one-quarter of that annual damage amount ($1,250 per vessel) to account for the measure of protection afforded while utilizing the Akutan Harbor.

In the with-project condition, the prevention of damage to vessels will provide $1,250 x 38 vessels, or a total annual benefit of $47,500 (Alternative 1). For Alternative 2 the annual benefit is $1,250 x 48 vessels ($60,000) and for Alternative 3, the annual benefit is $1,250 x 60 vessels ($75,000).

6.4 Vessel in-Season Mooring Costs

Two or three times every fishing season, vessels fishing in the Bering Sea come to the end of a fishery opening and have to find short-term moorage until the next fishery opens. The proposed project will allow between 38 (12 Acre Basin) and 60 (20 Acre Basin) vessels to obtain secure moorage in Akutan.

The benefits associated with this moorage were calculated based upon two trips to obtain moorage every season. It is assumed that the fleet, in the absence of the project, would be forced to seek moorage in other ports, from preference to the closer port of Unalaska, to King Cove, Sand Point, Kodiak, ports in Southeast Alaska and finally in the Pacific Northwest (Seattle areas and Portland/Astoria).

Since each end of the season is an independent event, we can't know with certainty which of the harbors the vessels projected to utilize the Akutan harbor would have found. It was assumed that the capacity of the harbor (38, 48 and 60 vessels) would have obtained seasonal moorage 25 percent in the closest ports (Dutch Harbor, King Cove and Sand Point). The second 25 percent would find moorage in Kodiak. The third 25 percent would find moorage in Southwest Alaska (Juneau and Petersburg) while the remaining 25 percent would be forced to travel to the Pacific Northwest. Table A2-15 estimated the travel costs to these alternate port. The total benefit from elimination of this cost for the different alternatives is as follows. The estimated costs for reduced costs associated with in-season moorage include only vessel operating costs and do not include opportunity costs for the crew members.

The travel costs are averaged round trips to/from the ports of 1) Dutch Harbor-King Cove-Sand Point, 2) Juneau & Petersburg, 3) Seattle and Portland. The port of Kodiak is a discrete travel distance/cost in itself. The travel costs used for this calculation are shown in Table A2-15 as follows: Dutch Harbor – King Cove – Sand Point average cost of $1,487/trip; Kodiak $6,209/trip; Juneau-Petersburg average cost of $13,658/trip; and Seattle-Portland average cost of $20,896/trip.

12 Acre Basin

38 vessels times the travel cost per trip (as shown in Table A2-15) times two trips per year results in an annual cost of $761,436. The calculation is as follows: (2 trips per year x 10 vessels x $1,487/trip) plus (2 trips per year x 10 vessels x $6,209/trip) plus (2 trips per year x 10 vessels x $13,658/trip) plus (2 trips per year x 8 vessels x $20,896/trip).

15 Acre Basin

48 vessels times the travel cost per trip (as shown in Table A2-15) times two trips per year results in an annual cost of $1,014,025. The calculation was made in the same manner as

shown above for the 12 acre basin, with the vessel distribution of 12 vessels for each of the alternate port destinations.

20 Acre Basin

60 vessels times the travel cost per trip (as shown in Table A2-15) times two trips per year results in an annual cost of $1,267,532. The calculation was made in the same manner as shown above for the 12 acre basin, with the vessel distribution of 15 vessels for each of the alternate port destinations.

6.5 Pacific Northwest Annual Travel Cost

As discussed earlier in the report, in the absence of secure moorage in Akutan, fishing vessels travel back to their home ports in the Pacific Northwest at the end of the fishing season. Moorage in Akutan will save these vessels the travel costs associated with the trip once every other year (0.5 times per year). Every other year, vessels will still travel to the Pacific Northwest to take care of regular maintenance, haul out and insurance inspections. The project benefit will come from the elimination of one end-of-season trip to the Pacific Northwest each year. This trip will still be necessary every two to three years for vessel and gear maintenance, overhaul, insurance inspections, drydock maintenance and other needed repairs and refitting.

The benefits estimated result from the reduction of one trip every other year to the Pacific Northwest. This is and end-of-season return to the vessel's homeport and not in-season moorage. The calculation is based on the savings of one trip every other year. Since the without-project condition is to return to the Pacific Northwest every year, we believe it is appropriate to include the opportunity cost of time based on the survey data from the 1997 Fleet Survey Project for Seattle and Portland.

The benefits associated with elimination of this cost are as follows:

Alternative 1

Taking the average travel cost to the Pacific Northwest from Table A2-15 ($20,896) x 0.5 times per year plus the average Pacific Northwest opportunity cost from Table 2A-16 ($15,973 for 3 crew members) x 38 vessels equals times 0.5 times per year equals $700,508.

