Valdez Harbor Expansion Feasibility Study
Economics Appendix B

Valdez, Alaska

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U.S. Army Corps of Engineers

Alaska District

VALDEZ HARBOR EXPANSION FEASIBILITY STUDY
ECONOMICS APPENDIX B
VALDEZ, ALASKA

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ACRONYMS

ABC	Allowable Biological Catch
ADA	Americans with Disabilities Act
ADF&G	Alaska Department of Fish & Game
ADOL&WD	Alaska Department of Labor & Workforce Development
ADOT&PF	Alaska Department of Transportation & Public Facilities
B/C	Benefit/Cost
BLS	Bureau of Labor Statistics
CFEC	Commercial Fisheries Entry Commission
COAR	Commercial Operators Annual Report
CPI	Consumer Price Index
CSIS	Community Subsistence Information System
CV	Contingent Value
CVM	Contingent Valuation Method
EGM	Economic Guidance Memorandum
ER	Engineering Regulation
ERV	Escort Response Vessel
EVOS	Exxon-Valdez Oil Spill Council
FCC	Federal Communication Commission
FVA	Fishing Vessel Administrators
GPH	Gallons Per Hour
HP	Horsepower
IFQ	Individual Fishing Quota
IPHC	International Pacific Halibut Commission
IVQ	Individual Vessel Quota
MLLW	Mean Lower Low Water
NED	National Economic Development
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration

ACRONYMS

NPFMC	North Pacific Fisheries Management Council
OCS	Outer Continental Shelf
OCT	Opportunity Cost of Time
OES	Occupational Employment Statistics
OMB	Office of Management and Budget
OSE	Other Social Effects
OUPV	Operator of Uninspected Passenger Vessel
P&I	Protection & Indemnity
PNW	Pacific Northwest
PWS	Prince William Sound
PWSAC	Prince William Sound Aquaculture Corporation
PWSRCAC	Prince William Sound Regional Citizens' Advisory Council
RAM	Restricted Access Management
RED	Regional Economic Development
SERVS	Ship Escort Response Vessel System
Stanford/SRI	Stanford University/Stanford Research Institute
TAC	Total Allowable Catch
TAPS	Trans-Alaska Pipeline System
TCM	Travel Cost Method
UAF	University of Alaska Fairbanks
UDV	Unit Day Value
UDVM	Unit Day Value Method
USCG	U.S. Coast Guard
VEOC	Valdez Emergency Operations Center
VFDA	Valdez Fisheries Development Association

I. OVERVIEW OF REGION AND COMMUNITY

This section provides general background information pertaining to the socioeconomic composition of the study area. The information enables planners and report reviewers to understand the community infrastructure, the level of economic activity generated, and the potential of the area to support the project under consideration. The following discussion addresses problems under existing conditions.

A. Problem Description

Vessel owners have three major harbor choices in Prince William Sound (PWS): Cordova, Whittier, and Valdez. PWS has been described as a commercial fisher's and sportsman's paradise. Marine resources are abundant, scenery is first class, and it is accessible but remote from urban areas. Therefore, use by commercial fishers, charterboat operators, and pleasure boaters causes demand for year-round moorage to exceed supply.

This overcrowding problem was identified as early as January 1982 in the *Valdez Commercial Boat Harbor Feasibility Study Phase I*, a report prepared by DOWL Engineers. (See Figure B-1.) Other reports further documented the problem: the 1995 Raytheon Reconnaissance Study; more recently, other concerns were discussed in the Expedited Reconnaissance Study of Boat Harbor Improvements, July 7, 1998 by Tryck Nyman Hayes, Inc. Additional problems include rafting and hot-berthing of vessels, avoidable damages to vessels and infrastructure, inefficient commercial operations, and avoidable harbor personnel time.

1. Overcrowded Conditions

The demand for moorage at the existing small boat harbor at Valdez has steadily increased over the past 20 years. The harbor had only 350 boats in 1979 and no vessels wait-listed. By the year 2007, the situation changed significantly as the harbor's 500 permanent slips were fully utilized with full-time berth holders and another 243 boats waiting for permanent moorage.[1]

There has been strong growth in sport fishing out of Valdez in recent years. Enhancement by the Valdez Fisheries Development Association at Solomon Gulch in 2009 created a run of nearly 200,000 Coho salmon. Similar returns were expected for 2010. The pink salmon run as a result of the Solomon Gulch Hatchery in 2009 was over 18 million fish. Along with the numerous pink salmon, fishing attracts many seasonal, trailer-hauled, pleasure craft users from the Fairbanks area. City officials estimate between 200 and 700 boaters trailer their crafts 360 miles from Fairbanks to Valdez on summer weekends. The number of boats trailered depends on the time of year, weather conditions, fishing seasons, reported fishing success, and holidays. However, during a "normal weekend", 400 drive-in boats are common.

Transient commercial and recreation boat operators are also heavy users of the harbor. In 2005, 640 vessels visited Valdez harbor. During the peak-use months of May through September, as many as 200 transient vessels use the harbor for moorage in a single day. The current float system can safely

[1] The harbor recently lost a few slips to accommodate both American with Disabilities Act (ADA) modifications and new fish cleaning stations. In 1999, the harbor reported total slips of 511. The modified harbor accommodates 500 vessels.

provide moorage for 30 transient vessels at any one time and about 60 boats when double berthed. Therefore, during a single peak day, there are 140 additional vessels requiring transient space in Valdez. There is an active and significant charter boat business operating out of Valdez. In 1991, only 37 charter boats operated out of Valdez. This number increased to 77 permanent berth holders by the year 2006. The trend in the charter boat industry is towards larger boats (over 16.8 meters or 55 feet) that can hold more passengers. However, the existing harbor was designed to accommodate mostly the smaller size recreation vessels.

Surrounded by glaciers, alpine, and marine landscapes, Valdez also attracts many small recreation vessels such as sail, paddle, and kayak which contribute to congestion at the harbor. Larger vessel owners complain about potential dangers in maneuvering their boats around these small vessels that enter and exit the harbor. Some vessel owners with the Valdez Harbor Users Association indicated that it is only a matter of time until a collision occurs. There have been many reports of near misses.

A survey of recreational boaters at Valdez Harbor conducted in 2004 revealed that 47 percent of current slip renters at the harbor and 66 percent of prospective renters (waitlisted vessels) find overcrowding a problem. Inadequate parking at the harbor was also identified as a problem suggesting that more than just the harbor suffers from congestion. Few of the current and prospective slip renters at the harbor said there were no problems, 18 and 15 percent respectively.

Table B-1. Problems at Valdez Harbor

Slip Renters	Damage to boat or equipment	Inadequate parking	Overcrowding	Poor water quality	Inadequate protection from storms	No problems	Total responses
Current	26%	58%	47%	28%	3%	18%	272
Prospective	17%	54%	66%	27%	1%	15%	151

Source: Responses from recreational boat owners to the November 2004 Valdez Harbor slip renter survey.

Figure B-1. Valdez Harbor When Crowded

2. Rafting and Hot-Berthing

The Valdez harbormaster does not prohibit entry of vessels into the harbor, primarily because of the liability to the City if boats are turned away. To accommodate as many vessels as possible, two marine management techniques are used: rafting and hot-berthing. However, both practices are problematic because inner harbor facilities and boats are regularly damaged as a result.

The highest degree of rafting occurs from Memorial Day through Labor Day, as increased pleasure boat activity and large numbers of salmon fishers create more demand for limited moorage space. During busy times, vessels are often rafted six or seven deep. (See Figure B-2.) When this type of rafting occurs, there can be excessive boat stress and damages to hulls of fiberglass and wooden vessels from the swaying movement of boats. Other difficulties include those from boat operators maneuvering larger crafts seeking a rafting position, time delays and the added costs of harbor personnel required to move rafted vessels, increased risk of falls, and the potential for catastrophic fire loss.

Figure B-2. Vessels Rafted Four Deep at Valdez Harbor

Hot-berthing (temporarily storing a transient boat in an empty but rented slip) is an efficient method that helps minimize the many problems associated with overcrowding by allowing the harbor to use existing inner harbor facilities to the greatest possible extent. Hot-berthing occurs year-round. While it helps to maximize existing facilities, it too has its limitations and associated problems. Hot-berthing creates a burden on harbor personnel. When an assigned vessel arrives without proper notice, the hot-berthed craft must be moved to another space; this generates additional labor costs and can have a negative impact on public relations because the assigned vessel owners perceive they are not receiving the full value of their moorage fees.

3. Time-Delay Problems

Delay time and congestion are frequent occurrences at several locations within the existing small boat harbor. Delays occur at the fuel docks when everyone is fueling up before going out to fish (about 7 a.m.). Delays also take place near the haul-out (lift) area, at the Peter Pan and Sea Hawk Seafood's processing docks (located in the center of the fairway), at A and B docks, during rafting, and when large fishing boats and processors enter or exit the harbor. Interviews with over 40 boat operators who use the existing facilities at Valdez indicate that permanent commercial berth holders experience an average delay time of 30 minutes; delays for tenders and transient commercial vessels are one hour on average. These delays occur during the peak fishing season, mid-May through mid-September, while entering and exiting the harbor. Under existing conditions, 24 permanent berth-holding commercial vessels experience 30-minute delays, while 84 transient commercial boats and six tenders incur one-hour delays on a regular basis during a 130-day fishing period.

4. Travel-Related Expenses

Tenders unable to obtain permanent moorage in Valdez return to their homeport to store their vessels in the off-season. This can be as far away as the Pacific Northwest. If those tenders had a permanent slip, then the additional cost of traveling to and from other ports would be eliminated.

5. Harbor Personnel

Overcrowding and the demand for transient moorage during the busy summer period require additional harbor staff to accommodate vessel operations. Personnel are obligated to locate and assign spaces, and move vessels from one transient space to another open slip (either transient or a permanent stall that is temporarily vacated). A minimum of two additional people are required to spend an average of 2.5 hours each day to accommodate safe and effective vessel movements.

6. Damages to Vessels, Docks/Pilings

Chafed lines, broken cleats, and paint damages are common problems caused by crowded conditions in the existing harbor. Rafted boats are most likely to experience these damages as they rub, bump, and collide with each other. Damage occurs to rails, guards and planking, and fiberglass hulls. Rafting related damages result in an average cost of $162,900 cost per vessel annually based on survey responses from permanent and waitlisted renters in Valdez. In addition, heavy rafting decreases the useful life of the inner-harbor facilities, especially to docks and pilings, at an additional expenditure of $32,700 for repairs annually. (See Figure B-3.)

Figure B-3. Valdez Harbor Dock Damage Example

7. Other Problems

Thus far, we have discussed the complications of overcrowding, time delays, damages to vessels and docks and pilings, increased costs of harbor personnel, and problems associated with rafting/hot-berthing. Additional concerns identified in interviews and surveys follow:

The present launch ramp located in the northeast corner within the harbor is congested and difficult to access during peak recreational use periods. All vessels using the ramp must transit the entire length of the harbor for ingress and egress. Overall, the ramps are unprotected (sides are uncovered). This can create a very dangerous situation when precipitation causes it to be slippery.

There is limited parking for vehicles and trailers. More parking spaces are needed to accommodate harbor users.

Many operators remove their vessels from the water or seek shelter in distant ports at considerable cost. Dry storage can damage boats and is not available for many of the larger vessels.

About 350-400 man-hours per year are spent to remove debris, sticks, and fish parts that accumulate in the harbor due to poor water circulation. Most of the interviews conducted with fishermen identified harbor flushing, water quality, and circulation as significant problems.

The existing harbor appears to be outdated. A 1995 Raytheon study reported that the existing harbor does not appear to be configured for the most effective utilization of moorage slips, vessel sizes, and launch ramp location. The transient float is not designed for rafting of more than two vessels. Furthermore, the uplands supporting the harbor do not appear to be laid out for the most effective use of dry storage area. Interviews with fishers suggest that the original harbor was designed mainly for recreation use; however, there has been a steady increase in the number and size of commercial vessels using the harbor (tenders are over 30.5 meter (100 ft.)). It is also reported that access from boat-to-boat is difficult because of different deck configurations.

The concrete floats are a problem because of the freezing weather in Valdez; the concrete is separating.

With an average snowfall of 8.3 meters (325 inches) in Valdez, boats risk becoming unstable under the weight of snow accumulation and ice. In addition, ice buildup around vessels can make them icebound. By not maintaining an ice-free slip, boat operators are unable to have vessels readily available in the event of emergencies.

Without additional navigation improvements at Valdez, conditions outlined above will continue and possibly deteriorate over time. The existing harbor will remain overcrowded during peak-use periods and vessels will continue to experience delays and damages.

B. Physical Location

Valdez is located on the north shore of Port Valdez, a deep-water fjord in Prince William Sound. By air, Valdez is approximately 193 kilometers (120 miles) east of Anchorage and 2,333 kilometers (1,450 miles) northwest of Seattle. The Richardson Highway connects Valdez to Anchorage, Fairbanks, and Canada. By road, it is about 113 kilometers (70 miles) to Glennallen, 491 kilometers (305 miles) to Anchorage, and 586 kilometers (364 miles) to Fairbanks. Valdez is also the southern terminus of the Trans-Alaska Pipeline System (TAPS). It sits at about 61d 07 m N Latitude, 146d 16m W Longitude (Sec. 32, T008S, R006W, Copper River Meridian). The community is located in the Valdez Recording District and encompasses 222 square miles of land and 55 square miles of water.

C. Climate

Valdez is a coastal community. Though it sits at sea level, it is surrounded by mountains that climb to over 1,524 meters (5,000 feet) within one mile of the main street. This rugged, coastal terrain creates an ideal location for snow and rain to accumulate.

Valdez experiences a northern maritime climate. The proximity of the area to the ocean buffers it from the temperature extremes of interior Alaska. Many of the storms generated in the Gulf of Alaska (traveling down the West Coast and inland) first impact landmasses near Valdez. These storms dump their moisture when confronted with the cooler air mass and elevation of the Chugach Mountains resulting in large amounts of precipitation. Annual precipitation is over 64 inches per year with snowfall averaging 8.3 meters (27 feet) per year.

D. Community History

The City of Valdez has been characterized by several economic booms followed by devastating events. The first boom occurred within 15 years of the U.S. purchase of Alaska from Russia in 1867. American prospectors started to make their appearance in the Valdez area. Valdez was originally settled as a community in support of the Alaska gold rush circa 1900. When incorporated in 1901, the City of Valdez included only a few hundred people. The overland route to the interior of Alaska eventually became the Richardson Highway. By 1910, Valdez was established as a transportation center serving interior Alaska.

The first devastating event was the Good Friday Earthquake in 1964. In 1967 the original town site was condemned and the community relocated to a site four miles away. Economic activity perked back up again in 1969 when oil development hit Alaska, initiating land speculation and rapid change. Valdez was selected as the terminus of the Trans-Alaska Pipeline System and the site of the oil storage/transfer marine terminal. From the initial hauling of the pipe until construction of the line and the completion of the new 1,000-acre terminal in 1977, a boomtown situation developed. After the construction phases of the pipeline project ended, the community was left with a more stable population and a healthier economy.

Valdez was hit with a second devastating event in 1989 when the *Exxon-Valdez* hit Bligh Reef and spilled almost 40 million liters (11 million gallons) of crude oil into Prince William Sound. The spill was the largest in U.S. history and one of the most devastating man-made environmental disasters ever to occur at sea, seriously affecting both plants and wildlife. The spill affected more than 1,900 km (1,180 miles) of Alaska coastline and put many commercial sea-captains out of business. It is now 19 years later and fishermen affected by the spill have not received payment for damages (the court case has gone through several rounds of appeals). [2] Those who could afford to sit out fishing for a few years while the Sound recovered are probably still fishing while the more marginal operators left the fishing industry.

Several things happened to protect Prince William Sound in the aftermath of the *Exxon-Valdez* spill. Tanker regulations were changed to require double-hulls and increased assistance when traveling through the Sound. A citizen's advisory council was also created to provide oversight, with other agencies, that continues to monitor the Sound's ecosystem today.

[2] The Supreme Court ruled on June 26, 2008 to drastically cut the $5 billion punitive damage award against Exxon to just over $500 million.

The Prince William Sound Regional Citizens' Advisory Council (PWSRCAC) was organized after the *Exxon-Valdez* spill in 1989 to provide a voice for communities affected by oil industry decisions in Prince William Sound, the Gulf of Alaska, and Cook Inlet. PWSRCAC monitors Alyeska's Valdez terminal and tanker operations, conducts independent research, and advises industry and government on ways to prevent oil spills and respond effectively if spills do occur. PWSRCAC also increases public awareness of these areas and various other aspects of Alyeska's operations, including environmental protection capabilities as well as actual and potential environmental impacts of the terminal and tanker operations. About 350 vessels throughout the Gulf of Alaska are currently contracted to assist in the event of an oil spill emergency.

The *Exxon-Valdez* Oil Spill Council (EVOS) produced a number of studies evaluating the economic impacts of the spill on recreation, sport fishing, and tourism in the Sound. It continues working to restore the Sound to a healthy, productive ecosystem while striving to maintain a reasonable standard of living. Other entities such as the Prince William Sound Science Center and the Valdez Science Center also work to assess the damages in the Sound and provide information to decision-makers and interested public.

Today, Valdez's economy is stable. The primary sources of local income include the recreation, sport-fishing, tourism, seafood processing, and transportation industries. While oil spill damage is still evident in some parts of the region, the commercial fishing industry has basically recovered (although somewhat changed from pre-1989 since the herring fishery never recovered). The city still hosts the terminus of the Trans-Alaska Pipeline System (TAPS) and may be one of the benefactors of a new Alaska gas pipeline if the project is approved.

E. Marine Facilities

Numerous cargo and container facilities are present in Valdez with both barges and trucking services delivering cargo to the city. Port Valdez is ice-free year-round and is navigated by hundreds of oil cargo vessels each year. The State Ferry provides year-round transport to Cordova and Tatitlek and summer service to the communities of Seward and Whittier. Valdez has the largest floating concrete dock in the world; it has a 213 meter front extending to 366 meters (1,200 ft.) with two mooring dolphins and a water depth exceeding 15 meters (50 ft.). The small boat harbor accommodates 500 commercial fishing boats and recreational vessels. Boat launches and helicopter services are also available. The Port & Harbor Commission administers transportation-related facilities. In addition to the Port Director, the Department has five other full-time positions and about four seasonal or part-time positions.

1. Port and Harbor

The Valdez harbor today provides boat moorage, related amenities and haulout services to boaters. Harbor facilities include: Harbormaster's office - 1,000 square feet; shop/garage - 600 square feet; public rest room and showers - 1,000 square feet. Port and harbor facilities at Valdez consist of piers, wharves, and various docks. These are used for handling general cargo, containers, and petroleum products. The petroleum traffic includes both local distribution and loading crude oil from Alaska's North Slope oil fields for export. The small boat harbor was constructed by the Corps of Engineers after the original Federal project was destroyed in the 1964 earthquake. The port has an unused grain elevator with nine silos. Plenty of open storage area exists for containers and general cargo adjacent to the container terminal. There are no facilities available to make repairs, dry dock, or haulout large deep-draft vessels in Valdez. The nearest haul out facilities are located in Seward, Alaska, (144 nautical miles) which has a 2,721 metric-ton (6 million lbs.) marine elevator.

The growth of the city's boat harbor has been significant. In 1979, the harbor had only 350 slips, no waiting list, one launching ramp, three full-time employees, three tour boats, no fish processing plants, a small commercial fishing fleet and only a few out-of-town sports fishermen.

Small Boat Harbor. The River and Harbor Act, dated 20 June 1938, authorized construction of the original small boat harbor in Valdez. It was constructed in several stages and completed in 1939. Following the 1964 earthquake and the resulting tsunami, Valdez was rebuilt at its present location, west of Mineral Creek. The U.S. Army Corps of Engineers constructed the initial basin, entrance channel, breakwaters and floats B-E for the new harbor. In 1978, the State of Alaska added mooring floats A, F and G. The City of Valdez expanded the harbor basin to the east in 1985, adding floats H-K. Additional harbor improvements included the construction of a tour/charter boat float and a sheetpile bulkhead to the west in 1987. Floats B and A were rebuilt in 1999 and 2001 respectively. (See Figure B-4.)

The harbor is operated and maintained by the City of Valdez. It is approximately 15.4 hectares (38 acres), 585 meters by 264 meters (1,919 ft. by 866 ft.). The harbor slip and float system is designed to accommodate about 500 permanent vessels (depending on the configuration of fish cleaning stations), a boat launch ramp, a tidal repair grid, and a 60-ton Marine Travelift boat haulout dock. A timber dock and float is also located on the south side of the harbor. Seahawk Seafoods and Peter Pan Seafoods presently operate this facility for offloading fish from commercial vessels. The basin is maintained at -3.7 meters (-12 ft.) mean lower low water (MLLW). The entrance channel is about 37 meters (120 ft.) wide, and also has a maintained depth of -3.7 meters (-12 ft.) MLLW. Two rock mound breakwaters of approximately 164 meters (625 ft.) and 209 meters (685 ft.) in length protect the entrance channel. All slips are under either permanent or transient use lease with water and electrical services provided to the float system.

Figure B-4. Valdez Small Boat Harbor

2. Docks and Terminals

Port of Valdez Container Terminal. The container terminal is a 213 meter (700 ft.) concrete floating dock located near the head of Port Valdez and the old Valdez town-site, about 2.4 kilometers

(1.5 miles) east of the small boat harbor. The facility includes developed uplands with over 20 acres of lighted storage. It is connected to the mainland by an earth-fill causeway.

The container dock is tied to a 21-acre marshalling yard by two 60 meter (200 ft.) ramps. The dock is designed as a multi-purpose berth to handle containerized, roll on/roll off and lift on/lift off operations. Its container storage capacity includes 560, 12-meter (40 ft.) vans, and 360 dual reefer outlets. The container terminal has a 60-ton, Fairbanks certification scale located at its entrance.

The container terminal grounds also house a grain terminal consisting of nine concrete silos 34 meters (112 ft.) tall and 10 meters (33 ft.) in diameter with a total capacity of 522,000 bushels.

Alyeska Pipeline Service Company SERVS and VEOC Dock. This facility is located on the exposed northern shore of Port Valdez on the land mass directly south of the existing small boat harbor. The structure is an 18.3 meter by 61 meter (60 ft. by 200 ft.) floating concrete dock with steel dolphins. Alyeska uses it as a temporary berthing facility for oil spill response and tanker escort vessels.

City Dock and Alaska Marine Ferry Terminal. The city dock is a 182.9-meter by 18.3-meter (600 ft. by 60 ft.) timber structure that is located at the western edge of the city. Its functions include: berthing the State ferry MV Tustumena, accommodating a fish processing operation, and serving as transient moorage for tour ships and the Alyeska SERVS vessels. A separate docking facility for the berthing of the State ferries, FV Chenega and MV Aurora, is located immediately to the west of the city dock.

Valdez Petroleum Dock. This is a private docking facility operated and occupied by Petro Star Valdez Refinery for use in bulk fuel transfers. It is a 61-meter (200 ft.) long timber pile structure with mooring dolphins and is located immediately east of the city dock.

Puget Sound Tug and Barge Dock. This private facility is a 99-meter (325 ft.) long barge dock located east of the Port of Valdez container terminal.

Valdez Alaska Terminal. This offshore structure is a private facility located east of the Port of Valdez container terminal. It has a 73-meter (240 ft.) long barge dock with upland storage.

Valdez Marine Terminal. Owned and operated by the Alyeska Pipeline Service Company, these shipping facilities constitute the terminus of the Trans-Alaska Pipeline. The facility includes four deepwater oil tanker berths, a construction dock and a basin for small boat moorage. It is located on the south shore of Port Valdez across from the City of Valdez.

F. Airport

The Valdez Pioneer Field airport is operated by the State of Alaska. Its paved runway is 1,981 meters long and 46 meters wide (6,500 ft. by 150 ft.). It is equipped with a microwave landing system, which facilitates safe landings and takeoffs in a variety of weather conditions. With its size, instrument landing system and control tower, the airport is capable of serving large aircraft. A State-owned seaplane base is also available at nearby Robe Lake.

The City owns and operates the terminal building at the airport. The building is about 8,530 sq. meters (28,000 sq. ft.) and currently serves one airline, two rental car agencies, a museum, an office, and a snack bar. The Alyeska Pipeline Service Company leases approximately 1,830 sq. meters

(6,000 sq. ft.) for its visitor center and training facilities. The terminal also houses a joint City/ADOT&PF fire station.

G. Government

Valdez is a home-rule municipality. Alaska State statutes provide that a home-rule municipality can exercise any power not prohibited by law. The City is commonly known and designated as the council/manager form of government. The elected officers of the City are the mayor, who presides over the City Council, and six council members serving staggered terms. The Administration consists of the City Manager, an Administrative Assistant, and support staff. The City Manager is appointed and directed by the City Council. He/she serves as the chief administrative office of the City, administers day-to-day operations of the municipal government, oversees the operations of nine departments, and carries out policy set by the Council.