Alternative 2

Taking the average travel cost to the Pacific Northwest from Table A2-15 ($20,896) x 0.5 times per year plus the average Pacific Northwest opportunity cost from Table 2A-16 ($15,973 for 3 crew members) x 48 vessels x 0.5 times per year equals $884,853.

Alternative 3

Taking the average travel cost to the Pacific Northwest from Table A2-15 ($20,896) x 0.5 times per year plus the average Pacific Northwest opportunity cost from Table 2A-16 ($15,973 for 3 crew members) x 60 vessels equals $1,106,066.

Future benefits from this category will be dependent upon vessels being able to obtain seasonal moorage in the Pacific Northwest every other year. The current policy regarding priority moorage in the Fishermen's Terminal in Seattle is provided by the following information:

> *"In January 2002, the Port of Seattle Commission adopted Resolution No. 3480, as amended, which allows non-commercial vessels to moor in slips not needed by the fishing and commercial workboat industries. On May 14, 2002, the Commission reviewed the Introduction Plan that reaffirms that the Terminal is a facility primarily for the fishing industry, meets the requirements of Resolution No. 3480, as amended, and has been reviewed and approved by the Fishermen's Terminal Advisory Committee (FTAC) and other interested users of the Terminal."*
>
> *Source: letter from Kenneth R. Lyles, General Manager, Fishermen's Terminal, May 29, 2002.*

In addition to the above, the letter stipulates that:

- *"Priority for vessel moorage will be given to those vessels actively engaged in bona fide commercial fishing operations and to those vessels otherwise qualifying but inactive due to govern mandated closure of their fisher(ies). Second priority will be given to shoes vessels actively engaged in commercial marine operations and those that become inactive while moored while at the Terminal. Third priority will be given to vessels not actively engaged in commercial fishing or marine operations, including recreational vessels."*

- *Vessels not engaged in commercial operations will be permitted only if they do not displace commercial fishing, commercial marine operations or impede fishing or industrial operations.* (emphasis added)

Another letter from Charlie Sheldon, managing director of the Seaport at the Port of Seattle was published in the Seattle Post-Intelligencer on May 14, 2002. This letter provides the following comments:

- *"Fishermen's Terminal is without question the best facility for fishermen on the West Coast, with a special combination of businesses, moorage and facilities to help support and maintain their industry."*

- *"Fishermen's Terminal is not in decline. It has been renovated a number of times. It went through a $13 million expansion in 1988 and is currently undergoing a $35 million, three-year improvement project."*
- *"Throughout its history, fishermen and the port have insisted that the Fishermen's Terminal be maintained as an industrial facility for working boats. Over the years, we have added tenants on the uplands to improve the business climate, such as restaurants and the Wild Salmon fish market, but we have been able to maintain the working character of the area."*

It is clear from these policy documents that while it is true that the Port of Seattle passed a resolution allowing recreational use for unused moorage in Fishermen's Terminal, commercial fishing vessels clearly have the priority use of the facility. There should be no diminished availability for moorage of vessels fishing in the Bering Sea and traveling to the Pacific Northwest for moorage, vessel and gear maintenance and overhaul, insurance inspections and other needed services and drydock maintenance and repairs and refitting.

6.6 Subsistence Benefits

The Akutan project will provide moorage space for 20 locally-owned skiffs that are utilized by residents to produce subsistence foods for their family's consumption. The ability of these residents to keep their skiffs in the water and ready for use will increase their subsistence activities and harvests. The local residents will therefore benefit from increased subsistence production as a direct consequence of the project.

Subsistence is a household production in Akutan, similar to many remote communities in Alaska. The term includes traditional food gathering activities practiced by the Aleut residents living in the village of Akutan. There is no market value associated with subsistence production because it is a non-market commodity. Placing a value on increased subsistence production requires the use one of several methods to determine a value for non-market goods.

The study team favors a methodology to determine the value of increased subsistence value by its substitution value. That is, what is the value (local cost) of the food that will be replaced by subsistence production. This substitution methodology acknowledges that it overlooks the cultural values inherent in production and consumption of subsistence foods (Peterson et al., 1992).

Table A2-18 shows the current (January 2002) cost for meats in Akutan. This table is based on interviews with the Akutan Store, the only store in the community. The average price per pound for all meat products is $6.15 per pound. This represents the cost for residents for meats they have to purchase, if their subsistence harvests are insufficient to meet their needs. This average cost is similar, although slightly lower, than the average cost per pound of $6.74 recently reported in the Corps of Engineers feasibility report for the False Pass, Alaska Navigation Improvements study (Corps of Engineers, 2000). The shadow price for subsistence production is based upon the per pound value of all substitute foods purchased by Akutan residents.