H. Economy

A brief overview of the Valdez economy is presented below. Additional information on employment and population of the Valdez economy is also presented in Section VII Regional Economy. Valdez is the only community in the state where nearly a third of the wage and salary workforce is employed in transportation. Most of this activity is related to the transportation of oil carried out by Alyeska Pipeline Service Company. Alyeska is the largest employer in Valdez. A list of Valdez's top 10 employers for 2005 is shown in Table B-2.

Table B-2. Top 10 Employers in Valdez, 2005

Rank	Firm	Average No. Employees
1	Alyeska Pipeline Service Company	259
2	Valdez City Schools	138
3	City of Valdez	136
4	TCC LLC [1]	98
5	Peter Pan Seafoods	87
6	Safeway Inc.	68
7	Connecting Ties Inc.	65
8	University of Alaska	55
9	Totem Inn Motel and Restaurant	35
10	Copper Valley Telephone Cooperative Inc.	33

[1]TCC LLC operates the SERVS contract with Alyeska Pipeline Service Company, Inc.

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

Each year, the number of visitors arriving in Valdez grows. They usually visit Valdez to gain access to Prince William Sound. In 1998, it was estimated that 150,000 visitors made their way to Valdez. These visitors included out-of-state passengers on cruiseships, charter and sightseeing vessels, ferry traffic, and many Alaskans coming to visit the Sound and Valdez. The Alaska Marine Highway System offers year-round service between Valdez, Cordova, and Tatitlek and a summer schedule to the communities of Seward and Whittier. In 2009, almost 10,000 passengers and 3,400 vehicles disembarked from the Port of Valdez. The city has also developed into a major sightseeing and

fishing charter boat community. There are 77 permanent charter boat berth holders and another 21 charter vessels using transient floats, though the number of charter boats operating out of the Valdez Harbor continues to increase. Once a sleepy port, Valdez's waterfront has become a bustling player in the city's economy.

Commercial fishing adds diversity to the Valdez economy. In 2009, 383 commercial fishing permits were issued to Prince William Sound (Census Area 16 Valdez-Cordova). Of these, 41 belonged to Valdez residents. The earnings of these residents amounted to $4.6 million from 4,506 metric tons (almost 10 million lbs.) of fish. The community is also home to three fish processing plants. One of Valdez's 10 largest employers is Peter Pan Seafoods, a fish processor.

1. Employment

Total employment in 1998 was at an all time high of 2,467 workers. (Self-employed workers such as fishers and crew are not included in this total.) Employment has declined since then to the 2005 average of 1,919 workers. The trade, transportation, and utilities sector leads the industry employment with an average of 576 workers in 2005. This number represents about 30 percent of Valdez's employment. The government sector follows in second place with an average of 463 workers in 2005. Almost all of the manufacturing employment in the area is associated with seafood processing. Table B-3 presents wage and salary employment trends for all industries and the major sectors of the economy from 2000 through 2005.[3]

Table B-3. Valdez Employment, 2000 - 2005

Industry Classification	2000	2001	2002	2003	2004	2005
Total All Industries[1]	**2,214**	**2,134**	**2,155**	**2,088**	**2,038**	**1,919**
Natural Resources and Mining	42	42	43	39	44	43
Construction	32	32	58	67	73	63
Manufacturing	219	174	208	211	163	151
Trade, Transportation, and Utilities	724	709	695	642	595	576
Retail & Wholesale Trade	99	185	192	200	192	203
Transportation and Warehousing	527	523	503	423	385	355
Information	50	60	60	66	65	64
Financial Activities	32	27	29	27	26	25
Professional and Business Services	211	202	167	147	138	154
Education and Health Services	105	78	100	130	125	132
Leisure and Hospitality	271	279	244	218	257	215
Other Services	36	29	30	28	34	34
Government	**492**	**504**	**521**	**514**	**518**	**463**
Federal	15	15	16	17	24	25
State	125	127	135	131	128	125
Local	352	362	370	366	365	314

[1] Does not include self-employed workers, fishers, or unpaid family help.

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

[3] The Alaska Department of Labor & Workforce Development no longer releases employment data by community. For the Gulf Coast Region, employment increased from 27,850 in 2001 to 29,450 in 2009.

2. Population Trends

Huge fluctuations and periods of stagnation have characterized the population of Valdez. All of Prince William Sound (PWS) has had a surprisingly long and varied history of human activity and use, dating back to the Spanish explorers in the 1600s. The boom/bust population changes were evident with the Gold Rush days of the late 1800s and then again during construction of the Trans-Alaska Pipeline and Marine Terminal facility during the 1970-80 decade. Human activity in the PWS area, including Valdez, have shown remarkable continuity despite radical resource shifts over time and it is expected this trend will continue in the future. The estimated population for 2009 is 3,475, a decline from the 2000 Census population of 4,036 (See Figure B-5 for population from 1990 through 2009).

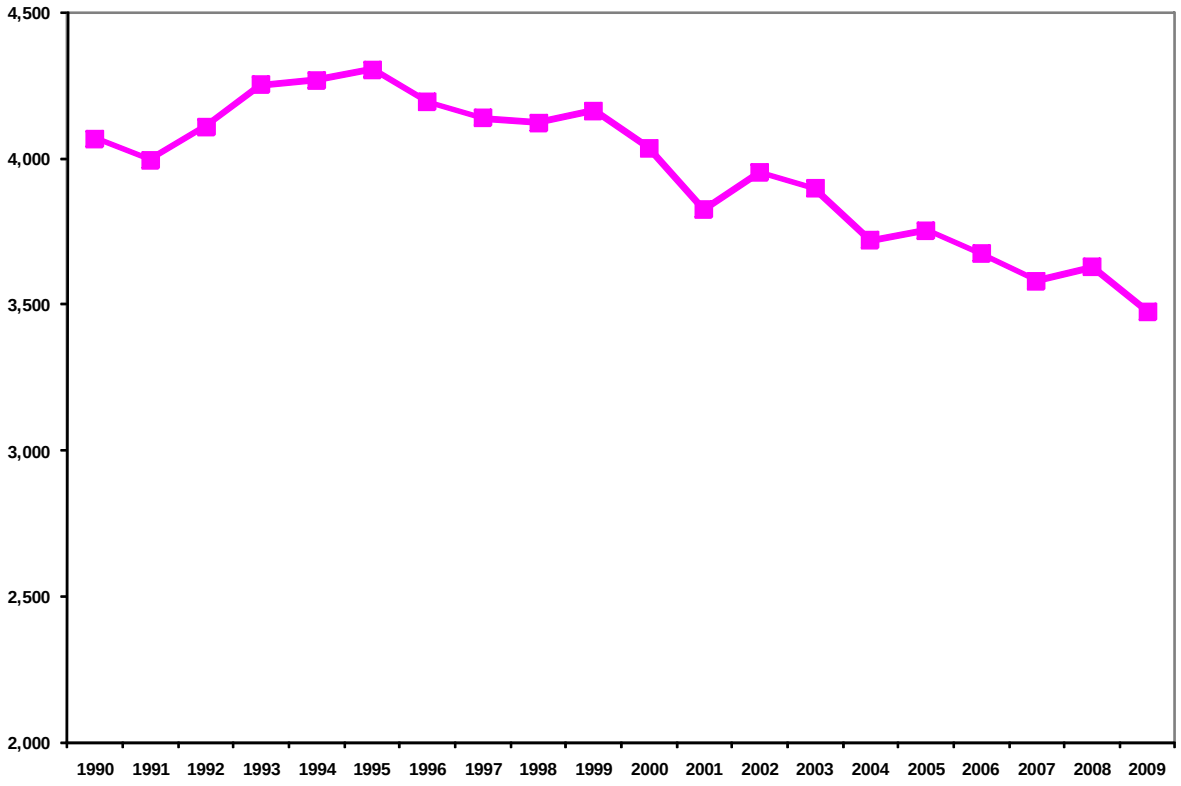


Figure B-5. Valdez Population Estimates, 1990 – 2009
Source: Alaska Department of Labor and Workforce Development Research and Analysis Section

II. MARINE RESOURCE ASSESSMENT

This next section describes the fisheries resources in the Valdez area, the historical catch and values, and the expectations for the future. This marine resource assessment was initially developed in 2006 using 2005 data and while the rest of this report has been updated to 2010, this section was not as the fisheries have not changed appreciably since that time.

A. Introduction

The Prince William Sound management area encompasses all coastal waters and inland drainages entering the north central Gulf of Alaska between Cape Suckling and Cape Fairfield. Valdez is at the center of the Commercial Fisheries Entry Commission (CFEC) statistical area known as the "Eastern District". The most important commercially harvested resources include five species of salmon, along with halibut and sablefish. Other resources include bottom fish such as lingcod, rockfish, flounder, and sole. Commercial vessels operating out of Prince William Sound, particularly Valdez, are characterized as drift gillnet, purse seine, or longline. Purse seine and longline vessels are the most typical in the Valdez area, though each class of vessel may be outfitted to have multiple gear types, allowing for the catch of multiple species. As such, many vessel owners hold more than one permit, often fishing them with the same boat.

Purse seine vessels are the primary type and are typically used to catch salmon; though fishers will often modify their seine equipment to allow longline fishing of groundfish and halibut after the salmon season is over. Fishers estimate that there are typically 90 seine vessels that use Valdez as their base of operations for the mid-June to September salmon seine fishery. A purse seine is a net which is set in a circle and can be drawn closed at the bottom. Because salmon migrate in tight schools, it is not unusual for an Alaskan seiner to "wrap up" 250 to over 1,500 fish with one set. A skiff is used to "purse" the net. Skiffs are usually 4.88 to 5.49 meters (16 to 18 ft.) long aluminum boats and are stored above the vessel's deck or in the water. The vessels themselves are limited to 17.68 meters (58 ft.) in length by Alaskan Law.

The Commercial Fisheries Entry Commission showed 52 registered vessels with Valdez addresses in 2005. Those vessels had the following characteristics:

- An average length of 9.57 meters (31.4 ft.)
- An average engine horsepower (HP) of 298.4
- An average build year of 1984 making vessels approximately 21 years old (in 2005)
- Most were fiberglass (60 percent)

The seine fishery is a high volume operation that tends to be conducted separately from the processing and marketing sectors. For example, many fishing boats will deliver their catch to a tender, a much larger vessel outside the harbor. The tender will then, in turn, deliver the fish to the processor. Some vessels and tenders deliver the catch to a floating processor located near the fishing grounds, while others deliver directly to the on-shore processor(s) within the Valdez Harbor.

Another important element of the Valdez commercial fishing fleet are the number of vessels that operate almost exclusively as longline vessels. Longlines are the primary harvesting method for Pacific halibut and sablefish. The gear, a groundline strung with fish hooks, is also used in the harvest

of Pacific Cod, Greenland Halibut, and some rockfish. Longline vessels operating in the Valdez area are typically vessels under 17.68 meters (58 ft.). Larger longlining vessels, such as factory longliners fishing for Pacific cod, do not generally operate in the Valdez area.

Many of the vessels operating in Prince William Sound hold multiple permits; purse seiners, longliners, and pot gear can all be attributed to the same vessel. An examination of the Alaska Department of Fish and Game permit database for vessels with Valdez zip codes reveals that 60 percent of the vessels have more than one permit with one vessel carrying 8 permits for 2005.

B. Commercial Fishing Activities

1. General

The primary fishery resources associated with fishing vessels that use the Valdez Harbor are salmon, halibut, and sablefish, though salmon is by far the dominant sector. Longlining targets mostly halibut and sablefish. The salmon are harvested within Valdez Arm and Port Valdez, predominantly by purse seine vessels. This salmon seine fishery is targeted by commercial fishers who are residents of Valdez and many seine fishers throughout Prince William Sound, other communities in Alaska, and by some in the Pacific Northwest. Groundfish are harvested within PWS and much farther south in the central and western Gulf of Alaska by both mid-sized vessels that use only longline gear and by seine type vessels equipped for longlining. Many fishers have diversified their businesses by holding salmon permits, Individual Fishing Quotas (IFQ) for halibut, and permits for other groundfish.

Six salmon hatcheries contribute to the area fisheries. The Valdez Fisheries Development Association (VFDA) with the Solomon Gulch Hatchery and Prince William Sound Aquaculture Corporation operate five hatcheries in other areas of the Sound. The Gulkana Hatcheries at Paxson and Crosswind Lakes augment the production of sockeye salmon to the Copper River. The Cannery Creek Hatchery, on the north shore of the Sound, and Armin F. Koernig Hatchery in the southwest Sound produces pink salmon. The Norenberg Hatchery in the northwest Sound produces pink, chum, and coho salmon, and the Main Bay Hatchery in the western Sound produces sockeye salmon. VFDA operates the Solomon Gulch Hatchery in Port Valdez and produces pink and coho salmon.

Figure B-6 illustrates the ex-vessel values for all Prince William Sound fisheries in 2005. Notice that salmon constituted over 90 percent of the total ex-vessel value with almost $44.1 million. Halibut was the next largest contributor with about $3.9 million and 8 percent of the total value. Sablefish, other groundfish, and shellfish accounted for the balance of the total harvest. Herring are not included in this chart as the fishery has been closed since 1999 due to low population numbers.

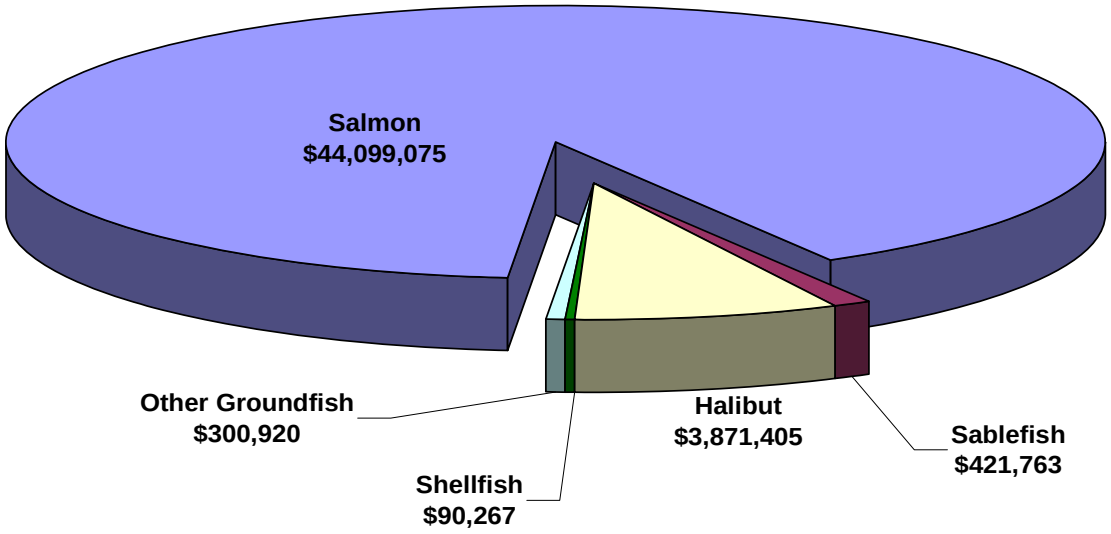


Figure B-6. Prince William Sound Fisheries Ex-vessel Values - 2005

Sources: Alaska Department of Fish and Game, Commercial Fisheries Entry Commission; Federal Register Vol. 70, No. 240; halibut value estimates made for this study.

Figure B-7 shows a time-scale analysis of total earnings for Prince William Sound fisheries between 1995 and 2005. This chart does not include "other groundfish" catches as data for these are only consistent after 2001. Although the long-term trend in earnings seems fairly stable, short-term fluctuations are clearly present. After adjusting for inflation by using the Anchorage Consumer Price Index, we can see that income peaked in 1999 at around $55.7 million in 2005 dollars. The low for this period came in 2002 at approximately $33.4 million. The average for this time frame is about $43.3 million.

Fishers and fishery development organizations are pursuing methods for on-board and shore-based fish processing and other measures that would allow these organizations to add value to their product prior to sending it to market. These measures could contribute to increasing the region's total earnings as increased efficiency and value-added processing will allow fishers to fetch higher prices for the product. Currently, the majority of fish leaving Prince William Sound are either frozen or canned.

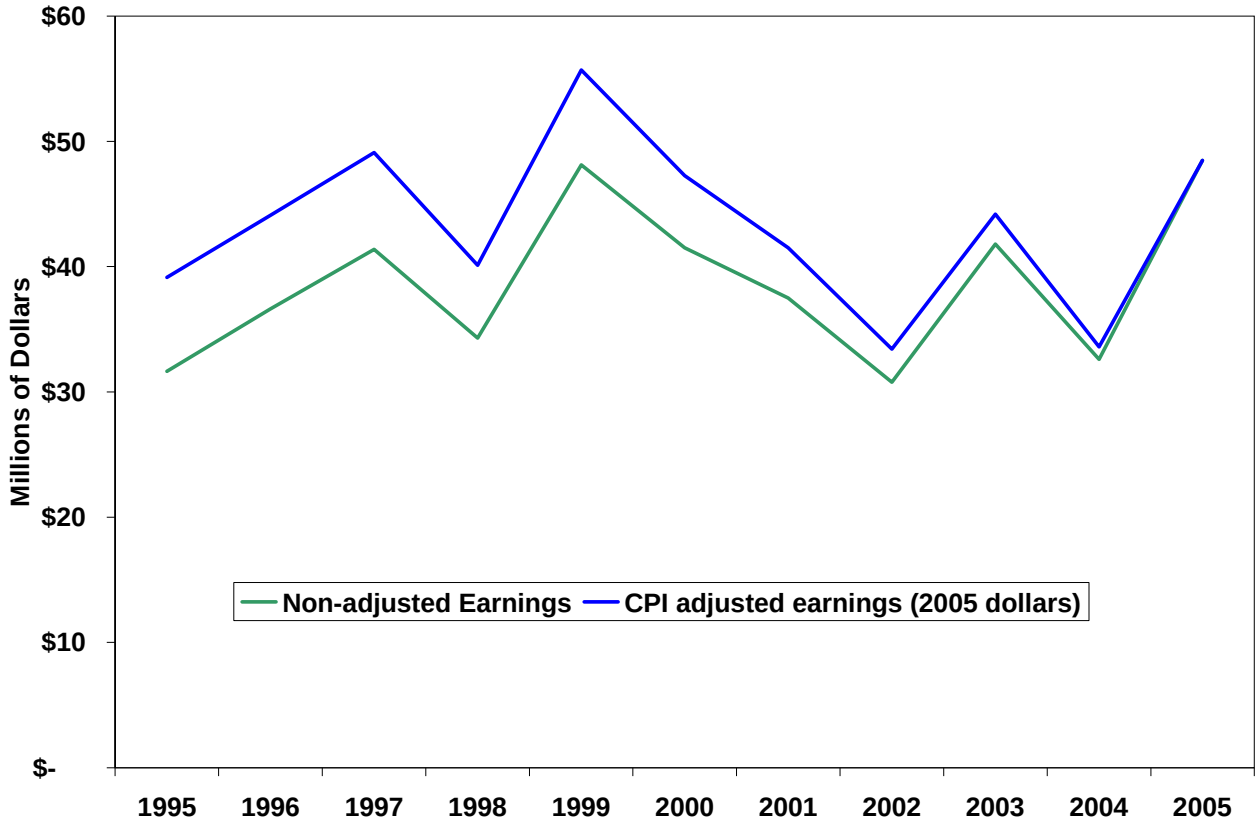


Figure B-7.
Prince William Sound Fisheries Total Ex-Vessel Value,
1995 – 2005

Source: Alaska Department of Fish and Game, Commercial Fisheries Entry Commission, Fishery Statistics Participation and Earnings.
Note: Inflation adjustment using Anchorage Consumer Price Index. Chart does not include "other groundfish".

Total permit activity between 1995 and 2005 has remained more consistent than total earnings. Figure B-8 shows the total number of permits issued/renewed compared to the total number fished; again, these figures do not include "other groundfish" permits. There is a spike during 1997 when 1,535 permits were issued and 1,000 permits were fished. Generally speaking, there are about 1,300 permits issued to PWS fishers and the percentage of permits actually fished has remained fairly constant at around 60 percent over this time span.

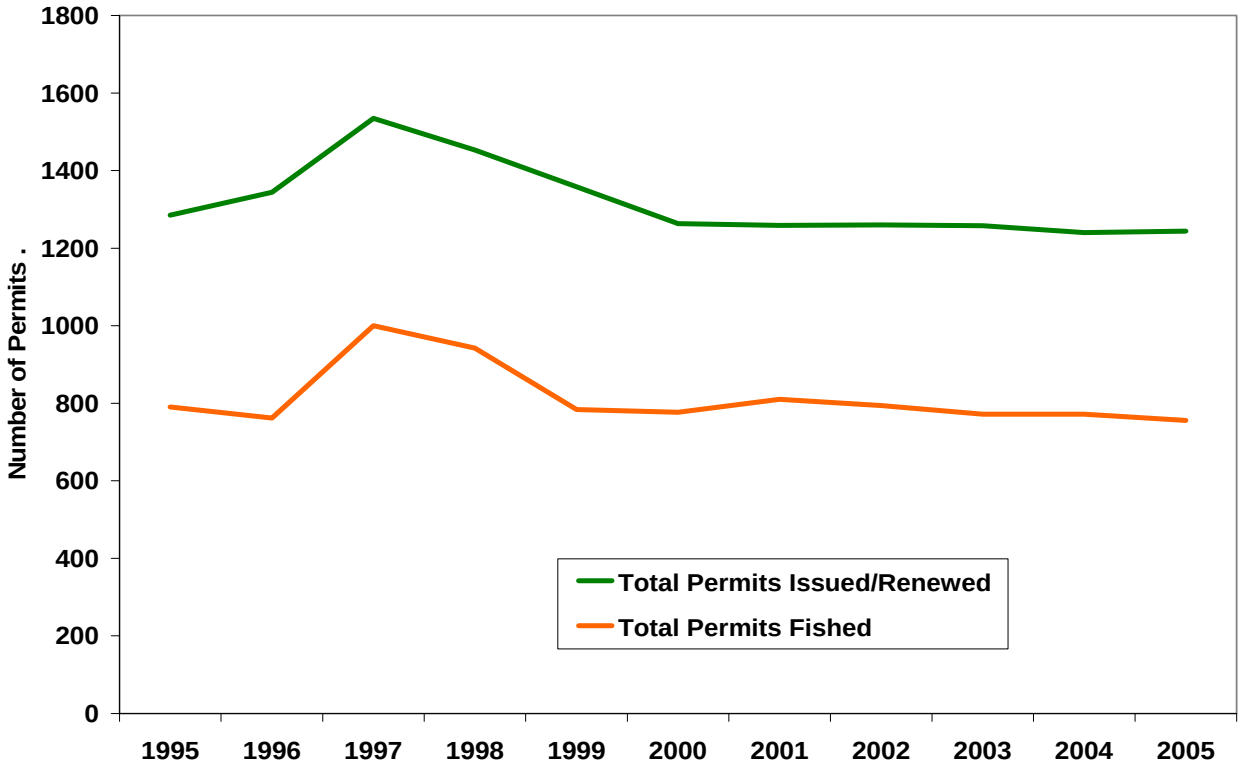


Figure B-8. Total Permit Activity for Prince William Sound, 1995 – 2005

Source: Alaska Department of Fish and Game, Commercial Fisheries Entry Commission, Fishery Statistics Participation and Earnings.

Note: Does not include "other groundfish".

The Alaska Commercial Fisheries Entry Commission (CFEC) lists 18 permit categories for Prince William Sound fisheries. In addition, there are federally permitted fisheries for groundfish and halibut. The number of permits reflects the relative abundance of resources and the distribution of fishing effort. A total of 1,244 CFEC permits were active in Prince William Sound in 2005, excluding those for "other groundfish"; of these, 756 were fished. A vessel will often have more than one permit, such as the case of a purse seiner owning both salmon and herring seine permits, and/or a halibut and blackcod longline license as well.

Salmon is the largest fishery for the region. In 2005, 834 total permits were issued with 629 fished. These included: 266 active salmon purse seine permits with 101 fished; 538 active drift gillnet permits with 502 fished; and 30 active set gillnet permits with 26 fished. While the number of active permits has remained relatively stable for the last ten years, the number of permits fished has fluctuated intensely. There were 107 fewer permits fished in 1996 than in 1995. This is a 15 percent decline. In contrast, the number issued dropped by only four. Over the long run, the number of fished permits has been trending downwards, though the number swelled around the turn of the century before dropping to current levels.

Halibut, the next largest fishery for the Sound, demonstrated an inverse relationship between permits issued and those fished between 1995 and 2005. The number issued has been trending downward during this time. However, both the absolute and relative number of permits actually fished has been

rising. For example, in 1996, the number issued was 93 with 65 fished; about 70 percent were used. In 2005, the totals were 82 issued permits with 75 actually fished. The percentage of halibut permits fished increased to about 91 percent of the total active permits.

The number of issued permits for Prince William Sound sablefish has dropped severely in the last ten years. Unlike the other fisheries, this one is marked by a significant drop in activity. In 1999, there were 21 less permits renewed/issued than in 1998. This is a 27 percent decline in one year. At the same time, the number of permits fished was reduced by 22, or 58 percent respectively. Since 1998, both permits issued and fished have remained fairly stable, though the number fished dropped again in 2000 before rebounding. In 2005, there were 54 permits issued with 44 fished.

Herring permits have the least economic significance in the region. Though 256 permits were active for purse seining, gillnetting and operating roe-on-kelp pounds in 2005, none were actually fished. This has been the case since the fishery closed in 1999 due to low population numbers.

The Prince William Sound shellfish fisheries were highly unstable during these years. Historical comparisons show that activity in this fishery was relatively subdued in 2005 with 18 active permits and 8 fished. However, there were four years since 1995 when no permits were fished at all. Furthermore, the largest catch during this time period came in 2005. These features come from both the relatively low abundance of shellfish in Prince William Sound compared to earlier periods, and the crab rationalization initiative that was enacted in 2005 to protect the fishery.

Table B-4 summarizes 2005 fishery statistics for Prince William Sound.

Table B-4.
2005 Permits, Catch and Earnings for Prince William Sound Fisheries

Fishery	Unique Vessel Count	Unique Permit Count	Total Catch		Gross Earnings	Average Earnings
			Metric Tons	Pounds		
Salmon	2,410	2,446	109,062	240,440,520	$55,117,562	$22,534
Groundfish[1]	523	703	2,982	6,573,703	1,162,727	1,654
Sablefish	171	250	2,742	6,044,246	18,970,686	75,883
Herring[2]	-	-	-		-	-
Halibut[3]	-	-	1,087	2,396,786	7,543,347	-
Shellfish	5	7	63	139,346	-	-
Total	**3,109**	**3,406**	**115,423**	**254,462,980**	**$79,122,379**	**$37,922**

[1] Includes lingcod, Pollock (Walleye), Pacific cod (grey), and eight species of rockfish.

[2] Herring had 256 permits issued with none fished due to closure.

[3] 2005 halibut earnings based on Federal Register Vol. 70 No. 240 for earnings per pound. Unique vessel/permit counts unavailable; there were 327 vessel landings in 2005.

Source: Alaska Department of Fish and Game, Commercial Fisheries Entry Commission and the National Marine Fisheries Service.

The following sections discuss each of the Prince William Sound fisheries in more detail.

2. Salmon

Prince William Sound is an important salmon-producing region for Alaska. Six species of salmon inhabit the rivers, streams, lakes, and coastal waters of the Sound. Commercial fishing for pink, sockeye, chum, coho, and Chinook salmon has long been a mainstay of the Prince William Sound

economy. There is a typical annual pattern for salmon fishing in PWS. Early season drift gillnet fishing activity is focused on wild sockeye and Chinook salmon fishing out of Cordova due to its proximity to the Copper River delta. For the remaining portions of the season, much of the salmon fishing occurs in relatively close proximity to Valdez supported mostly by returns to the various enhancement programs for pinks and to a smaller extent, coho and sockeye. Salmon are harvested by both seine and gillnet gear. The drift gillnet salmon fishery tends to be focused in the Copper River area and Cordova. The seine salmon fishery is centered in Port Valdez. Figure B-9 shows the catch of various salmon species in Prince William Sound between 1995 and 2005.

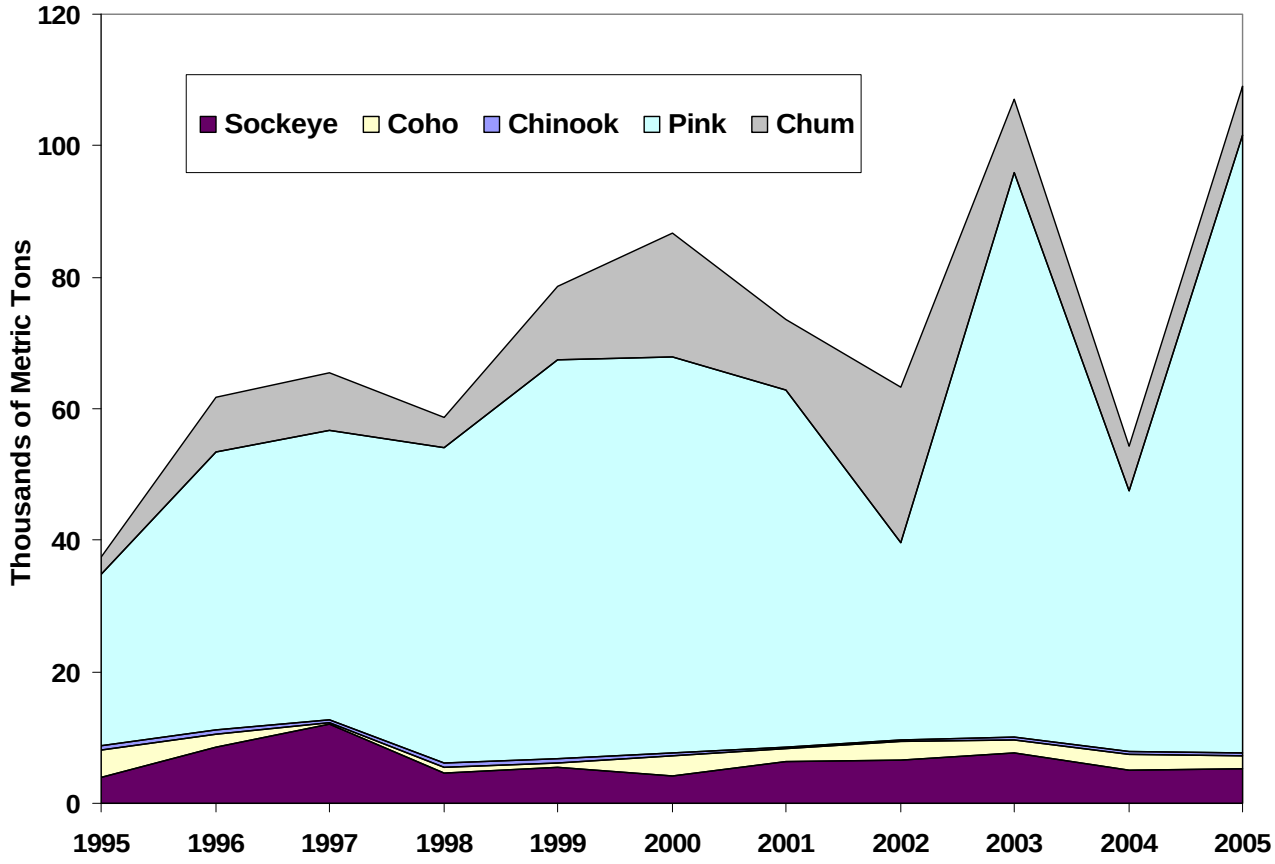


Figure B-9. Salmon Harvest in Prince William Sound, 1995 – 2005
Source: Alaska Department of Fish and Game – Division of Commercial Fisheries

Notice that the overall catch has been climbing over the last ten years, mostly fueled by increased pink salmon landings. In fact, the catches for coho, sockeye and Chinook remain relatively stable and relatively minimal in weight. Some of the upward trend is likely due to ecological recovery from the effects of the *Exxon-Valdez* oil spill in 1989.

There are three visible spikes in the landed weight: 2000, 2003, and 2005. Again, these are almost exclusively due to changes in the pink salmon fishery, though chum contributed to the first peak. These fluctuations could be the result of cyclical changes in fish returns and the influence of hatchery

production in the Sound. Over this ten-year time frame, total annual catch averaged about 72,351 metric tons (159,506,224 lbs.) reaching a high in 2005 with 109,062 metric tons (240,440,520 lbs.) and a low in 1995 of 37,502 metric tons (82,678,855 lbs.). Note that the second lowest annual catch was almost 17,000 metric tons (37,478,591 lbs.) larger than in 1995. In fact, if we disregard the 1995 season, average annual catch increases by almost 3,500 metric tons (7,716,180 lbs.)

Pink salmon is the dominant species catch, contributing about 74 percent of the overall catch (in weight) during these years. Landings of pinks have increased tremendously since the late 1970s. The largest catch during this period came in 2005 with 93,992 metric tons (207,216,661 lbs.). The lowest was in 1995 with 25,984 metric tons (57,283,931 lbs.). This total could have been diminished by a natural low in the cyclical salmon populations, or by lasting effects from the *Exxon-Valdez* oil spill which spurred many fishery closures and abnormally low catches in 1992 and 1993. The annual average pink salmon catch between 1995 and 2005 was 53,150 metric tons (117,176,088 lbs.). These are mostly harvested by seine vessels. Seine fleets from all over Prince William Sound, Alaska, and the Pacific Northwest travel to fishing areas near Valdez to harvest this resource. Even though hatchery production has increased, the odd-even year pattern of strong and weak run size is still present.

Chum salmon contribute about 14 percent of the total weight caught. Sockeye salmon account for about 9 percent with the largest catches coming from the Copper River. These fish are predominantly harvested by the Cordova drift gillnet fleet. Chinook and coho salmon comprise a minor portion of the commercial catch in Prince William Sound, totaling about 4 percent together. Notice that, with the exception of chum, these fisheries have remained fairly constant. Chum catches fluctuated the most, reaching a high of 23,851 metric tons (52,583,309 lbs.) in 2002 and a low of 2,703 metric tons (5,958,476 lbs.) in 1995. Average annual chum catch is about 10,375 metric tons (22,873,995 lbs.) for this period.

Salmon sport fisheries are important in accessible areas near Cordova, Valdez, and Whittier. Subsistence and personal use fisheries are an important food source to local residents of Valdez and particularly to the Native Alaskan villages of Tatitlek and Chenega in the Sound as well as communities along the Copper River drainage.

Figure B-10 illustrates the estimated ex-vessel values of these historic catches. There is a striking difference between the relative catch sizes and the relative values. For example, while sockeye salmon constitute an average of 9 percent of the landed weight, they account for an average of 40 percent of the total value. This is due in part to the successful marketing efforts for Copper River Reds (sockeye salmon), early season runs, and an established market for beginning season fresh Alaskan wild salmon. Many restaurants and fish markets in the Pacific Northwest advertise and alert their customers when these first-run fish are harvested. In contrast, pink salmon make up 74 percent of the landed weight and 34 percent of the value.

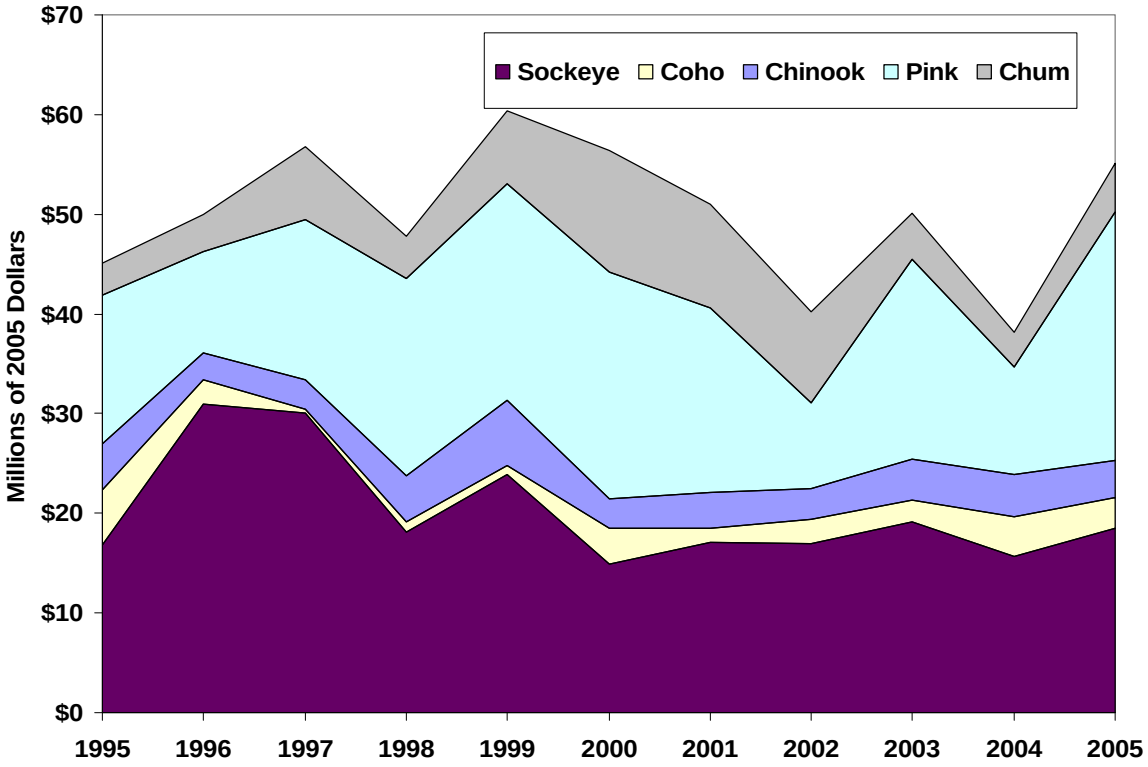


Figure B-10. Ex-Vessel Value of Prince William Sound Salmon Catches 1995 - 2005
Source: Alaska Department of Fish and Game – Division of Commercial Fisheries

In comparison to the annual landed weight, catch values of Prince William Sound fisheries remained fairly stable between 1995 and 2005. There was a high of more than $60 million in 1999 and a low of more than $38 million in 2004 (in 2005 dollars). The total average ex-vessel value for these years was more than $50 million. Sockeye and pink salmon account for 74 percent of this total, while Chinook, coho and chum comprise the other 26 percent. Table B-5 summarizes the catch data for Prince William Sound.

In Alaska, wild stocks of salmon provide the foundation for the salmon industry. However, in Prince William Sound non-profit hatcheries have operated since the mid-1970s for supplemental purposes. These hatcheries are operated by the Prince William Sound Aquaculture Corporation, which operates five hatcheries, and the Valdez Fisheries Development Association (VFDA) which operates one. The Solomon Gulch hatchery operated out of Valdez has a permitted capacity of 230 million pinks, 2 million cohos, and 300,000 Chinook salmon. Table B-6 shows the hatchery returns for 2009 for each of the six hatcheries operating in Prince William Sound.

Table B-5. Catch Statistics for Prince William Sound Salmon, Average 1995 – 2005

Salmon Fishery	Average Annual Harvest		Percent of Total	Average Annual Value [1]	Percent of Total
	Metric Tons	Pounds			
Chinook	512	1,129,386	0.7%	$ 3,940,320	7.9%
Sockeye	6,340	13,978,246	8.8%	20,164,133	40.3%
Coho	1,972	4,348,509	2.7%	2,475,895	4.9%
Pink	53,150	117,176,088	73.5%	17,089,096	34.1%
Chum	10,375	22,873,995	14.3%	6,425,536	12.8%
Total	**72,351**	**159,506,224**		**$ 50,094,980**	

[1] Values shown have been adjusted to 2005 dollars using the Anchorage Consumer Price Index.
Source: Alaska Department of Fish and Game – Division of Commercial Fisheries

Table B-6. Prince William Sound Salmon Hatchery Returns, 2009 - Numbers of Fish

Hatchery	Salmon Species					Total
	Pink	Chum	Coho	Chinook	Sockeye	
Prince William Sound Aquaculture Association						
Armin F. Koernig	6,500,000					**6,500,000**
Wally Noerenberg	5,800,000	3,550,000	18,000			**9,368,000**
Cannery Creek	6,300,000					**6,300,000**
Main Bay					836,000	**836,000**
Gulkana					190,000	**190,000**
Valdez Fisheries Development Association						
Solomon Gulch	10,632,000		178,228			**10,810,228**
Total	**29,232,000**	**3,550,000**	**196,228**	**-**	**1,026,000**	**34,004,228**
Percent of Total	**86.0**	**10.4**	**0.6**	**0.0**	**3.0**	

Source: Alaska Department of Fish and Game – Annual Alaska Salmon Enhancement Program – 2009 Annual Report dated March 2010.

VFDA, located in Valdez, was started in 1978 by local fishermen to enhance the regional salmon run through a small salmon hatchery. In 2005, it supported nearly 40 percent of the pink salmon and 75 percent of the coho salmon returns in Prince William Sound. VFDA has been active in providing training to fish processors and currently operates the Solomon Falls Seafoods plant in Valdez offering value-added smoked salmon and caviar for resale. VFDA typically employs 45 people a year in the value-added plant. The VFDA has plans to add a 200,000 pound cold storage facility expected to be completed in the next couple of years that will allow fishers to store product until they are ready to conduct value-added activity.

Increased salmon abundance has been attributed to both hatchery production and an increase in wild stock productivity. Table B-7 displays the 2006 ADF&G salmon forecast in number of fish and percent of the overall Alaska forecast. It is projected that almost 35 million salmon will return to Prince William Sound in 2006. This is roughly 21 percent of the statewide total. Pink salmon represent the bulk of these returns with an expected 30 million fish, or 27 percent of the statewide projection for pinks.

Table B-7. Salmon Forecast for Prince William Sound and Alaska, 2006 - Numbers of fish

Species	Prince William Sound	Alaska	Percent of Alaska Salmon
Chinook	47,000	780,000	6.0%
Sockeye	1,826,000	35,636,000	5.1%
Coho	565,000	4,959,000	11.4%
Pink	29,537,000	108,005,000	27.3%
Chum	2,681,000	17,552,000	15.3%
Total	**34,656,000**	**166,932,000**	**20.8%**

Source: Alaska Department of Fish and Game – Division of Commercial Fisheries

3. Halibut, Sablefish and Other Groundfish

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 sub-areas with catch quotas and time-area closures. In Prince William Sound, all halibut allocations are by Individual Fishing Quotas (IFQ). The fishery has a long tradition extending back to the late 1800s. There is an active recreational and commercial charter fishery as well. Stock assessment and management advice is provided by the International Pacific Halibut Commission (IPHC), which assesses halibut throughout its range.

Prince William Sound is encompassed by Area 3A as designated by the International Pacific Halibut Commission. This area management plan is now 100 percent individual fishing quota (IFQ). Since 2004, the IFQ fishing season has run from February 29 through November 15 of the year.

The total 2006 Alaskan Pacific halibut catch was just over 23,669 metric tons (52,180,882 lbs.); about 50 percent of the Alaska halibut catch comes from the central Gulf of Alaska. Figure B-11 shows the weights and estimated ex-vessel values of Prince William Sound halibut catches between 2000 and 2006. In 2000, PWS fishermen landed 635 metric tons of halibut. This number increased to over one thousand metric tons by 2006 (1.4 to 2.2 million pounds). The value of the catch has increased in recent years as well with an average $1.97 per pound in 2001 to a high of $3.06 per pound in 2005.

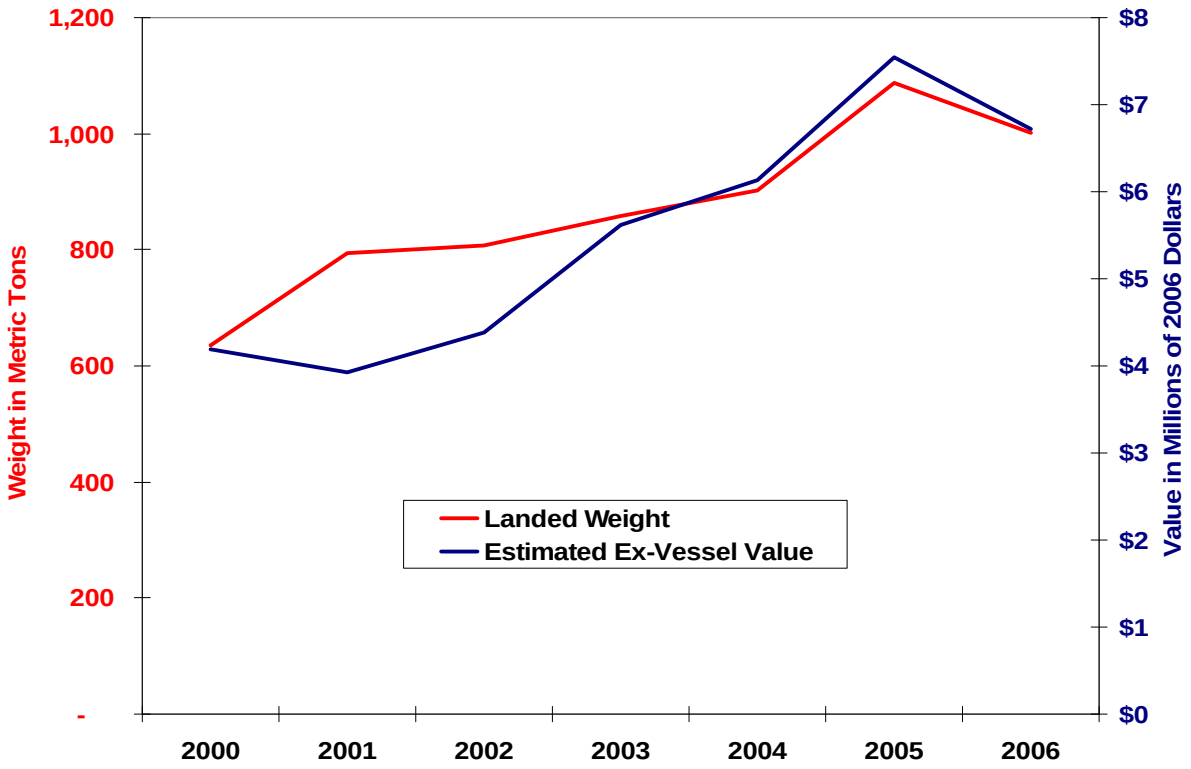


Figure B-11. Halibut Harvest and Value - Prince William Sound, 2000 – 2006

Source: National Marine Fisheries Service (NMFS) Restricted Access Management database and the Federal Register halibut price estimates for 2005 and 2006 made for this study. 2006 data is preliminary.

Figure B-11 demonstrates an upward trend in both landed weight and ex-vessel value. Overall, the landed weight average has increased 8 percent annually. The average annual halibut harvest over this time was 869 metric tons (1.9 million pounds). The years 2005 and 2006 both saw harvest levels of over one thousand metric tons (2.2 million pounds).

The ex-vessel value of the halibut catch during these years ranged from $3.92 in 2001 to $7.54 million in 2005 (these figures are in 2006 dollars). The average annual ex-vessel value during this time was $5.5 million.

Table B-8 displays the number of halibut landings and catch weight for select ports fishing from the Prince William Sound for the years 2000 and 2006. Notice that while Valdez and Cordova have increased their landed weight, Whittier's catch has actually decreased during this time. Also notice that Cordova's catch in 2006 was 33 percent higher than in 2000 while Valdez's landed halibut increased 12-fold. The Port of Valdez captured 26 percent of the total landed weight in 2006 compared to 3 percent in 2000.

Table B-8. Halibut Landings at Major Ports in Prince William Sound

Port	Number of Landings		Landed Weight			
			2000		2006	
	2000	2006	Metric tons	Pounds	Metric tons	Pounds
Valdez	27	54	20	43,578	265	584,571
Cordova	190	227	477	1,051,853	637	1,404,042
Whittier	83	51	138	304,017	100	221,222

Source: National Oceanic and Atmospheric Administration – National Marine Fisheries Service – Restricted Access Management (RAM) database prepared December 29, 2006.

It is unlikely that changes in the landings are due to changes in the harvestable resource. Changes in landings are more likely due to business management decisions on the part of the vessel owners and operators. The port of landing is likely a function of complex factors such as fuel prices, distance from the fishing grounds, processing plant turnover, vessel captains' knowledge of the fishing grounds, relationships developed with the processors, ocean conditions from the harvest grounds to the port of delivery, and residence of the vessel owner. Each port has its own set of advantages and disadvantages. Valdez, Cordova, and Whittier are all within the protected waters of Prince William Sound, so navigation is somewhat less challenging than Seward, for example, which typically has strong winter winds.

Sablefish. Vessels can be registered in only one groundfish registration area at a time. The longline fishery is typically not as high volume as the seine fishery but the catch is more diversified. It is also particularly well-suited for direct involvement by the primary operator in the fishing, processing, and marketing of the fish.

Figure B-12 displays the landed weight and estimated ex-vessel value for sablefish caught in Prince William Sound between 1995 and 2005. These totals include fish extracted from both state and federally-managed waters. The sablefish fishery experienced a fairly dramatic reduction in the size of the fleet over these 10 years, dropping from 350 unique vessels in 1995 to just 171 vessels in 2005. Vessels have become much more efficient in the harvest, however, as shown by the recent increase in landed weight even while the fleet was diminishing. Recent years have seen annual harvest levels of almost 3 thousand metric tons (more than 6 million pounds) with annual values of approximately $20 million.