The calculation of the value of increased subsistence production by Akutan residents is made by multiplying 466 pounds per capita (annual consumption) by 15 percent (the estimated increase in production resulting from project completion). This result in multiplied by 112, the number of residents in Akutan and then multiplied by $6.15 per pound, the weighted average of all substitute food products in the Akutan store. Subsistence benefits only account for two and one-half percent of the total project benefits. However, to the Aleut residents of the village of Akutan, these are perhaps the most important benefits of the project.

Table A2-18: Cost for Food Items at Akutan Store

food item	price per pound	food item	price per pound
ground beef	$2.45	Bacon	$4.18
cube steak	$5.82	beef sausage	$6.65
rib steak	$11.29	ham	$3.95
T-bone steak	$11.28	hot dogs	$4.88
Sirloin roast	$4.32	Bologna	$1.61
Beef ribs	$5.35	Pepperoni	$10.70
beef spare ribs	$3.81	Salami	$9.42
stew beef	$4.51	sliced ham	$6.14
pork spareribs	$4.21	canned clams	$8.62
pork chops	$6.04	Oysters	$10.79
pork loin	$6.04	Vienna sausages	$3.16
ham hocks	$4.71	Herring	$4.04
Polish sausage	$4.22	micro clams	$11.91
game hens	$4.27	beef jerky	$12.96
Chicken breast	$5.54	breaded cod fillets	$7.21
Chicken fryer	$2.09	breaded prawns	$6.29
Turkey	$1.92	salt pork	$3.89
canned shrimp	$11.75	fish sticks	$5.36
Average price per pound – all items			**$6.15**

Source: Akutan Store, January 2002.

6.7 Summary of Benefits

A summary of project benefits is shown in Table A2-19 for the benefit categories discussed above.

Table A2-19

Summary Sheet for Akutan Small Boat Harbor Benefits: Annual Benefits

Benefit Category	12 Acre Basin	15 Acre Basin	20 Acre Basin	reconfigured 12 acre basin
1) use of dredged materials	$391,000	$520,000	$690,000	$709,000
2) operating cost reductions				
2(a) reduced travel to Pac NW	$701,000	$885,000	$1,106,000	$701,000
2(b) In-season moorage travel costs	$761,000	$1,014,000	$1,268,000	$761,000
3) prevention of rafting damage	$48,000	$60,000	$75,000	$48,000
4) increase to subsistence production	$48,000	$48,000	$48,000	$48,000
Total Annual Benefits	**$1,949,000**	**$2,527,000**	**$3,187,000**	**$2,267,000**

7 REGIONAL BENEFITS

The evaluation of regional benefits provides information for the residents of the Akutan, as well as the Aleutians East Borough on some of the impacts of the proposed project. The Corps of Engineers project evaluation methodology provides a structures analysis of the benefits to the nation resulting from the project. The Corps federal interest is based on costs and benefits evaluated under the national economic development (NED) guidelines.

While the national accounting stance is appropriate for the Corps of Engineers project evaluation, the local sponsor has a more focused concern. The project sponsor, the Aleutians East Borough and the City of Akutan, need to know that the facility will be a financial asset to their community. The important questions for these local government entities are, will the project add diversification and stability to employment in the region? Will it serve the moorage needs of the residents?

Although meeting the moorage needs of the community takes a relatively small portion of the moorage basin, it is an important aspect of providing benefits to Akutan residents. As discussed in the benefits section, local residents will gain the benefit of increased subsistence production as a result of the project. Moorage in the community will also allow several local residents to enter commercial fishing activities. The participation of the community in the Aleutian Islands/Pribilof Community Development Quota group provides them with access to fisheries resources that they may be able to pursue, with the advantage of moorage in the community. Under the without-project condition, residents interested in commercial fishing are forced to leave the community to operate.

There is an inshore waters State waters fishery for Pacific cod that is only open to small boats, such as those owned by the residents of Akutan. Again, having moorage available during the Pacific cod season will allow several local residents to pursue that fishery.

It is anticipated that moorage revenues from the project will be sufficient to fund annual operations and maintenance and also cover long-term maintenance to ensure that the harbor is preserved for continued future operation. There are at least two direct local jobs that will come out of operation of the facility. A harbormaster will be needed to operate the facility, with annual salary benefits in the $30,000 to $40,000 range. In addition, there will probably be the opportunity, and need, for a boat sitting service. This business will monitor vessels moored in the harbor for owners during long-term moored periods. This operation is similar to Mac Enterprises in Unalaska/Dutch Harbor, and provides full time employment for at least one person.