Table B-9 displays the number of sablefish landings and catch weight for select ports fishing from Prince William Sound for the years 2000 and 2006. The Port of Valdez captured 22 percent of the total sablefish landed weight in 2006.

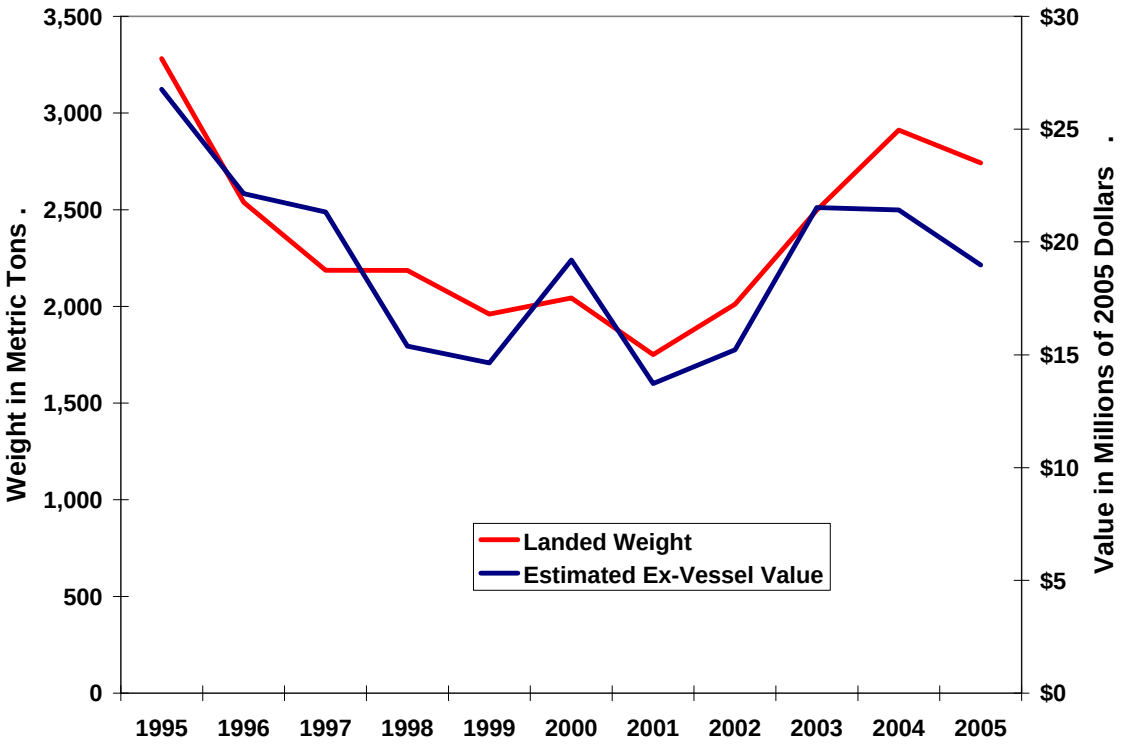


Figure B-12. Sablefish Harvest and Value - Prince William Sound, 1995-2005

Source: Alaska Department of Fish and Game – Division of Commercial Fisheries – Commercial Operators Annual Report (COAR) data request of November 2006.
Note: Values shown are adjusted to 2005 dollars using the Anchorage Consumer Price Index.

Table B-9. Sablefish Landings at Major Ports in Prince William Sound

Port	Number of Landings		Landed Weight			
			2000		2006	
	2000	2006	Metric tons	Pounds	Metric tons	Pounds
Valdez	1	17	5	11,687	133	293,753
Cordova	42	55	475	1,048,221	475	1,105,375
Whittier	1	0	<1	800	-	-

Source: National Oceanic and Atmospheric Administration – National Marine Fisheries Service – Restricted Access Management (RAM) database prepared December 29, 2006.

Other Groundfish. Generally groundfish in all waters more than 3 nautical miles from shore are managed by the National Marine Fisheries Service (NMFS). Waters up to 3 nautical miles from shore are managed by the State of Alaska. The exception to this is that lingcod fishing in all waters within PWS is managed by the State of Alaska. Pollock and Pacific cod have separate state water allocations that are deducted from the Federal waters allowable catch levels. The Pacific cod state waters allocation is Gulf-wide, but a specific Prince William Sound pollock quota was established in 1995.

Prince William Sound has two dominant demersal fish species within its waters: arrowtooth flounder and walleye pollock. A NMFS 1989 trawl survey conducted in Prince William Sound estimated that arrowtooth flounder made up the greatest proportion of total biomass at every site except Central Basin and Port Wells. It accounted for 67 percent of total biomass in the area of Knight Island/Montague Strait and 65 percent of total biomass in the area outside Prince William Sound. Arrowtooth flounder, however, have little commercial value.

Pollock, on the other hand, has been the predominant species in both landed weight and value of the "other groundfish" catch (Figure B-13). Pollock accounted for almost 80 percent of the catch between 1995 and 2005. The Pollock harvest reached a high in 1998 at 8,563 metric tons (more than 18 million pounds) but has leveled out in more recent years to about 2,000 metric tons (about 4.4 million pounds). The fish are primarily harvested during the winter months with most deliveries going to Cordova.

The next largest fishery in this category consists of miscellaneous species that include, but are not limited to eels, grenadiers, sculpins, skates, soles, turbots, lumpsuckers, wrymouths, and flounders. Pacific cod ranks third in this group representing about 15 percent of the catch between 1995 and 2005. The Pacific cod harvest was at a high in 1995 with 1,651 metric tons (3.6 million pounds) but has fallen in more recent years to under 100 metric tons. The other groundfish category adds approximately $2 million to the overall fish harvest value in Prince William Sound.

The wide disparity between the potential and recent yield for the other groundfish category can be attributed to restrictions by the North Pacific Fisheries Management Council (NPFMC) to reduce incidental catches of Pacific halibut.

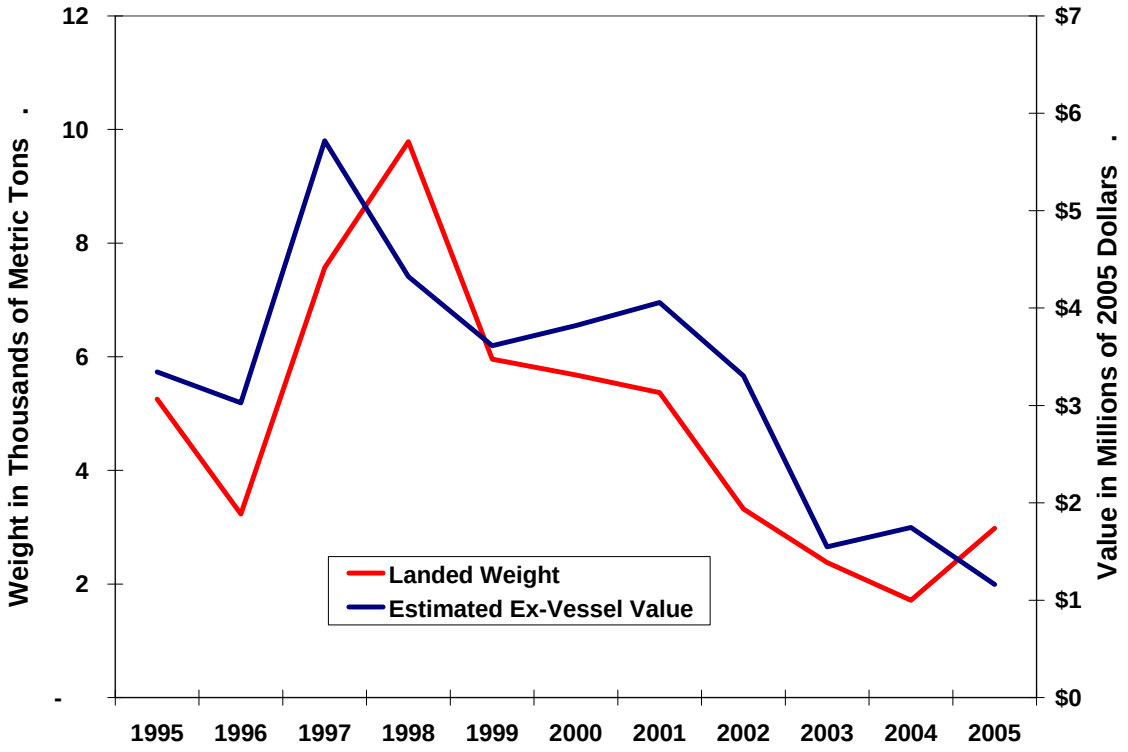


Figure B-13. Other Groundfish Harvest and Value - Prince William Sound, 1995-2005

Source: Alaska Department of Fish and Game – Commercial Fisheries Division – Commercial Operators Annual Report (COAR) data request of November 2006.

Note: Values shown are adjusted to 2005 dollars using the Anchorage Consumer Price Index.

4. Shellfish

The marketable shellfish resources of Prince William Sound are primarily crab and shrimp. However, there is a small razor clam fishery near the Copper River, and also a small scallop fishery operating in the Sound. In the past, tanner crab was the most productive PWS shellfish fishery with catches near 3,175 metric tons (7 million pounds) in the late 1970s. However, tanner crab declined sharply soon after the peak, as did king crab which provided the basis of a small harvest (27 metric ton or 60,000 pounds average) in the Sound. Both the tanner crab and king crab fisheries were halted in the late 1980s due to low abundance.

The Dungeness crab fishery harvests peaked in Prince William Sound in 1978 with a harvest around 907 metric tons (2 million pounds). Through the 1980s Dungeness catches averaged around 272 metric tons (600,000 pounds), and then declined rapidly until the fishery closed in 1992. None of the crab species have been open for harvest in recent years, and this closure is not expected to change in the near future.

Shrimp is harvested in pot fisheries and trawl fisheries throughout the Sound. The pot fishery concentrates on spot and construe shrimp. The trawl fishery harvests pink and sidestripe shrimp. Between 1978 and 1999, the pot shrimp fishery had an annual average harvest of about 39 metric tons

(86,000 pounds) though the fishery has been closed since 1992 due to low abundance. The trawl fishery harvest during the same period averaged about 146 metric tons (322,000 pounds) and is characterized by a shift from pink shrimp in the earlier years to sidestripe more recently. At least one transient user of Valdez Harbor was identified who harvests shrimp. This vessel typically makes three trips per year into Valdez Harbor to sell their product directly from the docks to local businesses.

Figure B-14 shows the shellfish catches in PWS between 1995 and 2005. This chart shows the weight of these catches only; value data for this time is confidential due to the small number of reporting processors. Notice that this time frame seems to be characterized by an initial drop in catch followed by a recovery of the fishery. The smallest catch during these years occurred in 2001 with 38 metric tons (83,000 pounds) being landed. Both 1995 and 2004 shared the high mark of 69 metric tons (151,500 pounds), though 1995 pulled in about 1,000 pounds more fish. Average catch for this span was about 52 metric tons (114, 000 pounds).

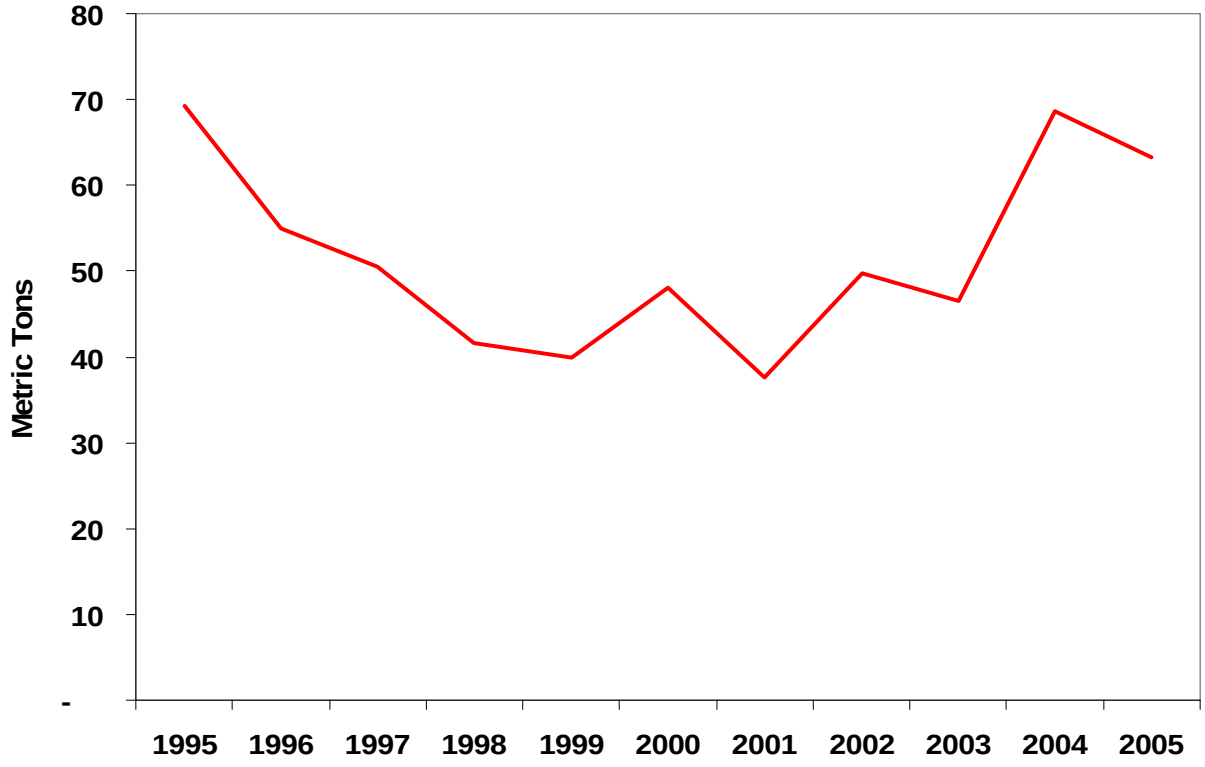


Figure B-14. Shellfish Harvest in Prince William Sound, 1995 – 2005

Source: Alaska Department of Fish and Game – Commercial Operators Annual Report (COAR) data request November 2006.
Note: Value of the shellfish harvest is considered confidential due to small numbers of reporting processors.

5. Herring

Herring are managed with individual quotas for discrete stocks and are harvested commercially by gillnetters and purse seiners. Herring are also commercially harvested for use as bait for the halibut, groundfish, crab, and salmon troll fisheries. Bait harvest has extended to Dutch Harbor in the Aleutian

Islands in recent years. During the late 1990s, herring were harvested primarily for sac roe to send to foreign markets. Generally, herring spawns in Prince William Sound in the spring, from mid-April to early May. This is also the season for seine and gill net fisheries for both sac roe and two spawn-on-kelp fisheries. The food and bait fishery runs from October through January.

Historically, Prince William Sound catches from the roe fisheries have been much greater than those from Cook Inlet and Kodiak. However, more recent years have been different as the herring population in the Sound has been below the threshold of 22,000 tons since 1999. Two causes have been hypothesized for the collapse of this fishery: (1) Residual effects from the *Exxon Valdez* oil spill; (2) Stress from simultaneous high abundance of herring and pink salmon in Prince William Sound. Examination of the available data gives more credence to the latter case. When the fishery was open, the harvest was generally about 77 percent roe, 22 percent food and bait, and 1 percent spawn on kelp.

C. Fishery Seasons/Periods of Operation

Some fishing seasons have unusual restrictions that affect the amount of time a vessel can fish during the open season. For example, the gillnet season is open mid-June to the end of September but operates in a way that harvesting only occurs 2 to 4 days per week at various locations. There are occasionally concurrent multiple short openings at several locations. The salmon openings start as early as May but generally take place from July through September (see Figure B-15). Harvesting is allowed at varied locations only 4 to 5 days per week or less. Based on open season fishing days during a typical year, vessels in Prince William Sound are actively fishing about 130 days per year.

The "year" is effectively a 10-month period devoted to actually fishing and other fishing related tasks. Although time spent harvesting during the year is 150 days (May 15 through October 15), vessel preparation, obtaining provisions, offloading, making repairs, and travel are conducted throughout the year. Therefore, during a 10-month period, actual operating time is estimated at 1,820 hours; the number of operating days is typically 195. Idle time between annual cycles and long-term vessel layup are not included in operating time.

Up to half of the time during these 10 months could be devoted to activities related to salmon harvest. In 2006, the combined salmon harvest season spanned 150 days. Because of the variety in permits and area openings, it is impossible for one vessel to fish all available days. However, one vessel could participate in more than one opening per day depending on the area, species, and ability to deliver product. Alaska Department of Fish and Game manages the salmon runs to assure sustained yield and to meet all user group allocations. Escapement goals are set annually and fishing may be halted if sonar counts indicate low returns. In general, fishing time has steadily been reduced over the years in response to changing patterns in the fishery, increased efficiency of the fleet, and reallocations by the Board of Fisheries. Individual vessels look beyond the salmon season and stretch the harvest days to include sablefish, halibut, Pacific cod, and shrimp. Some large combination vessels have adequate equipment and permits to fish year-round but venture to offshore areas part of the year.

PWS fishermen are increasingly using charter operations to fill down time in other fisheries. Most charter operations focus on salmon and halibut fishing between May and September.

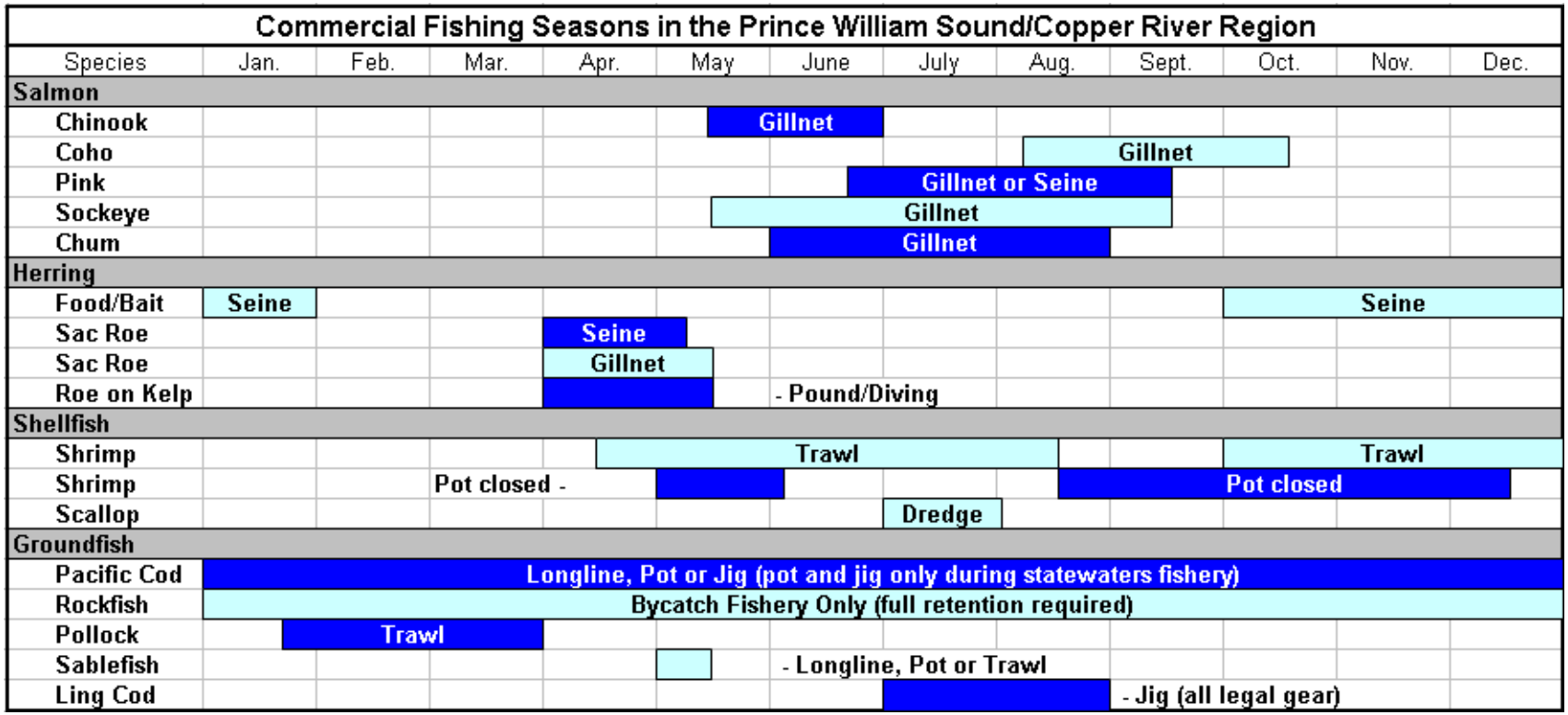


Figure B-15. Commercial Fishing Seasons by Species

Source: Alaska Department of Fish and Game – Commercial Fisheries – General Information

D. Outlook of Commercial Fisheries Potential in Valdez Area

Sound management techniques and continued enhancement activity will allow the commercial fisheries in Prince William Sound to remain strong contributors to the local economy. Continued sustainability of the Prince William Sound (and other Alaska) fisheries has not been a problem due to the active involvement of governmental agencies and willingness on the part of harvesters. While this has not been the case worldwide, Alaska fisheries have been managed for the most part to avoid the drastic stock reductions experienced in other places.

The outlook for commercial fisheries resources in the coming years is for salmon, halibut, and groundfish to continue to be the primary species harvested in the Valdez area. Salmon will continue to dominate the commercial harvest as a result of Alaska Department of Fish and Game management efforts and the success of fish hatchery operations in the Sound. Halibut and sablefish landings have increased in recent years but still make up less than 10 percent of the total PWS fisheries value. Smaller harvests of other groundfish and shellfish help to supplement the existing fisheries. Farmed fish competition is expected to have little effect on PWS fisheries as the success of marketing Alaska wild salmon continues and the relatively low prices per pound for pink salmon encourage fish farms to concentrate on the higher returns available for other species. Pink salmon in Prince William Sound averaged 14.5 cents per pound in the most recent 10 years reaching a high of $0.21 per pound in 1995 and a low of $0.09 per pound in 1996. More recent years have seen average prices in the $0.10 to $0.12 per pound range. It is anticipated that farmed fish operations will continue to focus their efforts on the higher returns available with other species and will need to combat negative publicity and the wild Alaska label.

1. Salmon

The 2005 Prince William Sound commercial salmon harvest of 64.5 million fish was the largest on record. The harvest was comprised of 59.9 million pink, 1.9 million sockeye, 2.0 million chum, 536,675 coho, and 36,118 Chinook salmon. Approximately 80 percent of the harvest, 51.1 million fish, was common property harvest, and 13.3 million fish were sold for hatchery cost recovery. The Alaska Department of Fish and Game Division of Commercial Fisheries predict that the final 2006 harvest will be the 11th largest total run among the 23 even-brood years. (Pink salmon follow a 2-year cycle.) Sockeye, chum, coho, and Chinook salmon are also predicted to have large returns.

Hatchery production is an important component of the Valdez salmon fisheries. Hatchery production and other salmon enhancement efforts aid in maintaining harvest levels. In recent years, due to the success of the salmon hatcheries in Prince William Sound, the Alaska Department of Fish and Game has relied on hatchery forecasts for the Department's management forecasts.

Following the *Exxon-Valdez* oil spill of 1989, many PWS fishing vessels suffered heavy losses. The fishery resource appears to have recovered from the spill though many fishermen lost their livelihoods as a result of the accident. The response from the remaining fishing fleet was to consolidate, become more efficient, increase technical capabilities, and be more flexible in the targeted harvest species. Because the Valdez commercial fishing fleet has the flexibility to gear up, target a specific and profitable fishery, and hold more than one fishing permit, all indications are that the fishing fleet will remain stable in the long term. Therefore, the future economic viability of the salmon fishing industry in Prince William Sound looks bright.

2. Halibut

Large year-classes produced in the late 1970s and into the mid-1980s resulted in a buildup of halibut biomass to current high levels. Limits are placed on halibut taken as bycatch in groundfish target fisheries. Over half of the biomass in 2000 was found in areas 3A and 3B (central and western Gulf of Alaska). The directed halibut longline fishery is regulated by the halibut/sablefish individual fishing quota program which began in 1995. The Pacific halibut stock is managed by the International Pacific Halibut Commission (IPHC) which sets the annual catch limits. During the years 2001 to 2004, 70-85 percent of the Alaskan halibut biomass was in the Gulf of Alaska. Barring management regime changes and natural disasters, the halibut stock is expected to remain healthy in the foreseeable future.

3. Sablefish

Sablefish in the Bering Sea, Aleutian Islands, and Gulf of Alaska are considered to be part of the same stock. Catch in the Gulf of Alaska peaked in 1972 and rose again in the late 1980s. The current biomass of the sablefish stock off Alaska appears low but stable.

4. Other Groundfish

Several species of other groundfish support the commercial harvest in PWS; pollock, Pacific cod, flatfish, and rockfish. These species represent a small portion of the overall commercial harvest. Though the catch has significantly declined in both weight and value since the late 1990s, it seems to have been normalized in recent years through quota initiatives. This fishery is expected to remain relatively stable in terms of biomass and harvest in the foreseeable future. By state regulation, the groundfish fishery in Prince William Sound requires seabird avoidance measures in all longline fisheries in state waters. In addition, the NMFS designs fishing closures to protect Steller sea lions in the area.

Pollock in the Gulf of Alaska are managed as a single stock that is separate from the Bering Sea and Aleutian Island pollock stocks. Since the mid 1980s, biomass has declined. In December 1998, the NMFS issued a biological opinion that the pollock fishery jeopardized the continued existence or adversely modified the critical habitat of Steller sea lions. In response, the NPFMC prohibited pollock fishing within 10-20 nautical miles of numerous rookeries and haulouts, reduced the catch of pollock within critical habitat areas, and redistributed fishing effort.

Pacific cod stock in the Gulf of Alaska has also declined since peaking in the late 1980s. The Pacific cod stock is exploited by a multiple-gear fishery, principally by trawls and smaller amounts of longlines, jigs, and pots. For trawl fisheries, cod harvests have been constrained by halibut bycatch limits.

Far and away the dominant flatfish species in the Gulf of Alaska is arrowtooth flounder which appear to be at peak levels. This species, however, has little market value. There are several varieties of rockfish present in the Sound. Many of the species are abundant and are commonly taken by bottom trawls and longline gear. Recent harvests have been between 50-70 percent of the allowable biological catch (ABC).

5. Herring

Herring fisheries in Prince William Sound include the purse seine and gillnet sac roe harvests, the spawn-on-kelp in pound fishery, and the wild spawn-on-kelp harvests. The Prince William Sound herring biomass estimate continues to be below the minimum spawning biomass threshold of 22,000 tons. All herring fisheries in Prince William Sound are expected to remain closed in the foreseeable future while the biomass continues to recover.

6. Shellfish

Shrimp harvests are forecast to remain near current low levels in the foreseeable future. There is no evidence of potential increase in the near term. Studies of species interactions suggest that shellfish will not increase to support the harvest levels observed in the 1960s and 1970s until predatory species decrease in abundance.

In 2004, the Alaska Department of Fish and Game initiated a 2-year study of the abundance, distribution, and movement of golden king crab in the western portion of the Sound. The fishery has been closed since 1995 due to stock concerns. Data collected from these surveys will assist decision-makers to assess the potential for reopening the harvest. The golden king crab fishery in the Sound is expected to remain closed for the foreseeable future while the stock recovers.

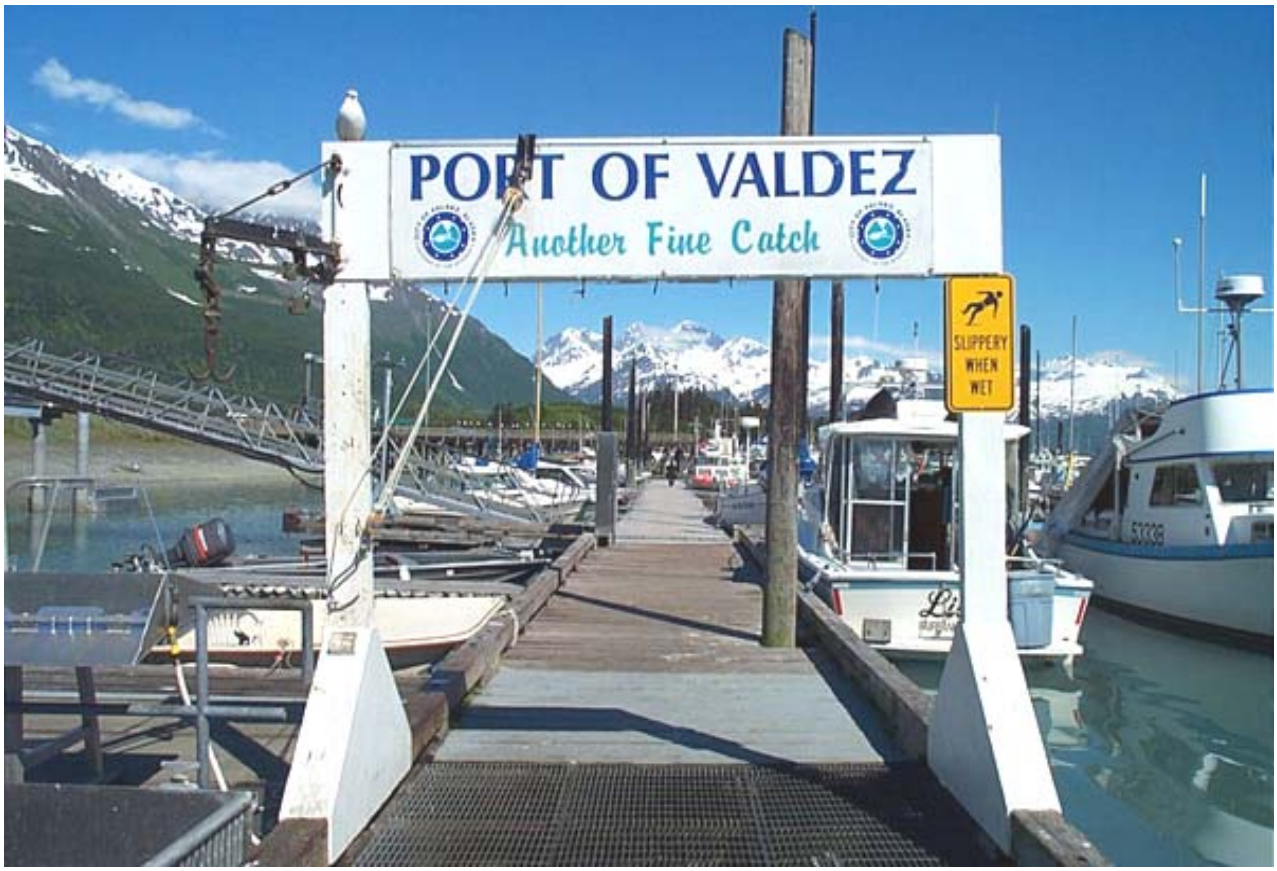


Figure B-16. Port of Valdez

III. RESEARCH METHODOLOGY

This section describes the methods and procedures used to analyze the potential economic benefits that could be realized with the various harbor plans and alternatives under consideration. Justification for a proposed action is determined by comparing average annual costs - including project first costs, interest during construction, and operating and maintenance expenses - with an estimate of the average annual benefits to be derived from the project. Application of an appropriate interest rate and period of analysis make benefits and costs comparable to an equivalent time value of money.

The identification of project benefits under the NED criteria is based on increases in the net value of national output of goods and services, expressed in monetary units. It includes the value of goods and services that are and those that are not marketed. Benefit cost analysis is the technique used to identify and value the effects. Benefits are derived for both the recreational fleet and the commercial fleet. Included are categories of benefits that can be assigned tangible monetary values directly resulting from harbor development.

A. Evaluation Framework

Army Corps of Engineers planning is conducted by comparing with- and without-project forecasts of future conditions in the study area. The differences in costs incurred by, and benefits accruing as a result of the project are more readily identified. To ensure that plan alternatives are economically efficient, it is necessary to impose the condition of economically rational behavior on individuals and firms in both project conditions. The evaluation results in the identification of a theoretical willingness to pay for the project outputs which is used to express the NED benefit, regardless of who will actually pay. Three approaches were used in the analysis for this study: expert interviews, focus groups, and a mail-out survey. These approaches are described more fully in the following:

1. Expert Interview Approach

The expert interview approach is used in this study to accommodate circumstances specific to Valdez. It follows widely recognized principles incorporating the Stanford/SRI protocol for conducting a formal elicitation meeting with the expert. This protocol emphasizes bias reduction, careful consideration of information, and sound principles for encoding probabilities. The approach involves four steps, culminating in the one-time, in-person, elicitation interview.

Step 1. Selection of Experts. An "expert group" was selected for the study. These experts have similar qualifications in estimating the parameters of interest so that opinions are considered equally valid. This is important because different experts may define different distributions (i.e., have different opinions) and those distributions must be combined to form a single distribution in the end. Another option to combining distributions from individual experts was to define a team of experts. This team would have a designated leader and would go through the elicitation process together, combining opinions and rationale, to produce a single consensus distribution for each study. However, the nature of the fishing industry with its many overlapping seasons is such that it would be difficult to gather a team and keep them together. Thus, the first option was selected as being more cost-effective and convenient from the interviewer's perspective.

Step 2. Review of Background Material on Probability Assessment. Verification of familiarity with the issues is one of the important principles of expert elicitation. An initial objective was to establish an initial rapport with the interviewer and introduce concepts of

probability assessment into the discussion. At this time the interviewer searched for motivation biases, which are conscious or unconscious adjustments in estimates based on self-interest or conflicts of interest.

Step 3. Interviewer's Familiarization with Expert's Knowledge. The experts were asked to provide background or descriptions accounting for their knowledge of similar studies. They were also asked to verify characteristics of delay as a variable that will be assigned uncertainty distributions. In addition, respondents were requested to explain or describe what they felt was the value of the uncertain variables.

Step 4. Interview. Interviews were held on an individual basis at the project location, by telephone and via electronic mail. Most were completed in less than 30 minutes.

A summary of interviews conducted can be found in Exhibit 1. Interviews were conducted with 41 commercial fishers and charterboat operators in order to gain information on the delays (and causes) along with damage estimates and descriptions of congestion problems at the harbor. Highlights of those interviews are:

- Those boat owners with permanent moorage experienced less delays and damages than boat owners using transient moorage
- Waits for permanent moorage slips were up to six years
- Vessel owners upgrading to larger vessels continued to keep smaller slips due to lack of appropriately sized stalls
- Rafting of vessels 3 to 4 abreast is common with occurrences of 5 to 6 abreast during peak seasons
- Recreation boaters and kayakers cause problems for the commercial operators due to lack of understanding on proper boating etiquette
- The water in the harbor is stagnant and gets very dirty especially when the cannery is in operation
- Congestion is especially bad when the tenders are in the harbor because they locate in the fairway entrance to the harbor and the big vessels must maneuver around the processing plant making it difficult for other boats to pass
- Commercial fishing vessels averaged $170 annually in vessel damages as a result of Valdez Harbor conditions

2. Focus Groups

Two focus group meetings were held: one in Valdez and one in Fairbanks in October 2004. The intentions were to assist the Corps and the City of Valdez in understanding the potential for National Economic Development benefits for the harbor project and to help develop survey instruments to assess possible recreation benefits. Estimating the recreation benefits of a new harbor to existing and new recreational boaters is an important step in the economic justification of potential harbor

improvements. Recreational boaters and those interested in recreational boating at Valdez were invited to participate in these workshops.

3. Surveys

The contingent valuation method is a survey approach for determining willingness to pay. The quality of the sightseeing and fishing experience on pristine Prince William Sound has resulted in the demand for recreation facilities outstripping the limited supply at the Port of Valdez. Specifically the demand for boat moorage has increased dramatically during the past 20 years. Currently there are 500 fully utilized permanent slips at Valdez Harbor, of which nearly 400 are occupied by recreational boats. An additional 243 boaters pay an annual fee to be on a waitlist in the event that an existing or new slip becomes available. Of these, 216 are recreational boaters. Inadequate parking, overcrowding, and insufficient moorage result in reduced enjoyment of the recreation experience, damage to boats as a result of makeshift berthing arrangements, delays to launch and retrieve boats, and inconvenience, travel cost, and storage cost that would be greatly reduced if additional moorage facilities were available. The addition of boat slips would decrease costs and increase the enjoyment and efficiency for both slip users and non-slip users. A preliminary economic analysis indicated that such improvements would be economically justified.

The purpose of the survey was to refine the analysis and contribute to a decision regarding the feasibility of the proposed project. In accordance with Corps procedures, both surveys were approved for distribution by the Office of Management and Budget – OMB 0710-0001. See Exhibits 2 and 3 for copies of the survey instrument.

Research Questions. The primary research question was: "What is the benefit of additional recreational slips at Valdez Harbor?" A Contingent Value (CV) question was used to make this determination. Secondary questions regarding recreation activity and boat damage experienced by current and prospective slip renters were also included. This information was necessary to estimate Unit Day Value (UDV) recreation benefits and to avoid double counting, so the higher quality recreation experience and boat damage savings could be reflected in the CV estimate. In addition, the CV question attempts to capture the value to boaters from having a guaranteed space at the harbor. Guaranteed space relieves boat owners of manning boats that must be rafted or hot-berthed as a result of limited space.

Sampling Strategy. The Prospective Slip Renter Survey was mailed to all individuals who were on the wait list for slip rental (commercial fishing vessels were excluded), and the Slip Renter Survey was mailed to all individuals who currently rent slips at Valdez Harbor. In 2004, there were 195 recreation rental applicants waitlisted and 417 persons already renting slips, for a total distribution of over 600 questionnaires. Reminder postcards and follow-up phone calls were planned to maximize response rates for each boat-length class in each of the two types of surveys. Survey and length classes were identified by one letter of the alphabet preceding a unique numerical code on each questionnaire. Response rates were high enough after the reminder postcard, over 63 percent, that no follow-up phone calls were required.

Table B-10.
Valdez Current and Prospective Slip Renter Surveys Mailed and Returned

Type of Boat	Surveys Mailed	Number Responding	Response Rate
Current Renters:			
Recreational Boat	417	238	57.07 %
Charter Boat	37	32	86.49 %
Commercial Fisher*	12	10	83.33 %
Waitlisted Boats:			
Recreational Boat	195	135	69.23 %
Charter Boat	16	16	100.00 %
TOTAL	**677**	**431**	**63.66 %**

*Responses from surveys accidentally sent to owners of commercial fishing boats were not included in the recreation analysis.

Collection Procedures. The cover letter and questionnaire were provided to the City of Valdez and distributed under the signature of the City Mayor. The letter was on City letterhead but clearly stated that it was distributed on behalf of the U.S. Army Corps of Engineers. A stamped envelope addressed to the Alaska District office was enclosed to facilitate return of the questionnaire.

Follow-up Procedures. Each questionnaire had a unique identification number. It was explained in the cover letter that this number was strictly for mailing purposes, and responses would be kept confidential. After the first questionnaire was mailed, a reminder postcard was sent one week later thanking those that responded and urging those who had not to please respond. When responses were received, the code and corresponding address was crossed off the list.

Data Analysis Plan. Information provided by the questionnaire was evaluated and used in the following manner. The *Contingent Valuation* (CV) question was asked of current slip renters and those on the waitlist. Current slip renters were asked if they planned on renting at Valdez Harbor again next year. All slip renters indicated willingness to continue renting at the harbor. Charterboat operators, on average, were willing to pay more than strictly recreation boaters to have guaranteed space in the harbor, $357 compared to $320 annually.

Table B-11.
Contingent Valuation Survey Results – November 2004

Without-Project	Recreation Boaters	Charterboat Operators
Plan on renting at Valdez again next year		
Permanent	100%	100%
Auction - Willingness to Pay		
Average additional amount	$ 320	$ 357
Minimum bid	-	-
Maximum bid	$ 3,000	$ 3,000

Note: The contingent valuation question asked respondents about their willingness-to-bid on guaranteed space at the harbor and provided values from zero to $3,000 for selection.

Respondents were then asked to describe the best reason they could give for answering the previous bid question. Recreation boaters indicated a willingness to pay more but that was all they could afford. Charterboat operators, on the other hand, mostly objected to the wording of the question. When providing reasons in the other category, some respondents indicated that additional expense would be encouragement for them to modify how they do business (i.e. would trailer their boat, would

seek moorage elsewhere, would sue the City, and mostly objected to the question wording and reasoning).

Table B-12.
Contingent Valuation Reason for Bid – November 2004

Mock Bid Rationale	Recreation Boaters	Charterboat Operators
I didn't want to place a dollar value	11%	13%
That's what it's worth to me	29%	11%
It's worth more to me, but it's all I can afford to pay	32%	13%
I object to the wording of the question	21%	22%
Not enough information is provided	13%	13%
Other:	14%	11%

Waitlisted vessels were assumed to want a slip in the following year since they are paying an annual fee to remain on the list. Not all current and waitlisted vessels would like a berth in the new harbor, however. Some vessels would prefer to stay in the existing harbor. It was assumed that waitlisted vessels would have higher contingent valuations for guaranteed moorage than those already assigned a permanent slip and this proved to be true. Benefits assigned to the recreation boaters as a result of the CV question are limited to the number of boats that could be accommodated under each of the alternatives.

Table B-13.
Contingent Valuation Survey Results for New Harbor – November 2004

With-Project	Recreation Boaters	Charterboat Operators
Percent who would seek berth in new harbor		
Permanent	65%	58%
Waitlist	90%	79%
Auction - Additional willingness to pay for new harbor		
Permanent berth holders		
Average additional amount	$ 225	$ 432
Minimum bid	-	-
Maximum bid	3,000	3,000
Waitlisted boaters		
Average additional amount	$ 408	$ 325
Minimum bid	-	-
Maximum bid	3,000	1,000

Note: The contingent valuation question asked respondents about their willingness-to-bid on guaranteed space at the harbor and provided values from zero to $3,000 for selection.

The *Unit Day Value* (UDV) method was used to estimate added recreation benefits under the with-project condition for existing slip users, waitlisted boaters, and for recreators on charter boats. A panel of experts convened in Valdez and Fairbanks during 2004 to determine without- and with-project points for Valdez Harbor. Experts were asked to assign point values to each of the five criteria for the recreation experience without-project and with-project under two different scenarios, with an additional 230 or 330 slips.

Table B-14. Recreation User Day Scores and Rationale

Recreation Criteria	Range of Possible Values	Point Value	Rationale
Recreation Experience	0-30	0 – 4 points	Heavy use or frequent crowding or other interference with use
		5 – 10 points	Moderate use, other users evident and likely to interfere with use
		11 – 16 points	Moderate use, some evidence of other users and occasional interference with use due to crowding
		17 – 23 points	Usually little evidence of other users, rarely if ever crowded
		24 – 30 points	Very low evidence of other users, never crowded
Carrying Capacity	0-14	0 – 2 points	Minimum facility for development for public health and safety
		3 – 5 points	Basic facility to conduct activity (ies)
		6 - 8 points	Adequate facilities to conduct without deterioration of the resource or activity experience
		9 - 11 points	Optimum facilities to conduct activity at site potential
		12 - 14 points	Ultimate facilities to achieve intent of selected alternative
Accessibility	0-18	0 – 3 points	Limited access by any means to site or within site
		4 - 6 points	Fair access, poor quality roads to site; limited access within site
		7 - 10 points	Fair access, fair road to site; fair access, good roads within site
		11 - 14 points	Good access, good roads to site; fair access, good roads within site
		15 - 18 points	Good access, high standard road to site; good access within site
Environmental	0-20	0 – 2 points	Low esthetic factors that significantly lower quality. Major esthetic qualities to be considered include geology and topography, water, and vegetation. Factors to be considered to lowering quality include air and water pollution, pests, poor climate, and unsightly adjacent areas
		3 - 6 points	Average esthetic quality; factors exist that lower quality to minor degree
		7 - 10 points	Above average esthetic quality; any limiting factors can be reasonably rectified
		11 - 15 points	High esthetic quality; no factors exist that lower quality
		16 - 20 points	Outstanding esthetic quality; no factors exist that lower quality
Availability of Opportunity (Includes likelihood of success at fishing and hunting.)	0-18	0 – 3 points	Several within one hour travel time; a few within 30 minutes travel time
		4 - 6 points	Several within one hour travel time; none within 30 minutes travel time
		7 - 10 points	One or two within one hour travel time; none within 45 minutes travel time
		11 - 14 points	None within one hour travel time
		15 - 18 points	None within two hour travel time

Experts were provided with guidelines for assigning values based on the Economic Guidance Memorandum (EGM) 04-03, 22 Dec 03. Special Fishing and Hunting values and Specialized Recreation values other than Fishing and Hunting were used based on survey responses.

Table B-15.
Unit Day Values for Valdez Harbor Without- and With-Project Conditions

Criteria	Total Possible Points	Without-Project			With-Project 230-slips			With-Project 330-slips		
		Perm Slips	Trans	Charter Pass.	Perm Slips	Trans	Charter Pass.	Perm Slips	Trans	Charter Pass.
Recreation Experience	30	6.0	4.3	3.6	16.9	15.8	15.9	22.8	20.7	22.6
Availability of Opportunity	18	13.0	10.7	12.5	15.5	15.4	15.7	16.3	16.3	15.8
Carrying Capacity	14	4.1	3.1	2.3	8.6	7.8	8.6	10.5	10.1	10.9
Accessibility	18	5.6	4.4	3.3	11.9	11.4	11.6	14.2	13.1	13.9
Environment	20	4.2	4.7	4.3	12.0	11.7	10.7	13.4	14.3	13.4
Total Points	**100**	**32.9**	**27.2**	**25.9**	**64.9**	**62.2**	**62.4**	**77.2**	**74.6**	**76.5**

Note: Points depicted here are average (mean) estimates derived from focus group meetings held in Valdez and Fairbanks during October 2004. Focus group participants were asked how the recreation experience would change given two alternatives; expanded harbor with 230 slips or 330 slips. Actual recreation benefits calculated further in this report reflect estimates of permanent slip renters, transient, and charter vessels for each of their respective groups. The UDV points used for the smaller harbor configurations (i.e. 125, 200, and 243 additional vessels) are associated with the 230-slip alternative from the focus groups and the UDV points for the 330 slip configuration has been used for the 320-slip alternative.

Based on harbor staff evaluations and Alaska Department of Fish and Game sport fish survey data, weights were assigned to charter and non-charter vessels for individuals engaging in Specialized Fishing and Hunting and those enjoying Specialized Recreation Values Other Than Hunting and Fishing as defined by Corps Guidance. The values for point assignments have been updated using the Economic Guidance Memorandum (EGM) 10-03, 20 November 2009 for purposes of this report.

The unit day values for permanent, transient, and charterboat operators were calculated as follows:

Table B-16.
UDV Points and Weighted Values

	UDV Points	UDV
Without Project		
Permanent Slipholders	32.9	$21.20
Transient Vessels	27.2	$20.58
Charter Passengers	25.9	$18.37
With-Project assuming 230 additional slips		
Permanent Slipholders	64.9	$28.67
Transient Vessels	62.2	$27.52
Charter Passengers	62.4	$25.56
With-Project assuming 330 additional slips		
Permanent Slipholders	77.2	$33.34
Transient Vessels	74.6	$32.16
Charter Passengers	76.5	$31.79

Note: Unit Day Value based on EGM 10-03, 20 November 2009.

Unit Day Values are weighted based on harbor staff evaluations and Alaska Department of Fish and Game Sport Fish Surveys which indicate that charterboat passengers engage in Specialized Fishing and Hunting 13 percent of the time and Specialized Recreation Values other than Fishing and Hunting 87 percent of the time. Non-charter recreators engage in Specialized Fishing and Hunting 36 percent of the time and Specialized Recreation Values other than Fishing and Hunting 64 percent of the time.

Current and prospective slip renters at Valdez Harbor were also asked about damages to vessels from conditions at the harbor. Respondents were instructed not to include damages incurred while away from Valdez Harbor and to estimate the value of repairs done by them. Current slip renters experienced much greater vessel damages than waitlisted vessels and charter vessels experienced greater damages than recreational boats. This could be attributed to the time spent in the harbor, current slip renters spending far greater time in the harbor than waitlisted boats who must trailer their vessels to the harbor. Commercial fishing vessels were not included in the survey.

Table B-17.
Average Annual Vessel Damages – November 2004

Without-Project	**Recreation Boaters**	**Charterboat Operators**
Average annual damages from inside Valdez Harbor		
Permanent	$ 274	$ 371
Waitlist	$ 74	$ 177

B. Delay Analysis

Some aspects of the Valdez feasibility study provide information for the planning process, drawing from models, data sets, and estimated values. In contrast, reliance on expert judgment for some aspects of the economic evaluation was necessitated by a lack of economic data, time constraints, and budget considerations. In the Valdez study, as with most other Army Corps of Engineers' harbor studies, reliance on judgment is unavoidable. Therefore, the interview approach is designed to verify expert opinion and:

- improve judgment-based estimates of most likely values and uncertainty about the problems of delay.
- provide documentation of assumptions, data, and other information that is associated with delay estimates.