There are limited opportunities for employment in Akutan, especially outside of fish processing. The proposed project will create a number of jobs during the construction phase that are likely to be filled by Akutan residents. These relatively high paying jobs will have a large beneficial impact on workers and families in Akutan.

Other vessel services may be developed adjacent to the harbor that will provide local business opportunities for Akutan residents, such as gear or crab pot storage.

There is a general trend for remote tourism development in the Aleutians by ecotourism groups, birders, ocean kayakers and sport fishermen. A substantial sport fishery has developed in Unalaska, following recognition of a world record halibut caught nearby. The completion of the proposed project may act as a catalyst to help develop some of these options.

8 SUBSISTENCE

The purpose of this section is to briefly describe the subsistence harvests and activities in Akutan, Alaska and address some potential effects a proposed harbor would have on subsistence harvests.

8.1 METHOD

For the summary of subsistence harvests in Akutan, SRB&A primarily relied on the Alaska Department of Fish and Game (ADF&G) Community Profile Data Base (CPDB) (ADF&G 2001) and secondarily on an unpublished subsistence report on Akutan (ADF&G 1993). Braund, Moorehead, Burnham, Hagenstein, and Holmes (1986b) provided some general subsistence information for the community. In January 2002, SRB&A made several phone calls to Akutan and conducted short interviews related to current subsistence activities and potential influences to subsistence with increased access to salt water associated with a port in Akutan. The interviewees had lived in Akutan between 36 and 49 years.

8.2 SUBSISTENCE IN AKUTAN, ALASKA

Subsistence is the non-commercial, traditional and customary harvest of renewable resources for food, clothing, fuel, transportation, construction, arts, crafts, sharing, and customary trade. These uses of wild resources are of important cultural and economic value in rural Alaska. Akutan is a typical rural community in the sense that subsistence activities are prevalent and significant.

ADF&G gathered subsistence activity data in Akutan in 1991 for a one year period from October 1990 through September 1991. The resulting data were published in the Community Profile Database (ADF&G 2001). These data are the basis for most of the following description of Akutan subsistence. Table A2-20 summarizes subsistence harvests by major resource category for the 1990-1991 study year, and Table A2-21 displays the species harvested in order of their contribution to the total community subsistence harvest. The top nine species were: halibut (18 percent), sockeye salmon (16 percent), Steller sea lion (16 percent), Pacific cod (six percent), feral cattle (six percent), coho salmon (five percent), pink salmon (four percent), harbor seal (four percent), and ducks (three percent). Thus, the vast majority of Akutan subsistence harvests by weight are marine resources.

In 1990-1991, the community Akutan harvested 69 different subsistence resources (ADF&G 1993). The community harvested a total of 47,397 pounds of wild resources during the study year. Residents harvested an average of 1,529 pounds per household of usable weight in subsistence products, or 466 pounds per person. This is over twice the 222 pounds per person of meat, fish, and poultry that the average western United State household purchased in the 1970s (US Department of Agriculture 1983 as cited in Fall et al. 1996:32). Ninety-six percent of Akutan households attempted to harvest subsistence resources and, due to sharing, 100 percent used wild resources (ADF&G 2001).

Table A2-20: Subsistence Harvests & Subsistence Activities for Akutan, Alaska, 1990-1991

Resource	Percentage of Households					Estimated Harvest				
	Using	Trying to Harvest	Harvesting	Receiving	Giving	Est. Number	Total Pounds	Mean HH Pounds	Per Capita Lbs	% Total Harvest
All Resources	100	96	96	100	92		47,397	1,529	466	100%
Fish	100	92	92	96	88		26,921	868	265	57%
Salmon	96	76	76	84	64	3,269	12,339	398	121	26%
Non-Salmon Fish	100	92	92	92	76		14,581	470	143	31%
Land Mammals	72	28	20	64	24	19	2,822	91	28	6%
Large Land Mammals	36	0	0	36	0		0	0	0	0%
Small Land Mammals	12	12	8	4	4	11	22	1	0	0%
Feral Animals	64	24	20	56	24	8	2,800	90	28	6%
Marine Mammals	92	48	44	84	40	142	10,767	347	106	23%
Birds and Eggs	92	72	68	84	52	4,840	2,882	93	28	6%
Marine Invertebrates	88	68	64	72	56		2,866	92	28	6%
Vegetation	100	96	96	64	52		1,140	37	11	2%

Source: ADF&G, Division of Subsistence CPDB, Version 3.10, January 2001.