Due to inadequate harbor records on vessel delays and a lack of any modeling information from prior studies, a great deal of uncertainty is present in analysis of the delay problem. A single-point estimate cannot reasonably represent the uncertain range of possible outcomes. Ignoring the range by using a single-point estimate does not make the decision easier because stakeholders would question whether a different decision would have been made if a different single-point estimate had been used. However, single-point estimates influencing the decision criteria can be combined and communicated in a simple manner.

The judgment and uncertainty represented in this process stems from specific individuals defined as the experts. The challenges for subjective probability assessment are to base probability distributions on thorough and objective thinking and to document this thinking and the assumptions in a manner that can be readily reviewed. The process of defining the distributions explicitly and documenting key assumptions helps to focus review on tangible issues.

1. Feedback on Delays

The entire interview process identified more than 100 individuals as prospective experts fitting a pre-described profile. "Experts" were adults, regular commercial users of the existing harbor (Valdez fishers and charters), admitted stakeholders, accessible, and willing to cooperate. Of the group identified, 45 permanent and transient commercial fishers and charter boat operators and owners were interviewed. Notes were taken on each occasion. Open-ended questions were asked of each respondent without the use of a standardized questionnaire. Information was solicited on delay times involved in entering and exiting Valdez harbor during peak periods as well as possible damages to their vessels from issues related to overcrowding. Depending upon the response, follow-up questions were asked to elicit more information.

Vessels likely to experience the most delays were those tied to rafts. The second most likely reason were boats needing to use the launch area and fuel docks. The least likely were vessels leasing slips (permanent berth holders) near the fairway of the channel, although they might be delayed by vessels already using the entrance channel forcing them to wait at their slip or near it until able to safely join moving traffic. During the Valdez salmon derby a one-half mile long line was observed trying to enter the harbor.

Several derbies take place annually in Valdez. This has been an effort by the City and others to increase tourism revenues and capitalize on the abundant fishery asset in the region. Dollars received from the tourism industry tend to stay in the region longer than those dollars generated by commercial fishing activity. Bragging rights and cash prizes go to the captains with customers reeling in the largest fish in the derbies. Charter fishing operators offer half and full-day along with multi-day excursions depending on client need. Full day excursions generally begin at 6 a.m. and end at 6 p.m. Half-day excursions have similar begin and end times with a return to the harbor around noon. Multi-day excursions depend on client needs, connecting flights, or other scheduled pick-ups and drop-offs.

Table B-18 shows the major derby events scheduled for 2009 in Valdez. Large cash prizes for the season ($15,000 for both the halibut and silver salmon derbies) along with weekly prizes encourage both out-of-state and Alaska residents to seek Valdez for recreational activity. Unique offerings such as the Women's Silver Salmon Derby (550 participants in 2008) and the Kids Pink Salmon Derby (over 200 participants in 2008) attract fishers from all over. Onshore activities such as banquets, dances, and auctions encourage derby participants to stay in Valdez longer than the advertised fishing event.

Telephone calls to the major tour operators in Valdez reveals that sightseeing tour operators have introduced flexibility into their schedules in order to avoid competing with fishing charters for entry and exit from the harbor. See Table B-19 for general timings of departures and arrivals for tour operators. Stan Stephens Cruises representative Colleen Stephens tells the Corps that sport fishing charters all leave the harbor around 6 a.m. to 7 a.m., recreational boats generally head out around from 7 a.m. to 8 a.m., and everyone – including commercial fishers – head back to the harbor between 6 and 8 p.m. Stan Stephens also has a water taxi vessel that leaves and returns all times of the day depending on customer needs for transportation. Stephens also said that it is very common for 2-3 tenders to limit the opening channel of the harbor to one lane (near the fuel dock) and that if even one tender needs to move, all other movement in and out of the harbor halts until they are able to get out of the way.

Other tour operators gave us the following details on their operations:

- Fred Rodolf of LuLu Belle Tours said that their tours go out daily from mid-May through the end of August. They leave at 2 p.m. and return to the harbor 8-8:30 p.m. and about 20 percent of the season have additional tours leaving the harbor at 8 a.m. returning 12:30-1:30 p.m..

- Valdez Tours website lists glacier tours heading out of the harbor noon daily and returning 6:30 p.m. from May 15 through September 15 and another tour on Sundays leaving 2 p.m. and returning 8:30 p.m. from July 13 through August 31. An additional tour heads out 10 a.m. daily returning 6 – 7 p.m. running from June through the end of August.

- Anadyr Adventures has a lot of fluctuation in when they leave and arrive based on tidal cycles. They exit the harbor between 6 a.m. and noon and return between noon and 10 p.m. based on the customer needs. They operate between May 1 through mid-September.

- Lucky Lady Charters is more of a fishing business but they do sightseeing tours leaving the harbor around 7 a.m. and returning between 5 and 7 p.m. They operate from late April through mid-September.

- Vixen Charters does mostly fishing but about 20 percent of their business is sightseeing tours. They typically leave the harbor between 6 and 7 a.m. and return around 6 to 7 p.m. They said that is the peak hours for all charter/sightseeing boats to be leaving and returning. They operate from beginning of June through mid-September.

Other activity expected to increase the charter fishing and sightseeing activity at Valdez is the start of a King salmon run in June. The City participated in building a King salmon rearing site that has been releasing Kings for the last four years. 2009 will be the first year of these fish returning and will enhance the normal pink, red, and silver runs that are already abundant in the Sound.

Table B-18. Calendar of Events – Valdez Alaska

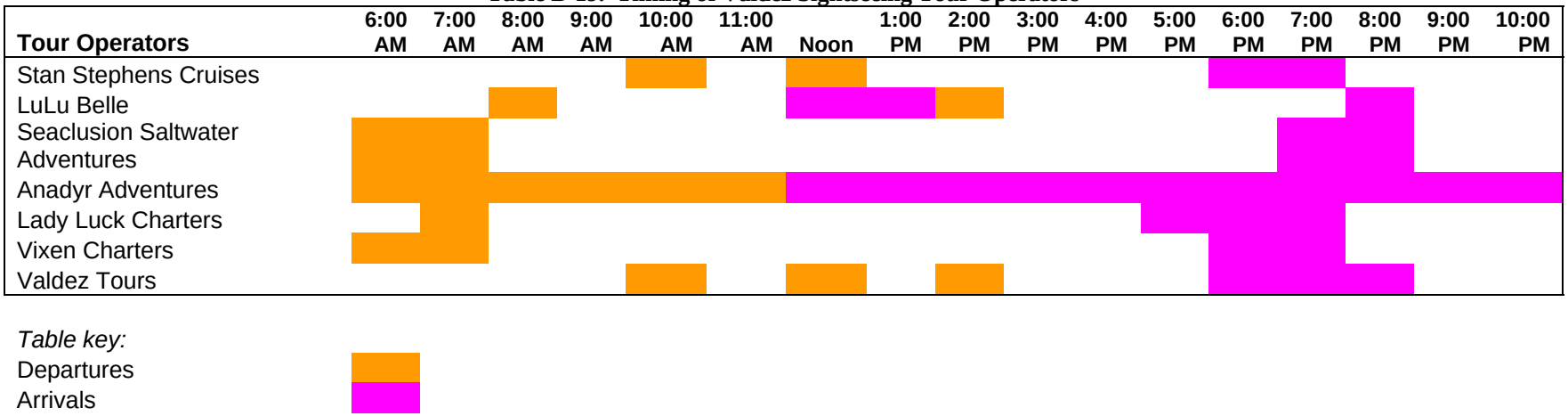
Events	Calendar of Events for 2009											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Scheduled Derbies												
Valdez Halibut Derby (May 23 - Sep 6) [1]												
Halibut Hullabaloo (June 11 - 21)												
Valdez Kids Pink Salmon Derby (July 18) [2]												
Valdez Silver Salmon Derby (July 25 - Sept 6) [3]												
Big Prize Fridays (July 31 and Sept 4)												
Valdez Women's Silver Salmon Derby (Aug. 8) [4]												
Spawn till Dawn Awards Party (Sept 6)												
Sample Charter Fishing Operations [5 6 7]												
Alaska Adventures Unlimited												
Halibut												
Ling Cod												
Salmon Shark												
Gemini Charters												
Halibut												
Salmon												
Shark												
Lady Luck Charters												
Halibut												
Silver salmon												
Orion Charters												
Halibut												
Ling Cod												
Salmon Shark												
Silver salmon												
Pink salmon												
King salmon												
Seaclusion Saltwater Adventures												
Silver Salmon												
Halibut												
Shark												

Sources: Valdez Fish Derbies at http://www.valdezfishderbies.com/, http://www.alaskan-adventures-unlimited.com/, http://www.geminiseacharters.com/, http://www.ladyluckcharters.com/, http://www.orioncharters.com/, http://www.seaclusionsaltwater.com/.

Notes to table:

1. 2008 first place prize for the halibut derby was $15,000. Weekly prizes are also offered. Derby tickets cost $10 in 2008.
2. 2008 - 200 young anglers participated in Kids Pink Salmon Derby. Four different age divisions win prizes of bicycles, skateboards, and fishing gear.
3. Silver Salmon Derby in 2008 there were daily 1st and 2nd place prizes as well as a $15,000 first place cash prize, $5,000 2nd place prize and $2,000 3rd place prize.
4. 2008 - 550 women participated and paid the $25 entry fee.
5. Charter fishing operators can be on the preferred list for derbies. A select view of the preferred fish charters time of operations are listed here by species.
6. Charter operators offer half, full-day, and multi-day excursions. Full-day trips generally begin at 6 a.m. and last until 6 p.m.. Half-day trips have similar begin and end times with a return to the harbor around noon. Multi-day excursions are based on customer need and other scheduled pick-ups and drop-offs.
7. Bear and deer hunting trips are also available but not shown on this chart. Charter operators generally drop off and pick up at prearranged times.

Table B-19. Timing of Valdez Sightseeing Tour Operators



Sources: Personal communications with representatives from Stan Stephens Cruises, LuLu Belle Tours, Seaclusion Saltwater Adventures, Anadyr Adventures, Lady Luck Charters, and Vixen Charters. Website information for Valdez Tours.

Inner harbor delays involve one or more of the following conditions: entering and exiting the harbor, getting into and out of a permanent slip, and/or looking for transient space. Delays also occur at the fuel docks when boats are refueling before/after going out to fish, when large fishing boats and processors block vessel passage while entering or exiting the harbor, near the haul-out (lift) area, and at the processing dock.

Extreme delays of rafters were described as including two or three events during a night when the entire raft might be disrupted for a vessel needing to depart. The operation did not account for delays in the channel, but it was repeatedly described as often accounting for two or three man-hours aboard every rafted vessel over the period of a single day. In all delay cases where rafted vessels were involved, the delay would be prevented by project expansion. Severe delays impact more than 200 rafted vessels on a peak day and account for up to 300 man-hours. This is an average of 90 minutes per rafted vessel, not including delays on arrival and departure, which increases the delay time for each of the vessels on the inside of the raft.

Traffic congestion near the launch area and fuel docks causes launched vessels to experience extreme delays in excess of 90 minutes. This scenario is typically for a late arrival on a peak use day. If a skipper is trying to haul out, he will need to jockey the boat in a crowded area until he can gain access to the launch area. The experience is dangerous and damages are frequent. The delay time can be double the estimated 90 minutes if there are disabled vessels in the launch area, inexperienced haulout crews involved, broken equipment present, or if landside traffic delays the arrival of trailers for the boats being taken out (before and after the haulout, a driver may need to negotiate a landward traffic jam with a boat trailer in tow).

During peak use months, extreme delay for vessels with permanent moorage occurs regularly. The charter fleet contributes to the congestion problem because it must accommodate customers on a scheduled basis. Charter customers travel from great distances and have complicated travel arrangements that cannot be compromised by charter operators. With passenger and vessel safety as the primary concerns, the exodus from the harbor requires that vessels wait for the proper opportunity to merge into traffic. This can mean several boats must wait in their moorage row near their slip for an appropriate opportunity. Delays at the moorage tie-up and at the moorage row tend to exceed 15 minutes each time, though the two delays do not necessarily accompany one another. Also, delays on returning exceed 15 minutes. The non-typical extreme is 60 minutes.

On average, delays of 15 minutes for permanent berth holders and 45 minutes for transient vessels are experienced in Valdez Harbor. Likewise, 90-minute delays were common for transient vessels during heavy traffic. During off-hours, when the commercial fleet is neither coming nor going, there is little traffic and minimal delays. Fifteen minutes was judged to be appropriate for use in estimating average fleet delay, as it was the most common expectation amount for all classes of users, except those involved in rafting situations. Rafted vessels had higher delay expectations (45 minutes).

The first vessels to depart are not delayed if they move quickly into the channel. However, once the queue forms, every vessel is delayed. The closer one boat operator is to the end of the line, the longer the wait. Less disciplined, non-commercial skippers who are not duty-bound to rigid rules can compound the total wait-time by crowding to lessen their own delay. When dozens of recreational crafts are added, wait time during peak use days becomes excessively long.

In an effort to avoid the congestion, it is common for vessels approaching the harbor to reduce their speed and postpone their arrival. This tactic helps alleviate some of the overcrowding by allowing

those vessels using the inner facilities the opportunity to finish their tasks. Therefore, an additional 15-minute delay is common during the peak 90-day fishing season. When 15 minutes (outside the harbor) is added to the already established inner harbor delays of 15 minutes for permanent berth holders and 45 minutes for transients, total delays become 30 minutes and one hour, respectively.

2. Queue Analysis

In order to confirm the number and hours of delay, a queue analysis was performed of vessels attempting to enter and exit the harbor channel during various times and seasons. Different operating periods were established including summer season weekends and weekdays as well as winter season weekends and weekdays. Each timeframe is assumed to have similar operating hours but fewer boats during the winter season. The seasonal fluctuations are meant to mirror known behaviors related to fishing openings, charter operations, tender deliveries, and recreational usage.

The assumptions used in the queuing analysis follow:

- The summer season runs from May 15 to September 15 with vessels starting to use the entrance channel at 5:00 a.m. and most channel activity concluding by 8:00 p.m. daily.
- Up to four vessels can traverse the channel at one time maintaining a maximum speed of 3 mph as mandated by the harbormaster and assuming a 150-foot distance between vessels (this includes the length of the vessel)
- It takes on average 2.3 minutes to traverse the harbor entrance channel.
- The channel can accommodate up to 104 vessels per hour with 2-way traffic.
- For simplicity, there are four vessel classes using the Valdez Harbor:
    1. Commercial Fishing Vessels – There are nearly twice as many transient vessels as permanently moored vessels and the harbor is unable to accept more than 200 transient vessels on a given day. In winter, only 25 percent of the fishing vessels remain at the harbor.
    2. Charter/Sightseeing/Water Taxi Vessels – 40 percent offer full-day cruises, 40 percent offer half day cruises, and 20 percent enter and exit the harbor four or more times daily.
    3. Tender Vessels – cannot share the entrance channel with other vessels due to their size.
    4. Recreation vessels – there are nearly 1 ½ times as many transient recreation vessels as there are permanently moored vessels
- Daily boat launch vessels (a combination of the four vessel classes listed above) on a summer weekend day number 75 for this analysis. Valdez Harbormaster estimated that on a busy summer weekend day there can be up to 400 boat launches. However this analysis uses a conservative estimate for an average level of activity throughout the summer season.
- Summer weekdays operate at 90 percent of summer weekend levels for boat launches and charter activity.

- Winter weekend activity is 25 percent of summer weekend levels while winter weekday activity is 10 percent of summer weekend levels for boat launches, recreational, and charter vessels.
- Tenders operate daily with 20 vessels active in summer and 5 in winter. In the summer 50 percent of tenders make two deliveries daily, the rest make one. In winter the tender vessels make one delivery.
- The structure and timing of delays using the assumptions stated here show that no boat is delayed more than one hour. However, on a busy launch day such as that described by the Harbormaster, the delays could extend for multiple hours.

During summer weekends, vessels start arriving at the boat launch at 5:00 a.m. with another surge of vessels at 8:00 a.m. These vessels compete with the moored vessels to exit the harbor. Everyone is chasing fish. Depending on the success of the fishing day, boats will start returning at noon daily. When fishing is poor boats will stay out longer but then the congestion returning to the harbor is exacerbated as recreation, commercial fishing, and charter vessels all return at the same time.

Delays occur during six of the sixteen hours in the assumed operating period. In the busy morning period delays begin in the 0500 hour, peaking in the 0600 hour, and returning to zero by 0900. A small number of delays are present in the 1300 hour as a number of charters operating half-day cruises return to the harbor and leave again for their second half-day cruise of the day. The final rush of activity occurs at 1800 hours when the charter and fishing fleets return for the evening. Delays and subsequent choke points throughout the day are shown in Figure B-17.

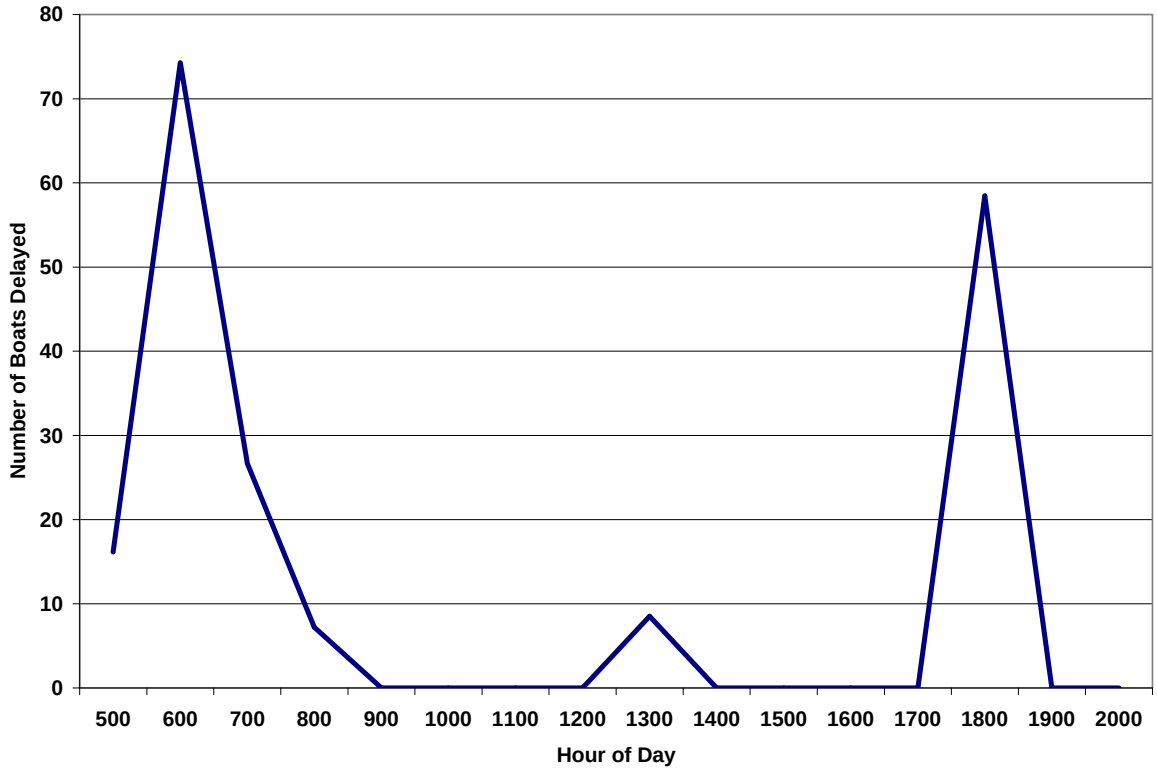


Figure B-17. Summer Weekend Delays by Hour of Day

Note: X and Y axis on the summer weekend and weekday graphs are the same for ease of comparison.

Understanding that a certain amount of uncertainty accompanies these assumptions, a simulation was run using @RISK. The simulation consisted of 10,000 iterations using a Poisson distribution and λ=191. The results are shown in Figure B-18.

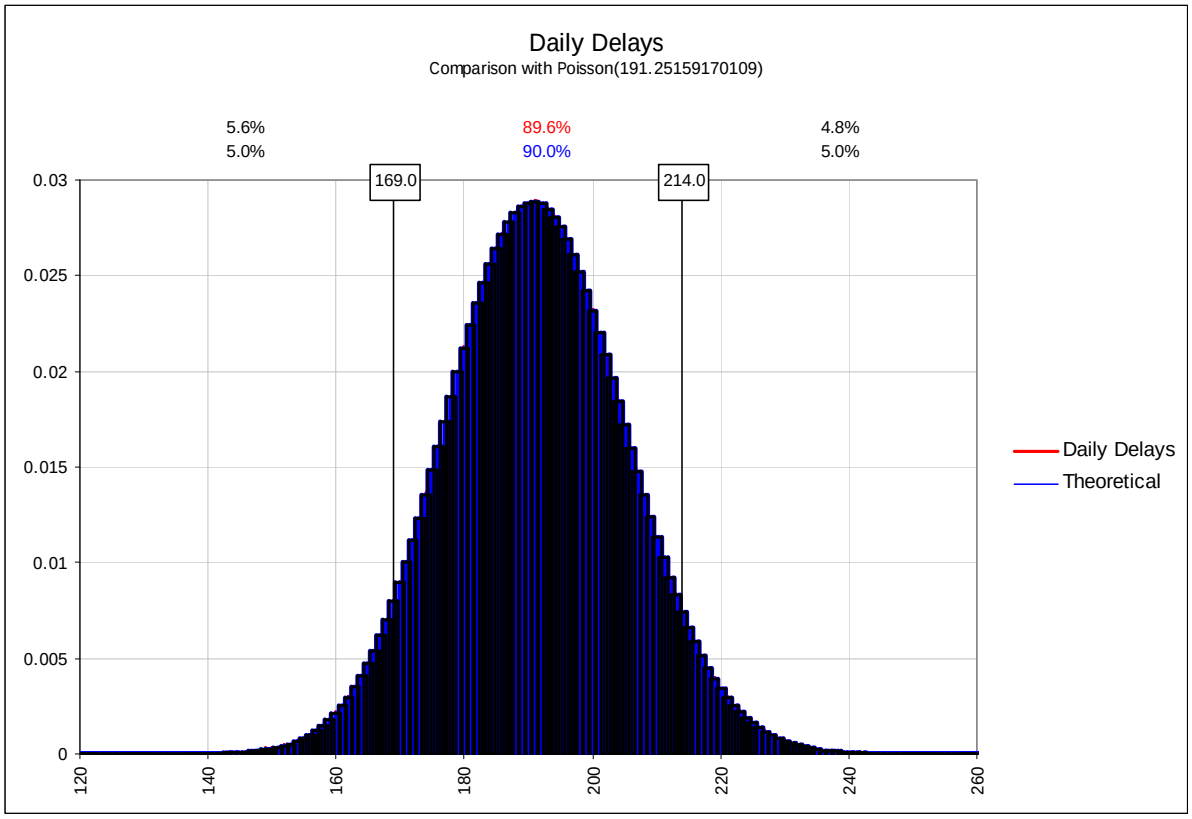


Figure B-18. Simulation of Delays on Summer Weekends

The figure shows that delays fall within a 90 percent confidence interval between 169 and 214 delays per day.

During summer weekdays, choke points follow a similar pattern to summer weekends. However, the activity does not cause the same number of delays. Delays occur primarily during two hours including the busy 0600 and 1800 hours for the same reasons described above. Delays and choke points for the summer weekdays are shown in Figure B-19.

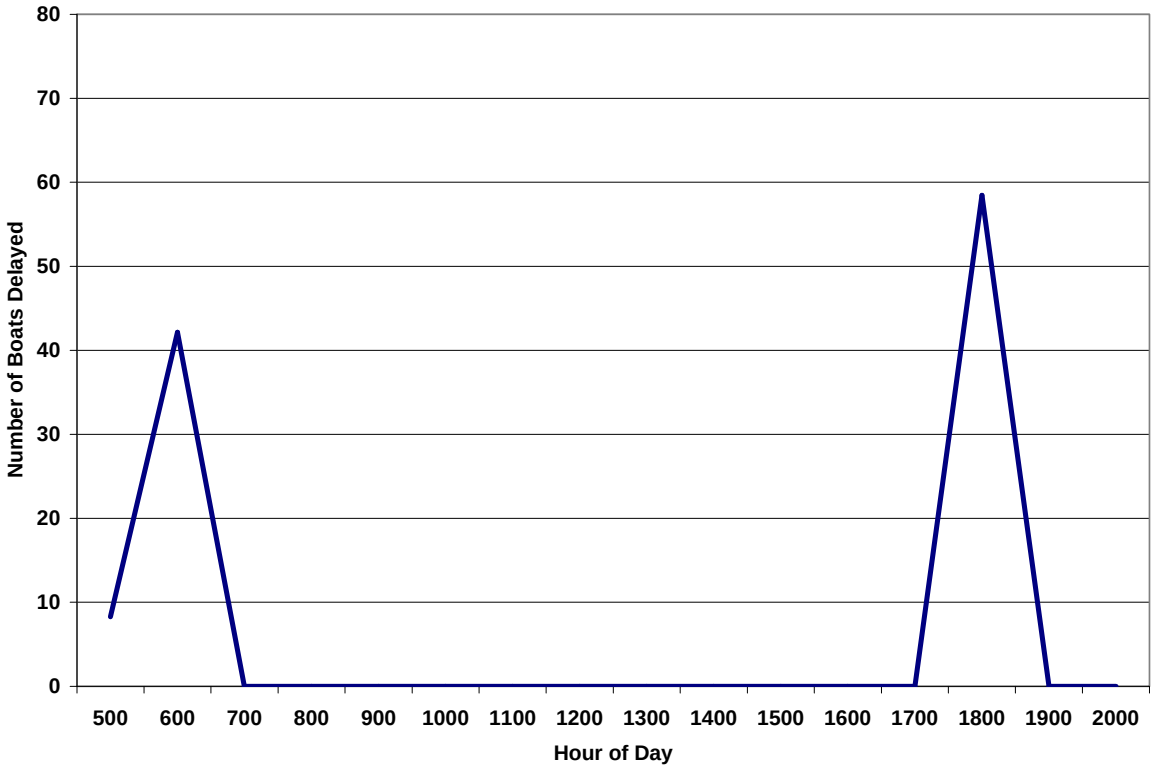


Figure B-19. Summer Weekday Delays by Hour of Day

Note: X and Y axis on the summer weekend and weekday graphs are the same for ease of comparison.

As with summer weekend delays a simulation using @RISK was performed to take into account the uncertainty surrounding this data. The simulation consisted of 10,000 iterations using a Poisson distribution and λ=82. The results are shown in Figure B-20.

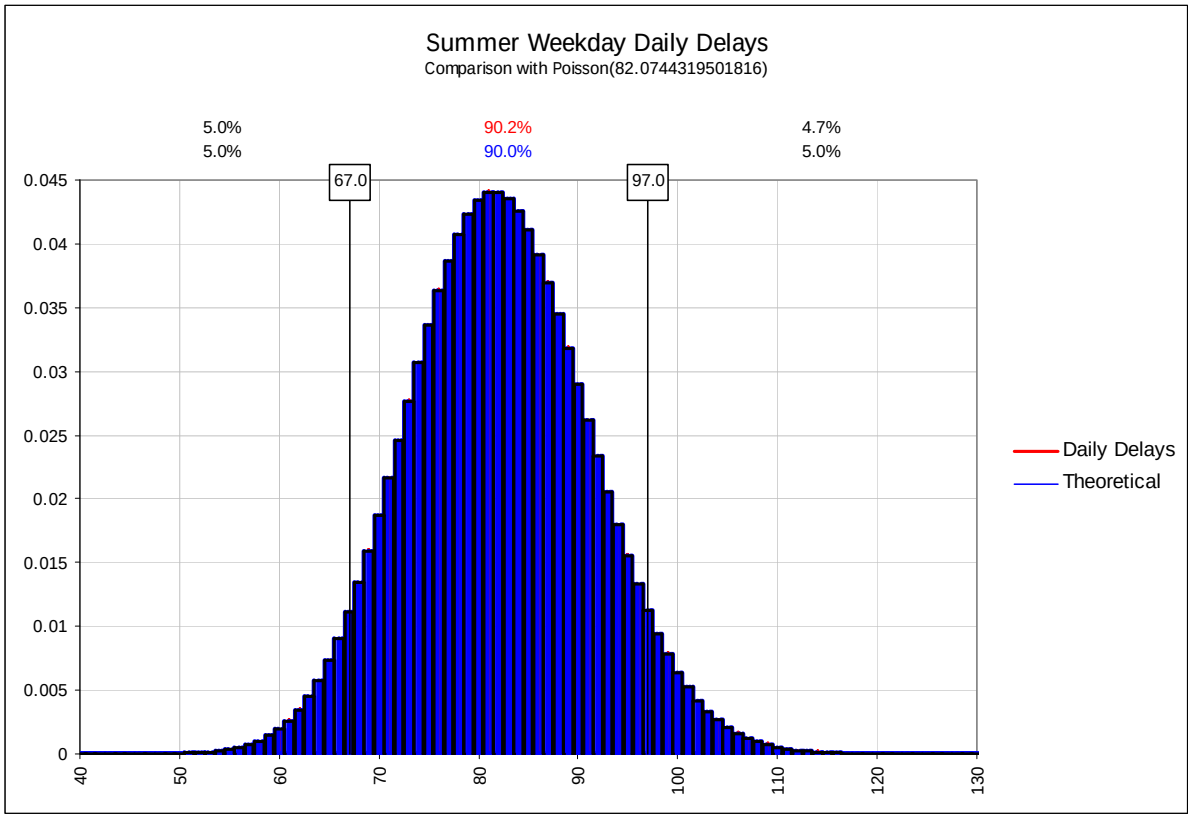


Figure B-20. Simulation of Delays on Summer Weekdays

The simulation shows a range in the 90 percent confidence interval of 67 to 97 delays.

No delays were found for the winter months given our assumptions for this analysis.

The summer season delays according to our queuing analysis total 16,600 hours. This is in excess of the delays actually claimed for this damage category which suggests that our estimate of damages is conservative. Using the 90 percent confidence intervals as a guide it was found that delays could fluctuate by 2,200 hours in either direction and then was still well above the total damages claimed for this category, suggesting again that our estimate of damages are realistic.

C. Fishers' OCT and Charters' Wages

One benefit category for a potential harbor expansion can be measured by the opportunity cost of time (OCT). The opportunity cost premise is based on the concept that the more time a vessel's crew is required to spend searching for moorage space, or in a long queue attempting to enter or exit the harbor, the more valuable space at Valdez becomes. While operating costs measure the direct out-of-pocket expenses associated with searching for protected harbor space, opportunity cost measures the time spent by a vessel's crew. OCT is the value of work or leisure activities forgone by suffering delays or by rerouting to alternate

ports. For OCT calculations, a value of the next best use of time has been assigned. In some cases, this calculation is based on the potential for increased earnings; at other times, this is based on increased leisure time.

If an individual enjoys the advantage of working in an industry with increasing efficiency, he/she can produce more output in the same amount of time or the same output in less time. Therefore, when the saved time is used for income-generating purposes, that time is valued by the potential increase in earnings. When time saved is used for leisure enjoyment, economists value it at a fraction of the income possibility. It should be noted that leisure time itself has an opportunity cost: the lost opportunity for other earnings. For this report, the OCT has been given a value based on the Cornell University study Value of Time Commercial Fishermen in Alaska Could Save with Improved Harbor Facilities for salmon fisher's captain and crew hourly wage rate and the Alaska Department of Labor and Workforce Development wage rates for charter captains and crew. For fishers who would use the gained time to spend in leisure activity, a value equal to one-third the wage rate is used. Leisure time saved is based on percent of fishers indicating a preference for leisure activity from the Cornell report.

Harbor improvements at Valdez would result in time saved for commercial fishermen and charter boat operators. The nature of each industry is such that most of the workers move from place to place as fishing seasons and seasons in general may require. While quota programs generally fix output in the fishing industry, technology continues to find ways of achieving that output with less and less time. The primary fishing activity in PWS is associated with salmon – not subject to quota limitations. Crew shares for commercial fishers and charter operator wages are discussed below.

1. Commercial Fishers' OCT

The Cornell University study analyzed the opportunity cost of time for commercial fishermen in Alaska. In that report, a survey was used to estimate the hourly value in monetary terms of various increments of time saved by commercial fisherman in Alaska. The specific objectives of the Cornell study were to determine: 1) what commercial fisherman in Alaska would do with additional time saved; 2) the monetary value of time saved and; 3) if the results of objective 2 differ based on the length of the delay, the type of fishery, region fished, or employment status (captain versus crew).

The survey found that a majority of Alaska fishermen would engage in additional fishing or fishing related activities if not delayed, as opposed to pursuing leisure time or alternative employment. The study also found that the monetary value of time saved by Alaska commercial fishermen varied depending on the length of delay, species fished, employment status, and in some cases the region fished. The fishing wage rate per hour for salmon fisherman (excluding western Alaska) is calculated to be $71.17 for captains and $57.13 for crew members. Using the U.S. Bureau of Labor Statistics Employment Cost Index for the Transportation and Warehousing Industry. Salmon fishers wage rates are now $77.27 for captains and $62.02 for crew members in 2009 dollars. The calculation for the opportunity cost of time for leisure time (one-third of this wage rate) equals $25.76 for captains, and $20.67 for crew members.

2. Charter Operators' Wages

Wages for Valdez charter industry crews and operators are based on net income estimations and shown as a variable cost line item in vessel operating costs. Data from the 2009 Alaska Wage Rates is collected through the Occupational Employment Statistics (OES) survey, a state-federal cooperative program with the U.S. Bureau of Labor Statistics (BLS). Results from this survey are used to represent the average hourly wage rate for charter operators.

The OES survey is a semiannual, mail survey that measures occupational employment and wage rates for wage and salary workers in non-farm establishments. The reference periods are May and November of each year. The OES survey is organized to provide estimates based on six periods (3 years) of data. The May 2010 estimates for the OES survey are based on data collected from firms in November 2009, May and November 2008, May and November 2007 and May 2006. Aggregating prior and current data improves reliability of estimates by utilizing a larger sample base, thus reducing sampling errors.

Wage data for 2010 was available for the following areas: Alaska statewide, Anchorage / Mat-Su Area, Fairbanks North Star Borough, Southeast Region, and the Balance of the State. Valdez data is included in the Balance of the State region. For this analysis, the "experienced" wage rate was used to calculate vessel captains and the "inexperienced" wage rate for this category was used to calculate the employment cost for crew members. Average hourly wage for charter crew members is $24.19, and the average hourly wage for charter captains is $44.21. The job description for the category that includes captains, mates, and pilots of water vessels surveyed in the OES is presented below:

> *Captains, mates, and pilots of water vessels. Command or supervise operations of ships and water vessels, such as tugboats and ferryboats, that travel into and out of harbors, estuaries, straits, and sounds and on rivers, lakes, bays, and oceans. Required to hold license issued by U.S. Coast Guard.*

D. Annual Vessel Operating Costs

Annual vessel characteristics for the Valdez fleet were matched with vessel operating cost profiles developed for three types of commercial vessels: fishers, charters, and tenders. Fishers' and charters' annual operating costs were calculated from primary and secondary sources. Primary sources included interviews with fishers, charter boat operators. Secondary sources included a review of engine performance specifications and relevant published studies. Previous Corps studies provided the basis for the methodology and operating assumptions used in our analysis. This triangulation of data from several sources allowed us to make estimates about the typical vessel characteristics for the different types of vessels currently operating in the Valdez harbor.

Operating costs for commercial and charter fishing vessels can vary significantly depending on the general characteristics and operations of the individual vessel. Cost profile data can be presented in a number of ways, although the various entries are somewhat similar. Vessel costs comprise both fixed and variable costs. The harbormaster provided information about vessels currently moored at Valdez harbor. The information on these vessels provided the framework for calculating annual vessel operating costs. This data shows the distribution of

vessels by length, type of moorage, and type of vessel (charter or commercial fisher). In addition, 2005 vessel data compiled by the State of Alaska, Department of Fish and Game, Commercial Fisheries Entry Commission were also used. The CFEC data provides a detailed analysis of the size and composition of the Prince William Sound commercial fishing fleet. The data is sorted by type of fishery (drift gillnet and purse seine), vessel size, and other features. The CFEC data provides an accurate description of the Valdez drift gillnet and purse seine fleets. Additional data was collected to supplement missing and/or outdated data used in previous studies, such as, fuel prices, vessel values, horsepower displacement and fuel consumption.

Annual operating costs include all expenditures except investment. Variable operating costs includes all expenditures except: investment, return on capital, insurance, association dues, license/permit fees, aquaculture assessment, and fishing crew shares. However, charters/tenders wages are included in variable operating costs. Hourly operating costs are the total variable costs divided by total operating hours. The average hourly cost range for each type of vessel is dependent on the assumptions about the number of hours of operation. Operating hours for commercial fishing vessels will vary from year to year and from area to area due to resource management decisions, availability and location of the resource, weather, and other factors.

The total number of operating hours for fishing vessels was estimated based on the 2004 Annual Finfish Management Report and interviews with crew. The report documented 244 commercial salmon harvesting periods for three gear types (124 openings for drift gillnets, 19 for set gillnet, and 101 openings for purse seine fishing) for the Prince William Sound Management Area. 4 The duration of these openings varied from 12 hours to 156 hours. The first salmon harvesting period occurred on May 17th and the season continued for the duration of 154 days, with 128 days open for commercial fishing for all subdistricts. Information provided from previous reports and interviews with the Valdez commercial fishing crews estimated that the typical commercial fishing crew operates for approximately 14 hours and with a season lasting 130 days. Under these assumptions, there are approximately 1,820 operational hours spent harvesting (130 days times 14 hours). However, while salmon is the primary commercial fishing activity for Valdez commercial fishing vessels, other Prince William Sound fisheries are available beyond the typical salmon season, such as halibut and sablefish. Therefore, the maximum number of operating days for the Prince William Sound commercial fishing fleet is estimated to be 195 days per year.

1. Fishers' and Charters' Operating Costs

Vessel operating costs from the "Navigation Improvements Final Interim Feasibility Report and Environmental Assessment-Port Lions, Alaska Appendix B- Economic Analysis", October 2005 (Port Lions Feasibility Study) were used to characterize the seine and longline

[4] *2004 Annual Finfish Management Report*. Prince William Sound Management Area, Alaska Department of Fish and Game, Division of Sport Fish and Commercial Fisheries. November 2005

vessels used in Valdez. Although most of the fleet is characterized as either a purse seine or longline vessel, a number of vessels are multi-gear. An analysis of vessel operating costs was developed to quantify costs associated with five vessel ranges: gill net vessels under 7 meters, 6.7-11 meter-longline/net vessels, 11-16 meters-seine/longline/pot/jig, 16-30 meter-seine/longline/crab and 30 meter tenders. These sizes were selected because they represent the fleet distribution provided by the harbormaster of vessels currently moored at Valdez Harbor.

The purpose for which a vessel is used (fishing or charter) has some impact on the vessel's operating cost. For example, a charter vessel is in operation approximately 1,620 hours and 180 days annually. This is compared to 1,820 hours and 195 days per year for a commercial fishing boat. Crew size is one factor that affects the differences between commercial fishing and charter profiles. Therefore, the profiles were adjusted in the following ways: chartered crews are paid an hourly wage rate whereas fishing crews share the monies they received from their catch. Also, the number of crewmembers aboard the vessel affects the amount and cost of food consumed. Subsequently, food, fishers' share and charter crew wages are listed separately in our analysis.

2. Tenders' Operating Costs

Developing a cost profile for tenders was more challenging because of the scarcity of data. Several data sources were used along with professional judgment. Data was collected about the 31 tenders operating in Valdez on a transient basis since 1998. Their vessel size averaged 26 meters in length with a 3-meter draft. Nine vessels considered Cordova their home port, and 9 were from Washington State. In addition, 5 tenders were from Seward, 4 from Homer, and one each from Kodiak, Juneau and Valdez. There was also one vessel with an unknown homeport. Of these 31 tenders, about 13 are most likely to work for either Peter Pan or Seahawk Seafood processors in Valdez. An analysis of 19 tenders currently listed for sale revealed that the most common engine configuration used by tenders in this range was twin 8V-71 Detroit diesel engines. The engine specifications were obtained through the manufacturer. The specs revealed average horsepower, and fuel consumption rates. This provided data used to calculate annual fuel costs. In addition, an interview with a commercial fishing vessel broker and a search of the boat brokers websites revealed the current price for a tender in the 30-meter range which formed the basis for the estimated return on capital portion of fixed expenses for tender vessels.

In terms of wages, one tender was reportedly paid $1,500 per day. Processors hired the tender for a set amount per day plus fuel. The tender split this out and paid his crew from $125 to $250 per day. Therefore, a reasonable daily wage for a crewmember was determined to be $187.50 while the owner received about one-third the total rate per day ($500).

During active operations and transits from other ports, there are three to four crew members (including the captain) on a tender. However, the number of crew members varies depending upon the situation. For example, during fishery closures: there are four crew members during transit to other harbors for moorage; if anchoring out near a harbor, one to two crew are needed; if moored inside a protected harbor then no crew are required on board the vessel.

During a fishery harvest opening, there are three to four crew members plus the captain; during one-way transit to/from homeport to fishery, there is typically one less crew member.

Tenders work a variety of fisheries throughout the year. Tending activities include not only the actual time spent on the fishing grounds but also time spent in preparation. The number of days actually tending varies according to which processor is being fished for (Valdez, Cordova, Seward, and so forth). For example, one tender from Seward worked approximately 10 days and one from Cordova worked 90 days in the Valdez area. The average number of hours worked and number of days tending is generally comparable to a commercial fishing boat: approximately 1,820 hours or 195 days a year.

To enhance tender's income, some operate their vessels as "floating stores", carrying supplies and groceries to sell to seine vessels. For example, one tender keeps a 1,000 gallon tank of gas, about $2,500 in groceries (mostly bread and meat), water and other supplies on board to sell to fishers. However, due to the informality, no attempt was made to calculate the financial impact of this practice on the fleet.

E. Recreation Benefits

Valdez harbor has a significant number of recreation vessels. Recreation boaters presently rent 399 slips or 76 percent of the 500 permanent slips in the Valdez harbor. Recreation boats comprise 216 of the 242 vessels on the harbormaster's wait list (almost 90 percent). Additionally, there are presently 77 commercial charter boat operators and 18 future charters expected with expansion of the existing harbor.

1. Recreational Angler Effort

From 1990 to 2008, recreational anglers fishing in Valdez Arm expended an average of 64,650 angler-days per year. The most popular fisheries in PWS in terms of recreational angling effort are in the Valdez area. As one of just a few road-accessible ports in the management area, fishing in the Valdez Arm area accounted for 25 percent of the recreational angling effort expended in all of Prince William Sound in 2008. While information for the Statewide Harvest Survey does not delineate the exact locations that anglers fished in marine waters, much of this effort is comprised of anglers targeting coho and pink salmon runs to take back to Port Valdez. In recent years, anglers have been traveling further from ports to catch their fish. Charter operators from Valdez regularly travel to Hinchinbrook Entrance, the waters along the outside shores of Montague Island, and beyond.

2. Three Approaches to Recreation Benefits

Recreation benefits of the proposed project are measured by the change in the willingness to pay for the recreation experience between the without- to the with-project scenario for both existing and potential users. In accordance with Section VII, ER 1105-2-100, titled NED Benefit Evaluation Procedures: Recreation, three approaches were considered in analyzing the monetary value associated with improving the quality of recreational boating activities in the Port of Valdez. These approaches include the travel cost method (TCM), contingent valuation method (CVM), and unit-day value method (UDV).

The travel cost method (TCM) is primarily intended to measure the shift in moorage demand as per capita travel costs from the place of origin increase. These include both out-of-pocket and time expenses. Federal regulation specifies that this approach may not be used when relative travel distance from alternative sites is inconsequential. This condition is evident in Valdez, where public and private harbors are within a relatively short distance from each other and moorage demand is almost exclusively by local Valdez residents. Thus, the TCM was omitted from this analysis.

The contingent valuation method (CVM) derives project benefits through a formal survey of local users. It estimates NED benefits by directly asking individual households their willingness to pay for changes in recreation opportunities at a given site. Individual values may be aggregated by summing the willingness to pay for all users in the study area. This method may be applied to either a site-specific study or a regional model. The basic tool used in this CVM study was the Valdez Harbor Recreational User Survey conducted in November 2004 by the Alaska District Corps of Engineers and the City of Valdez.

The unit-day value method (UDVM) relies on informed opinions and judgments to estimate the total value per day of recreation boating in the study area. The UDVM in recreation benefit analysis consists of two parts: estimating visitation and determining the value per visit. Five criteria are used to calculate the UDVM under both with- and without-project assumptions. The criteria for project evaluation include:

(1) recreation experience – measures the level of recreation use in the study area;

(2) availability of opportunity – identifies the relatively proximity of alternative recreational outlets;

(3) carrying capacity – this is a supply and demand evaluation, measuring the level of recreational services in the area in relation to demand;

(4) accessibility – refers to both inland and marine access conditions to reach the recreation site; and

(5) environmental quality – designed to measure a relative change in the aesthetic quality of the study area.

Each category is assigned a specific point value with a maximum point value of 100 for all categories combined. After a total point value is determined for with- and without-project conditions, the monetary value of each rating is obtained by using a table updated annually to convert points into dollars.5 The value difference between the with- and without-project conditions is then calculated. The final outcome for users is a unit-day value expressed in dollars.

Both the UDVM and the CVM were used for this report in order to approximate a range of potential recreation benefits.

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[5] Economics Guidance Memorandum, 10-03, Unit Day Values for Recreation, Fiscal Year 2010 distributed by the Department of the Army, U.S. Army Corps of Engineers.

F. Future Charter Benefits

The number of charter boats operating out of Valdez harbor has grown dramatically over the last decade. Discussions with the local harbormaster and staff personnel, as well as the Valdez Charter Boat Association, indicate that growth in this industry is now hindered by the availability of moorage space within the harbor. There are currently 18 charter vessels on the waitlist for permanent moorage at the harbor. Harbor staff and the Charter Boat Association estimate that about 10 new charter operations would begin during the years following completion of a new harbor (2011). Therefore, 28 additional charters are expected to obtain permanent moorage at the new harbor.

The benefits for new commercial charters are calculated by measuring the value of the activity they provide to the users. In this case, the users are the passengers on the various fishing and tour boats. The benefits are considered recreation benefits and are calculated using the unit-day value (UDV) technique. As previously described in this report, the UDV method is the most appropriate methodology for this study. Based on focus group discussions described earlier, 13 percent of charter vessel customers fish while 87 percent enjoy recreation/sightseeing opportunities.

It is assumed that future charters in the improved harbor will carry the same number of passengers as similarly sized vessels presently operating out of the harbor. Information on the average number of passengers per trip by boat size was obtained from interviews with Valdez charter boat owners and operators and from responses to the November 2004 survey. According to survey responses, the average number of passengers per charter boat is 4.02. Table B-20 is a summary of existing and projected future charter passengers.

Table B-20. Average Passenger Count by Vessel Size

Vessel Size (m)	Number of Current Charters	Percentage of Vessels By Size	Average Number of Passengers Per Charter	Additional Future Charters by Size	Total Future Charter Passengers
9	28	36	2.9	14	121
13	43	56	4.9	9	253
16	6	8	3.3	5	36
Total	**77**	**100**	**4.02**	**28**	**410**

Source: Responses from charter operators to the November 2004 Valdez Harbor slip renter survey.

The majority of existing fishing and touring charters go out about 120 days a year. It is anticipated that new operators will also offer tours and trips at the same rate. The total number of passengers per year can be estimated by multiplying the number of daily passengers (410) by the number of days (120) charters offer fishing and sightseeing trips. Therefore, with improved harbor conditions approximately 49,200 passengers would benefit from the proposed project.

Benefits from the improved harbor conditions can only be captured for the new charter passengers and the improved conditions for the existing charter passengers (the difference

between with- and without-project conditions). Survey responses provided information on the number of additional trips that existing charter operators would add to their annual schedule given a harbor expansion. The survey also obtained information on existing charters operating out of Valdez that do not have permanent slips and how they would change their procedures as a result of improved harbor conditions. It is assumed that the 18 charter vessels currently waitlisted in Valdez will take permanent slips as a result of the expanded harbor. It is further assumed that 10 additional charters will begin operations in Valdez within 20 years of project completion. Table B-21 depicts the additional charter vessel activity expected as a result of the expanded harbor.

Table B-21. Future Additional Charter Vessel Passengers

Charter Vessels	Number of Vessels	Average Number of Passengers	Additional Trips with Project	Total Additional Charter Vessel Passengers
With Permanent Slips	77	4.02	24.4	7,600
On Waitlist	18	4.02	95.8	6,900
Expected in Future	10	4.02	361.5	14,500
Total	**105**			**29,000**

Note: Additional trips with project and average number of passengers per charter vessel obtained from November 2004 survey results and Valdez harbormaster records indication of charter vessels.

IV. EXISTING HARBOR CONDITIONS

This section analyzes moorage demand in Prince William Sound, the Valdez small boat harbor, and other marine facilities. To better understand moorage demand at Valdez, total demand for moorage in the PWS region is presented. The moorage demand analysis is based on interviews conducted with Valdez Harbor officials and marine facility users (commercial fishers and charter boat operators). The availability of moorage for permanent berth holders, wait-listed, transient and other potential harbor users is discussed. Also presented are descriptions of the PWS management area and the proximity of Valdez to other harbors. The future of the commercial fishing fleet is briefly discussed.