Stephen R. Braund & Associates, 2002.

Table A2-21: Subsistence Species Used by Akutan Residents, 1990-1991

Resource	Percentage of Households					Estimated Harvest				
	Using	Trying to Harvest	Harvesting	Receiving	Giving	Est. # of Units Harv by Comm.	Est. Total Lbs Hrv by Community	Mean HH Pounds Harvested	Per Capita Lbs	% Total Harvest
All Resources	100	96	96	100	92	47,397	47,397	1,529	466	100%
Halibut	100	80	80	76	64	271	8,689	280	85	18%
Sockeye Salmon	92	72	68	72	44	1,872	7,752	250	76	16%
Steller Sea Lion	88	32	32	80	32	38	7,688	248	76	16%
Cod					48	930	2,975	96	29	6%
Cattle – Feral	60	24	20	52	24	8	2,800	90	28	6%
Coho Salmon	92	64	64	80	48	429	2,222	72	22	5%
Pink Salmon	76	56	56	60	36	915	2,068	67	20	4%
Harbor Seal	80	32	32	72	32	36	1,875	60	18	4%
Ducks	84	52	52	56	48	1,827	1,374	44	14	3%
Vegetation	100	96	96	64	52	1,140	1,140	37	11	2%
Rockfish	76	60	56	40	44	717	1,076	35	11	2%
Char	88	76	76	56	52	737	1,032	33	10	2%
Fur Seal	68	36	28	52	20	67	1,004	32	10	2%
Tanner Crab	68	24	24	48	24	1,004	1,004	32	10	2%
Octopus	84	48	48	52	36	195	781	25	8	2%
Bird Eggs	88	60	56	76	40	2,217	646	21	6	1%
King Crab	68	28	28	48	28	250	576	19	6	1%
Geese	72	40	40	52	32	221	511	16	5	1%

Emperor Geese	64	32	32	44	28	160	400	13	4	1%
Eider	68	40	40	40	36	236	307	10	3	1%
Chitons (bidarkis, gumboots)	56	48	48	32	36	61	244	8	2	1%

Source: ADF&G, Division of Subsistence CPDB, Version 3.10 January 2001.

Stephen R. Braund & Associates, 2002.

Fish accounted for over half (57 percent) of the subsistence take in Akutan. Residents harvested an average of 868 usable pounds of fish or 265 pounds per person. The top two individual subsistence species were in this category: halibut at 280 pounds per household and sockeye salmon at 250 pounds per household. Halibut harvests can occur throughout the year but sockeye salmon harvests are restricted to the summer months. Other fish species harvested include coho and pink salmon (plus a small number of chinook and chum salmon), Pacific cod, greenling, flounder, sole, herring black rockfish, sculpin, Dolly Varden and trout (ADF&G 2001).

Twenty-three percent of the 1990-1991 Akutan subsistence harvest consisted of marine mammals, specifically Steller sea lion and harbor seals. Steller sea lions were the third largest harvest of a single species. Households harvested an average of 248 pounds, which equated to 76 pounds per capita. Harbor seal harvests constituted four percent of the total community harvest (ADF&G 2001). A statewide study of harbor seal and Steller sea lion harvests (Wolfe & Mishler 1996) added data for 1992 through 1995 for Akutan, shown in Table A2-22 Harvests of both species declined during the study period.

Table A2-22 Akutan Harbor Seal and Sea Lion Harvests, 1992-1995

Harbor Seal Harvest					
Year	**1992**	**1993**	**1994**	**1995**	**Primary Harvest Months**
Number	13	16	14	7	May, Aug thru Nov, Jan & Feb Aleutian Islands harbor seal harvest season is primarily Sept. thru Dec. (Wolfe & Mishler, 1996:B-12).
Sea Lion Harvest					
Year	**1992**	**1993**	**1994**	**1995**	**Primary Harvest Months**
Number	26	15	13	6	March, April, June Aleutian Islands sea lion harvest season is primarily Oct thru Dec. (Wolfe & Mishler, 1996:B-12).

Source: Wolfe, R. and C. Mishler, 1996 (Tables 6, 10, 16 & 17 & Pages B-12, C-84)

Stephen R. Braund & Associates, 2002.

Harvests of land mammals, birds and eggs, and marine invertebrates each were six percent of the total community subsistence harvest. Land mammals consisted only of one species, feral cattle. Birds harvested were not specified but were classified as ducks (including eiders) and geese (including emperor geese). Ducks constituted most of the bird harvest (65 percent). Bird eggs collected from seabirds, loons and gulls contributed one percent of the total community harvest (646 pounds) and averaged 21 pounds per household. Marine invertebrates harvested by Akutan households included chitons, king and tanner crab, and octopus. Residents harvested an average of 92 pounds of marine invertebrates per household, or 28 pounds per person (ADF&G 2001).

8.3 EFFECTS OF PROPOSED HARBOR ON AKUTAN SUBSISTENCE

8.3.1 Boat Season and Use

Akutan is generally ice-free 12 months a year. In 1985, Akutan residents reported that the ice-free marine environment offered them boat access year-round to different areas for harvesting subsistence resources (Braund et al. 1986). However, several factors limit subsistence harvesters from having continuous access to the marine environment, including 1) inclement weather, 2) small boat size, and 3) the difficulty of continually having to launch and beach skiffs to protect them from bad weather.

According to the 2002 interviews, Akutan residents generally use smaller skiffs (e.g., 18 foot aluminum watercraft) for marine subsistence activities. With no protection for these watercraft in the water, boaters typically have to put them in and out of the water after each use. This is an arduous task and pulling the skiffs up and down the beach is wearing on the watercraft. Furthermore, it often requires a cooperative labor effort.

To accomplish this constant beaching of their boats, Akutan residents who use skiffs for subsistence harvesting build a wooden "skid" on the beach out of lumber. They use this to pull their skiffs up and down the beach. Often these skids or launches are gone after the winter storms. Akutan boaters continuously have to dig them out and repair them for use during the summer. One interviewee said, "That is a real headache. Changing weather patterns continually ruins the wooden landings that we have. A boat harbor would help in more ways than one."

When asked the boat season, one interviewee responded that the halibut season is open in their area from March/April to November. He indicated that he has his boat "in the water" for approximately three months focusing in the summer when the weather is nice and he is able to fish. He said he stores his boat out of the water in early September for the winter.

Another boater also indicated he has to take his boat out of the water each time he went out. He said it depends on the weather and "it is a lot of work to do that. We can go out 12 months a year depending on the weather, but moving the boats is a lot of work." Whenever

he has time and the weather is suitable, he goes trolling and duck hunting. He watches the weather predictions and takes his boat in and out of water depending on the forecast and his observations.

One interviewee said,

> "This is the first year with a marina; the Borough just put it in and people are just starting to use it. My brother's 24 footer allows him to get out further. People are just getting used to having it there. We use boats for subsistence, but we have to pull them out. We build "skids" that are about 60 feet long using 4 x 4s with winch at the top. I pull up my boat and lash it down. Sometimes the swell is bad and we cannot get off the skid. If something hangs up or a wave hits, it could swamp the boat."

8.3.2 Months Cannot Currently Use Boat

According to the interviews, during the fall/winter from approximately early September through April the weather is generally poor and small boat activity is limited. There can also be periods during the summer when it is blowing so hard people pull their skiff out of water and put them on the beach. However, in the summer, people often take their "chances with calm weather and leave the boat in the water for longer periods," but at sign of bad weather, they have to pull their boats out of the water.

One interviewee said, "The weather is worst from January to March; it can be really bad. It is not so bad in the fall, October and November."

Describing the seasonality and opportunistic nature of subsistence, one hunter said, "Subsistence is all year round. Summer is for fish, fall is for ducks and seals if they are around. We work with the seasons and what is out there."

Another hunter said, "There are months we cannot get out: January and February are bad months, but it all depends on what kind of fall year we had. It does freeze over here; it is always open. But the idea of hauling boats up and down the beach and wear and tear on the skiffs is hard."

One subsistence boater said they were limited from going out in boats "this time of the year" (January). He said that during the winter, they cannot get out 60-70 percent of the time.

Another hunter indicated that "December (this year), January, February, and March are the months with limited access due to weather." He said that he could only get out 10 percent of the time for several months. In November, he could get out 20 percent of the time and then it dropped to 10 percent in December.

8.3.3 Harbor's Influence on Subsistence Activities: – easier access; safer launching; additional trips; bigger boats; hunt other areas further away; increased harvests

One interviewee said, "If we had a boat harbor, people would get bigger boats and be out more and get more subsistence foods. They would be out a longer time also. Furthermore, there are other places around the island that residents could travel to with access to larger boats in the fall that are good for subsistence."

During periods when the surf is high due to an ocean swell, the water is acceptable for boating, but it is difficult for Akutan harvesters to launch their boats off of the "skids." The surf at the beach edge can be a dangerous transition zone where boats can swamp causing accidents. A harbor would eliminate the necessity of continually launching skiffs every time a subsistence harvester went out into salt water.

One interviewee indicated that there were cattle on "next island up from Akutan." He said the Native corporation owns them and "a good time to hunt them is in September and October before the grass dries." Currently, this is at the margin of the annual weather window for safe boat travel, especially in small skiffs that are used for subsistence (because there is no place to harbor a larger watercraft and the skiffs are generally removed from the water at the end of each trip).

Another subsistence harvester said,

> *We do commercial fish here also. However, we are limited to a skiff fishery due to no boat harbor. If we had a boat harbor, we could get into 32 foot class boats and be able to fish other species than halibut. We got added to the caribou hunt in Unimak Island (False Pass), but we cannot do that due to our skiff being too small to travel there. If we had a harbor and bigger boats, we could take advantage of that. My relatives are originally from the Chignik Lake area. I used to hunt caribou there. Some people locally would attempt to go to the next island up and hunt caribou if they had a bigger boat. The ability to get bigger boat and tow a skiff would give us the ability to go other places. For a bigger boat, we need a harbor.*

Interviewees indicated that if they had the ability to keep their boat in the water, they could go out more and rely on subsistence more. One hunter said,

> *We have to put the boats in and out of the water each time we use them. If we had a boat harbor to put our skiffs in, that would be one less worry. Basically, our subsistence lifestyle is done on nice days. It is a problem for us to pull our skiffs in and out of water. It stops you doing subsistence; it is a pain to keep doing that. In the winter we get weird storms that change the beach and waterfront. Most skiffs are aluminum and if do that [up and down the beach] too many times, it ruins them. Lunds have rivets in them. I cannot keep one in the water anymore due to*

running it up and down the beach. Having the ability to keep boats in the water would save our skiffs and you would see greater attempts to go out and get subsistence foods.

Additional comments included:

You need a bigger boat in order to get out and pull pots and stuff. A lot of guys have plans for bigger boats. The Marina will not hold all of the boats in a few years. We are hardly involved in commercial fisheries around here except for the Trident boats due to lack of a facility for commercial vessels without having it in Dutch where there is no space left. It is hard to work away from home. A harbor will change Akutan. It will allow people to get involved locally.

A boat harbor means we could have bigger boats and then travel further. My brother has plans for a bigger boat. For subsistence we sometimes use commercial craft out of season to hunt like at Unimak Island. We used to do that in the past when my uncle and grandfather had boats moored in the bay. We used to go to Unimak near False Pass to hunt caribou and reindeer.

With easier access to my boat [i.e., with a boat harbor], I would not have it on the beach. I would have it out or if we had a harbor I would have it in there. Therefore, I would not have any worry and hope that I can get it up the beach tonight. It would save a lot of headaches.

Oh yeah, I would use it more than now for sure. That way it [his boat] is always out and I do not have to find people to help me haul it in and out of the water. If a harbor was there, I would not need anybody.

In 2001, the Aleutians East Borough a built small skiff moorage next to the Akutan large ship dock. This facility provides some protected moorage for six to eight skiffs next to the dock. However, when the wind blows, these boats have to be taken out of the water and put on land. This is a difficult task. There is no hoist or crane to facilitate this maneuver. The small skiffs are moved up and down the beach. The bigger boats are even harder to move in and out of the water. Generally larger boats leave Akutan and look for winter moorage in comminutes with harbors (e.g., Sand Point, Dutch Harbor, King Cove or further south).

Substantial subsistence hunting and fishing is not in the bay, but is outside of the bay. With a little skiff, subsistence harvesters have to wait for good weather. Harvesters go to the next island over (Akun Island) or to the back of Akutan Island (go around on Bering Sea side), or to a couple of smaller, nearby islands (e.g.,

Rootok Island). This travel would be facilitated by larger craft that could be stored in a harbor.

8.4 Percent Increase in Subsistence Harvests with a Harbor

One person estimated that approximately 40 percent of his household's food currently comes from subsistence. He thought a harbor would increase that by 10 to 15 percent. Other comments included:

With boat harbor we would have more access to the water. People would get out more; the ones that hunt and have time. If we had a larger boat to get out to the bay and get cod or get out to where the fish are...currently subsistence is close.

With a harbor, I would use my boat all year round if weather was good. I would use it 50 percent more if had access to the water all of the time. My subsistence harvests would increase throughout the year. It would increase 10% or more.

With harbor, increase, right away, mainly because of the road, I would say maybe five or 10 or 15 percent increase.

9 SENSITITIVITY ANALYSIS

Future use of the proposed harbor will be contingent upon continued demand for secure moorage by vessels operating in Bering Sea waters adjacent to Akutan. The primary fisheries for these vessels are pollock, king crab, tanner crab, Pacific cod, sablefish, and a number of species of rockfish. Since 1977, the North Pacific Fishery Management Council (NPFMC) has managed these fisheries. While resource fluctuation is always going to occur, the management regulations provided by the NPFMC has been conservative, and has not resulted in depleted stocks of fishery resources in the Bering Sea.

It is well recognized that farmed salmon have had a very disruptive effect on the Alaska salmon industry. However, salmon are not an important species to the operation of fisheries activities at Akutan. In 2002 for instance, there were zero landings of salmon in Akutan for the entire year. Trident Seafoods, the owner and operator of the shore plant in Akutan does process salmon, but the main focus of the company is on Bering Sea groundfish and crab. Therefore, changes to market conditions for salmon are unlikely to have any effect for the Akutan harbor project.

The benefits from the proposed project result from cost savings calculated as the difference between the without-project conditions and the with-project conditions. Under the with-project conditions, the benefits will accrue to several different groups.

Components of the fishing fleets fishing in the Bering Sea, and to a lesser extent the Gulf of Alaska, will realize lower variable operating costs as a result of this project. The moorage benefits represent the largest components of overall benefits (89 percent). The benefits calculations are based on several assumptions,

calculation and interview data and are representative of current conditions facing the fishing fleet. Several of the key assumptions, such as the number of in-season lay-ups were specifically chosen to be conservative. Interviews from fishermen indicated that on average, three in-season lay-ups were necessary during a typical year. To account for any seasonal variation and to be conservative, only two in-season lay-up periods were utilized in benefit calculation.

Moorage demand is always subject to change, however, the proposed project will only provide moorage for a portion of the vessels seeking in-season and seasonal moorage in Akutan. Any reductions in numbers of vessels through regulatory change are unlikely to affect operation of the Akutan harbor. Trident Seafoods reports over 200 vessels operating in the region make occasional deliveries to their plant. The design fleet was based on 64 vessels that make up the vessels that constantly operate in the area and deliver fish to the Trident Seafoods Akutan plant. None of the alternatives would provide moorage to even this entire group.

The benefit cost ratio is relatively sensitive to changes in the calculation of benefits to fishing vessels. If, for example, the vessel benefits were reduced by 50 percent, the benefit cost ratio would be reduced, however, even with a change of this magnitude each of the alternatives still represents an economically viable project.

Moorage benefits to vessels are largely comprised of fuel cost savings. For purposes of calculation, the monthly fuel cost in the Seattle area was averaged with the monthly fuel cost in Akutan (which is the same price as Unalaska-Dutch Harbor) over the most recent full year (2001). If fuel costs were to vary from this annual average composite price for the Pacific northwest and Akutan, the benefits calculation would be directly affected. The long-term trend for fuel prices has been to increase over time. Therefore, it is most likely that future price changes would tend to increase the benefits to the fishing fleet rather than decrease them.

The benefit cost ratio is influenced to a lesser extent by the other benefit categories, that include: prevention of rafting damage (2.12 to 2.46 percent) of total benefits; use of dredged materials accounts for 20.06 to 31.27 percent of total benefits, depending on the specific alternative, and increased subsistence production accounts for 1.51 percent to 2.46 percent of total benefits, depending on the specific alternative.

10 SUMMARY

Table A2-23 provides a summary of the Akutan Harbor benefits and costs. Each of the alternatives show a benefit cost ration greater than unity. The highest benefit cost ratio is for the 20 Acre Basin and this is the NED alternative. Although this alternative may show the highest economic return for the Akutan harbor, there are environmental and physical space factors that favor the selection of the Reconfigured 12 Acre Basin as the preferred alternative.

TABLE A2-23 - Akutan Harbor Project Benefit and Cost Summary

	12 Acre Basin	15 Acre Basin	20 Acre Basin	Reconfigured 12 Acre Basin
Total NED construction costs	$18,960,000	$20,828,000	$23,445,000	$19,013,000
NED interest during construction	$800,000	$879,000	$989,000	$802,000
Total NED investment cost	$19,760,000	$21,707,000	$24,434,000	$19,815,000
Annual NED Cost - (50 years at 5-5/8%)	$1,189,000	$1,306,000	$1,470,000	$1,192,000
Annual Operations & Maintenance	$50,000	$60,000	$75,000	$50,000
Total Annual NED Costs	$1,239,000	$1,366,000	$1,545,000	$1,242,000
Annual Project benefits	$1,949,000	$2,527,000	$3,187,000	$2,267,000
Benefit/cost ratio	1.57	1.85	2.07	1.83
net annual benefits	$710,000	$1,161,000	$1,642,000	$1,025,000

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