A. Description of the PWS Management Area

The Prince William Sound management area encompasses all coastal waters and inland drainages entering the north central Gulf of Alaska between Cape Suckling and Cape Fairfield. This area includes the Bering and Copper Rivers and all of PWS with a total adjacent land area of about 38,000 square miles. The salmon management area is divided into 11 districts that correspond to the local geography and distribution of the five species of salmon harvested by the commercial fishery fleet. See the PWS Management Area map - Figure B-21. Valdez is at the center of the Commercial Fisheries Entry Commission statistical area known as the "Eastern District". It is one of five statistical reporting areas in PWS. It hosts many marine resources in sufficient abundance for commercial harvest. Commercially harvested resources include five species of salmon, halibut, black cod, pacific cod, shrimp, and numerous species of crab, including tanner, dungeness, and varieties of king crab (though shellfish fisheries have been reduced and/or closed in recent years due to low populations). Other resources include herring and bottom fish such as lingcod, rockfish, flounder and sole.

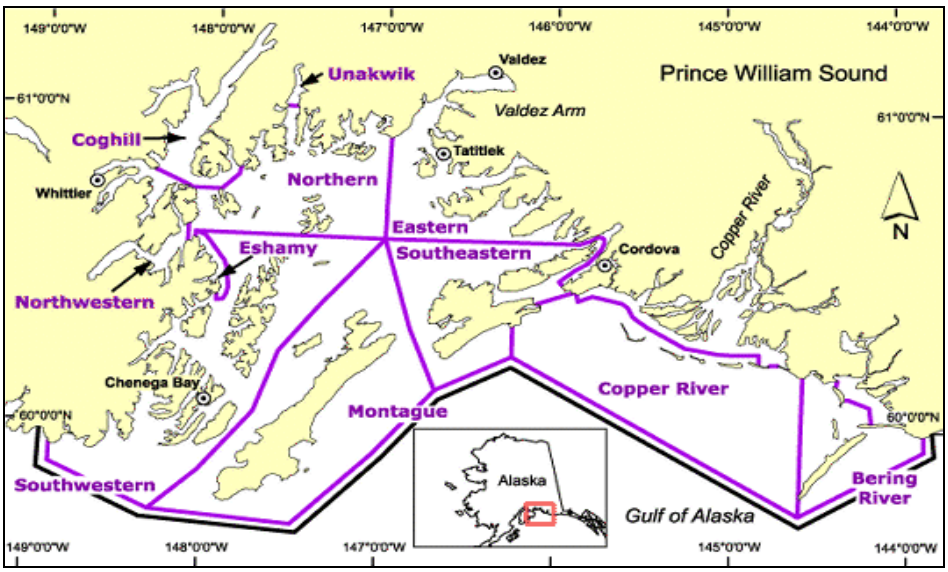

Figure B-21. Prince William Sound Salmon Management Area

Source: Alaska Department of Fish and Game – Division of Commercial Fisheries.

B. Current Harbor Conditions

Valdez harbor is used by a diverse group of vessel operators. The town is well situated for commercial and charter fishing, as well as a popular recreation harbor for residents on the road system in Interior Alaska. A growing number of charter tour boats operate out of Valdez. While this activity is good for the local economy, it puts increased pressure on harbor facilities because the harbor is not designed to accommodate the influx of a large number of vessels. Nearly 75 percent of the permanent stalls in Valdez's small boat harbor are 9.8 meters (32 ft.) or less.

Inadequate moorage and overcrowding increases the need for maintenance and repairs to both vessels and facilities. During the busy summer season, it also necessitates shuffling of boats about the mooring area, and requires operators to take special precautions during storms to secure protected moorage. Furthermore, the lack of permanent slips forces some operators to move their boats to distant harbors for the off-season and closed fishing periods. These activities take time and labor and raise operating costs, thereby reducing net income for commercial fishers and charter boat operators, as well as the harbor itself.

Damage to both vessels and facilities in Valdez are significant. When one boat in a raft needs to move, vessels to the outside have to be untied, moved, and then the raft must be reassembled. This requires the time and effort of several people. Congestion occurs because rafted boats extend into common maneuvering areas. This results in time delays for transient vessels, permanent berth holders, and other harbor users. All of these problems create increased operating costs and time losses for the vessels' crews.

Usage of Valdez Harbor falls into distinct seasons involving different combinations of vessel types. In general, a few transient fishing vessels start to arrive toward the end of April, but most begin arriving in middle May. Early in June, approximately 35 transient commercial vessels will be operating out of the harbor. When the hatchery-return fishing season begins about mid-July, approximately 150 commercial fishing vessels will start to use Valdez Harbor. These vessels generally operate out of Valdez through the end of July at which time they move on to other locations. Later, for the first week or two in September, about 30 transients return to fish the final salmon run.

Recreational use of the harbor is primarily a weekend activity. Most of the recreational boaters come from the Fairbanks area, which is six hours away by road; many take three-day weekends to fish in Port Valdez and Prince William Sound. As with the commercial vessels, recreational transient vessels begin to arrive in small numbers in the middle of May. At that time, about 25 vessels are using transient moorage in the harbor, primarily on weekends. From mid-June through July, about 40 transient recreational vessels moor in Valdez. During August, an average of 150 transient pleasure crafts will moor in Valdez on weekends.

C. Current Valdez Fleet

Excessive moorage for commercial vessels is handled in two ways: hot-berthing and rafting. If there are slips that are assigned to permanently moored vessels and are not being used, the harbormaster will authorize a transient vessel to moor in that slip until the permanent tenant

returns. This is called hot-berthing. However, once the salmon season is in full operation and a large fleet is in Valdez, hot-berthing opportunities become limited. Once all the hot-berthing opportunities are used, then vessels must be rafted on the transient floats, often as many as six deep.

Valdez is also the harbor of choice for many pleasure vessel owners. Valdez affords recreational fishers a convenient location for their leisure activities. Pleasure boats in Valdez generally range from 3-11 meters in length. The vast majority of pleasure crafts are in use from late May through early September. Recreation vessels generally are not rafted because the resulting damages are not acceptable to the boat operators. These vessels are hot-berthed until there is no more space and then they must be trailered.

The number of charter vessels in Port Valdez has been rapidly increasing. This growth is primarily due to commercial passenger vessels used to accommodate the tourism industry. Unfortunately, there is no space for expansion in the Valdez small boat harbor. The current fleet must resort to rafting and hot-berthing in order to secure moorage. Both of these topics are discussed elsewhere in this report in greater detail.

1. Commercial Fishers

Commercial vessels operating out of PWS and in particular, Valdez, are characterized as purse seine or drift gillnet even though they are multi-use boats. These vessels are able to gear up for whatever fishery needs to be targeted to remain active. Many boat operators hold a number of fishing permits as indicated below.

Prince William Sound Drift Gillnet Fleet. Drift gillnet permits for the PWS area totaled 538 in 2006. Of those vessels that actually fished, there were 492 in the drift gillnet fleet.

Using data from the Commercial Fisheries Entry Commission, files were merged with permit and vessel data to determine the characteristics for the Prince William Sound seine and drift gillnet fleets. From this information, a profile for the commercial fishing/charter fleet emerges. The majority (69 percent) of the PWS fishing fleet are drift gillnets, the remaining one-third are purse seine vessels. There are also a smaller number of set gillnet sites in PWS targeting salmon – 29 permits issued of which 26 were actually fished in 2006.

According to the Commercial Fisheries Entry Commission vessel file, the drift gillnet fleet is comprised of 601 vessels. The length characteristics and average horsepower for this fleet are shown in Table B-22. The distribution of the gillnet fleet is based on vessel sizes provided by the harbormaster. Most vessels within this fleet are between 6.7 and 11 meters in length. The average length of the drift gillnet fleet is 8.8 meters.

Table B-22. PWS Drift Gillnet Vessel Length in 2006

Length in Feet	Number of Vessels	Average Horsepower (rounded)
Less than 6.7 meters	34	130
6.7 - 11 meters	532	340
11.3 – 16.8 meters	34	480
16.8 - 30 meters	1	540
TOTAL	**601**	**340**
Percentage of Fleet	**69%**	
Average length (meters)	8.8	

Source: Commercial Fisheries Entry Commission – Fishery Statistics – Vessels. http://www.cfec.state.ak.us/fishery_statistics/vessels.htm.

Table B-23 shows the composition of the Prince William Sound drift gillnet commercial fishing fleet by engine type. More than half (53 percent) of the drift gillnet fleet uses gasoline, 46 percent use diesel fuel.

Table B-23. Drift Gillnet Fleet by Engine Type

Engine Type	Number	Percent
Gas	319	53%
Diesel	278	46%
Unknown	4	1%
TOTAL	**601**	

Source: Commercial Fisheries Entry Commission – Fishery Statistics – Vessels. http://www.cfec.state.ak.us/fishery_statistics/vessels.htm.

Table B-24 shows the average age of the Prince William Sound drift gillnet fleet. The typical vessel in the fleet (60 percent) is 15-25 years old. Only 19 percent of the fleet (115 out of 601 vessels) was built after 1990.

Table B-24. PWS Drift Gillnet Vessel Age in 2006

Year Built	# of Vessels
Up to 1950	1
1951-1960	1
1961-1970	2
1971-1980	154
1981-1990	325
After 1990	115
Unknown	3
Total	**601**

Source: Commercial Fisheries Entry Commission – Fishery Statistics – Vessels. http://www.cfec.state.ak.us/fishery_statistics/vessels.htm.

The drift gillnet fleet hull type is shown in Table B-25. Most (70 percent) of the drift gillnet vessels are made of fiberglass with aluminum being the second most numerous hull type.

Table B-25. PWS Drift Gillnet Hull Type in 2006

Hull Material	Number of Vessels
Aluminum	167
Fiberglass/Plastic	418
Iron/Steel/Alloy	0
Wood	5
Rubber	9
Unknown	2
Total	**601**

Source: Commercial Fisheries Entry Commission – Fishery Statistics – Vessels. http://www.cfec.state.ak.us/fishery_statistics/vessels.htm.

Most of the drift gillnet fleet in Prince William Sound is homeported out of Cordova. Only 10 vessels in 2006 indicated a homeport of Valdez.

Table B-26. PWS Drift Gillnet Fleet in 2006

Homeport	Number of Vessels
Anchorage	12
Bird Creek	1
Circle City	1
Cordova	445
Craig	1
Dillingham	1
Eagle River	1
Girdwood	2
Homer	25
Juneau	31
Kenai	1
Lower Tonsina	1
Seward	9
Sterling	1
Tatitlek	4
Valdez	10
Wasilla	5
Whittier	6
Oregon	13
Washington	26
Unknown	5
Total	**601**

Source: Commercial Fisheries Entry Commission – Fishery Statistics – Vessels. http://www.cfec.state.ak.us/fishery_statistics/vessels.htm.

Prince William Sound Seine Fleet. There were a total of 266 purse seine permits for the PWS area in 2006 (the most current data available showing earnings and participation rates for the fishery). However, only 111 seine vessels actually fished. The length characteristics and average horsepower for this fleet are shown in Table B-27. The average length of the purse seine fleet is 10 meters (33 ft).

Table B-27. PWS Purse Seine Vessels in 2006

Length in Meters	Number of Vessels	Average Horsepower (rounded)
Less than 6.7 meters	127	200
6.7 - 11 meters	21	300
11.3 – 16.8 meters	111	500
16.8 - 30 meters	11	630
TOTAL	**270**	**350**
Percentage of Fleet	**31%**	
Average length (meters)	10.0	

Source: Commercial Fisheries Entry Commission – Fishery Statistics – Vessels. http://www.cfec.state.ak.us/fishery_statistics/vessels.htm.

Table B-28 shows the composition of the Prince William Sound commercial purse seine fishing fleet by engine type. A majority (80 percent) of the Valdez purse seine fleet uses diesel fuel, 19 percent of the fleet uses gasoline.

Table B-28. PWS Purse Seine Fleet by Engine Type in 2006

Engine Type	Number	Percent
Gas	51	19%
Diesel	216	80%
Unknown	3	1%
TOTAL	**270**	

Source: Commercial Fisheries Entry Commission – Fishery Statistics – Vessels. http://www.cfec.state.ak.us/fishery_statistics/vessels.htm.

Table B-29 shows the age of the Prince William Sound purse seine fleet. Seventy-three percent are at least 15 years old; only 12 percent were built after 1990.

Table B-29. PWS Purse Seine Vessel Age in 2006

Year Built	Number of Vessels
Up to 1950	2
1951-1960	0
1961-1970	8
1971-1980	62
1981-1990	163
After 1990	33
Unknown	2
Total	**270**

Source: Commercial Fisheries Entry Commission – Fishery Statistics – Vessels. http://www.cfec.state.ak.us/fishery_statistics/vessels.htm.

The purse seine fleet hull type is shown in Table B-30. Most (63 percent) PWS purse seine vessels are made of fiberglass with aluminum being the second most numerous hull type.

Table B-30. PWS Purse Seine Hull Type in 2006

Hull Material	Number of Vessels
Aluminum	87
Fiberglass/Plastic	171
Iron/Steel/Alloy	8
Wood	2
Rubber	1
Unknown	1
Total	**270**

Source: Commercial Fisheries Entry Commission – Fishery Statistics – Vessels. http://www.cfec.state.ak.us/fishery_statistics/vessels.htm.

As with the drift gillnet fleet, most of the purse seine fleet is homeported out of Cordova. Valdez homeported vessels totaled 33 for 2006. (See Table B-31.)

Table B-31. PWS Purse Seine Fleet Homeport in 2006

Homeport	Number of Vessels
Anchorage	5
Cordova	138
Falls Bay	3
Girdwood	2
Homer	33
Juneau	14
Kasilof	5
Ketchikan	1
Kodiak	4
Petersburg	1
Sand Point	1
Seward	9
Valdez	33
Wasilla	2
Whittier	1
Washington	14
Unknown	4
Total	**270**

Source: Commercial Fisheries Entry Commission – Fishery Statistics – Vessels. http://www.cfec.state.ak.us/fishery_statistics/vessels.htm.

According to the CFEC, there were 663 commercial fishing permits of various types within Prince William Sound in 2006. Some individuals hold more than one permit, which may be fished by only one vessel. The count of permit holders and crew members that reside in the specified city are provided to the Alaska Department of Fish and Game. In 2006, there were 411 individual permit holders and 381 licensed crewmembers in the Valdez/Cordova Census Area. In addition there were 113 licensed, guided, sport charter vessels in the Valdez/Cordova Census Area for 2007.

2. Commercial Charter Boat Industry

Valdez has a very active and significant charter boat business that offers a wide variety of boating experiences to visitors. According to the harbormaster, most of the charter fleet growth resulted from the 1989 Exxon Valdez oil spill. Many people came to the area for the first time to help mitigate the effects of that incident. Afterwards, many started visiting regularly to enjoy the recreational boating and fishing opportunities. Because the fishery was severely affected by the oil spill, many commercial fishers switched from fishing activity to charter fishing, glacier viewing, and wildlife sightseeing. Many of the boats in the charter fleet were originally used in the clean-up effort and stayed on in Valdez to pursue other work. Some of them continue to operate as support vessels for the oil industry.

Most Valdez charter boats are members of the Valdez Charter Boat Association. Fishing charters consist of halibut, salmon, salmon sharks, lingcod and rockfish. Charter fishing boats are fully equipped, licensed, and insured. Seventy-seven (77) charter boats operating in the harbor are permanent slip holders; 21 others are transient users. Most of the transient charter boat operators are wait-listed for permanent space when a slip becomes available. According to the harbormaster's records, almost half of the charter boats operating from Valdez are in the 6 - 12 meter range (21 – 40 feet), although several are larger. The largest of the charter boats is in excess of 21.3 meters (70 feet). A variety of charter boat services are available for fishing, sightseeing, hunting, glacial tours, and so forth. Tours generally cost between $70 and $90 for half day trips, and from $135 to $180 per person for a full day.

Charter vessels in Valdez are divided between sightseeing and fishing charters. According to the responses obtained from the Valdez Harbor prospective and current user survey in November 2004, 13 percent of charter activity is fishing while 87 percent is sightseeing or other recreation. The pink salmon charter season is June and July; silver salmon, August through Labor Day. The chartered fishing season usually runs May 15 through September 15 (about 120 days) and operates from 7 a.m. to 7 p.m. However, it is common for a commercial charter boat to operate for 180 days to complete various tasks related to fishing and/or sightseeing, including obtaining supplies, traveling, preparation and making repairs. There are also times where the boats may be available to fish but are waiting for an opening. Therefore, an average of 1,620 operating hours per boat annually is not unusual.

The Valdez Harbor prospective and current slip renter surveys in November 2004 were used to determine how charter operations would be affected by improvements in the harbor conditions at Valdez. (See Table B-21.) The results suggest that improvements would lead to an additional 24 trips of charter operations by current slip renters per year; the transient charter fleet can be expected to operate an extra 96 trips per year. The surveys also found that, on average, there are 4.02 persons per charter vessel operating out of Valdez and that vessels leave the harbor anywhere between 10 and 180 days annually. More than 80 percent of the vessels offer day trips, with 8 percent offering week long trips, and the rest offering other variations.

Most chartered vessel skipper/owners have extensive experience fishing Prince William Sound and the Gulf of Alaska. They are United States Coast Guard licensed Captains with an Operator of Uninspected Passenger Vessel (OUPV) license. The OUPV license is for operating vessels up to 100 tons, and up to 100 miles offshore from the "Demarcation Line". This Line is 100 miles offshore of Hitchenbrook and Montague Islands.

Sightseeing charters include viewing the Columbia Glacier, many coastal bird species and marine mammals such as orcas, humpback whales, Steller sea lions, otters, and Dahl's porpoises. Chartered vessels are typically well equipped and maintained. Some customized vessels have a range of over 300 miles and can cruise at speeds over 40 knots.

Many charters hold licenses, certifications and/or memberships in the following:

- USCG Commercial Towing Endorsement Commercial Fisheries Entries Commission (CFEC) - "Sport Charter" License
- International Pacific Halibut Commission (IPHC) License
- Federal Communication Commission (FCC) Ship Radio Station License
- Registered ADF&G Sport Fishing Services Business and Saltwater Fishing Guide
- Alaska Big Game Transporter License
- Northern Marine Charter Insurance Valdez Charter Boat Association Member
- Valdez Chamber of Commerce Member
- Valdez Convention and Visitors Bureau Member
- Valdez Business License
- Alaska Business License
- Maritime Consortium Member

D. Proximity to Other Harbors

In addition to Valdez, boat owners have two other major harbor choices in Prince William Sound: Whittier and Cordova. Valdez is the site of the largest harbor in PWS and is located at the north end of the Sound. Cordova is at the south entry and Whittier near the center of the Sound. Each of these marine facilities is discussed as is a feasibility study to expand moorage at Tatitlek.

1. Whittier

The community of Whittier has an estimated 2009 population of 159. It is about 96 nautical miles southwest of Valdez; travel time is about 10 hours at 10 knots. In June 2000, the Alaska Department of Transportation and Public Facilities opened the Anton Anderson Memorial Tunnel linking Whittier by road to the Seward Highway at Portage. The Alaska Railroad also offers rail service for passengers, vehicles, and cargo to a station at Portage 12 miles away.

Whittier's port is ice-free with a 21-meter (70 ft.) dock. The City's small boat harbor has slips for 332 fishing, charter, and recreation vessels. In 1997, the harbor had a waiting list of 600;

by 1999, it had grown to over 1,000. The waitlist dropped down to 530 in 2006 and harbor staff believes this is because vessel owners got discouraged. Boat owners pay an annual fee ($40) to maintain seniority on the list. The waiting time for boats over 8.5 meters (28 ft.) is nine years. Bigger vessels of 16 meters (52 ft.) can expect to wait 15 – 20 years for a slip. The city has plans to expand the basin which will add about 120 slips to its capacity.

The city has permits to install a four-lane launch facility near the small boat harbor at the Head of the Bay. This would include parking for up to 200 vehicles. The launch facility and a potential breakwater project are currently under review.

At Whittier, there will be a residual need for 200-500 additional slips in order to accommodate small boats. These vessels will be launched from the new ramp and the dry storage. This new facility is considered to be an important consideration for improvements planned at Valdez. This is because Valdez will be a refueling station near the limit of small boat cruising distance. Fuel stops at Valdez will essentially double the range of small boats leaving from Whittier to explore Prince William Sound.

Customers seeking space for larger boats compound PWS moorage problems. The Whittier harbormaster maintains that the trend to larger boats is a factor contributing to additional crowding. As the basin expands, the waitlist is also expected to grow. This is because multi-year waitlists tend to discourage some boat owners. As moorage spaces are added, vessel operators become more positive and the wait list is re-established with new additions.

2. Cordova

Cordova has an estimated 2009 population of 2,126. It is 78 nautical miles from Valdez; traveling time is about 9 hours at 10 knots. Cordova is located on Orca Inlet at the southeastern entry to PWS. It has direct access to the Gulf of Alaska but no road access. Commercial fishing is a major industry contributing to its economy. It also has four active seafood processors. In 2009, 318 residents owned commercial fishing permits, one for about every six persons. Currently, there is no need to maintain a waitlist for permanent moorage. The harbor has run at about 85 percent capacity in recent years. Slips are not always available for all size boats but rafting of vessels is uncommon. During the peak months of April through September, the harbor accommodates up to 400 transient vessels, the majority of which are commercial fishing vessels. The harbor is capable of mooring 727 vessels. At this time, there are no plans for harbor expansion.

3. Tatitlek

Tatitlek has an estimated 2009 population of 83 residents. Tatitlek is an Alaskan Native coastal village located on northeastern PWS, in southcentral Alaska. It is 28 nautical miles (3 hours travel time at 10 knots) southwest of Valdez. Tatitlek does not have protected moorage. The number of boats moored at unprotected anchor buoys at Tatitlek includes 12 commercial fishing boats and 15 fair-weather boats used in sheltered waters. Each year Tatitlek is visited by transient vessels, some making repeat visits during the May-September period. A feasibility study to provide permanent moorage at Tatitlek considered three harbor designs:

30-, 54-, and 80-slip plans. At this time, plans for building protected moorage at Tatitlek have been put on hold.

E. Moorage Demand Analysis

To get a clear understanding of demand in Valdez, it is necessary to present a perspective of moorage demand in the region of Prince William Sound. The regional perspective is important because it addresses questions about whether nearby ports have excess capacity to absorb some of the demand for moorage. Therefore, this section begins with a discussion of moorage demand for PWS, followed by an in-depth analysis of Valdez moorage demand.

1. PWS Moorage Demand

All three major harbors in PWS (Valdez, Cordova, and Whittier) remain overcrowded during peak-use periods even with planned improvements. A 2006 review of moorage availability and wait lists indicates that within PWS there were 1,619 moorage slips. As shown in Table B-32, at the lowest use time of year there was an unmet request for 1,009 additional spaces; at the peak demand period, there were 2,600 requests for more slips. This leaves an unmet demand of approximately 1,000 additional slips within the Sound.

Table B-32. Prince William Sound Existing Moorage Demand

Vessels	Number of Slips	Wait List	Peak Season Demand
PWS Fleet			
Cordova	727	none	1,000
Valdez	560[1]	389[2]	700[3]
Whittier	332	530	700
Tatitlek	none	90	200
Current Facilities	**1,619**	**1,009**	**2,600**

[1]Includes 500 permanent slips and 60 transient spaces (double rafting) on floats.

[2]Includes 243 paid on wait list, 140 transient vessels, and 6 tenders.

[3]Trailered (estimate) that haul out or anchor outside the harbor.

2. Valdez Moorage Demand

Moorage demand in the Valdez small boat harbor has steadily increased over the past 20 years. During the summer months, mid-May through mid-September, there is a greater demand for moorage than the current facilities are able to meet. From mid-May through mid-July most of the excess demand comes from commercial vessels fishing for hatchery-return salmon. From mid-July through August, the majority of excess demand occurs from recreational boats. The commercial fishing fleet returns again in about mid-September. In the winter, mid-September through mid-May, over 200 vessels remain in the water in Valdez. It is at this time that the supply of moorage is significantly greater than the demand.

The harbor has a two-lane launch ramp for trailered vessels that is used heavily during summer months. In addition, two shallow draft cargo docks are adjacent to the entrance

channel and are used extensively in support of commercial fishing. A boat grid capable of handling a 36-meter (120 ft.) vessel and a 60-ton mobile boatlift are available in the harbor. A public repair area is located nearby. The U.S. Coast Guard has a dock with a harbor for mooring a patrol craft. Adjacent harbor lands are used for dry storage with additional areas available at many other locations around the community.

Existing and future demands for moorage space to accommodate both commercial and recreational vessels is accomplished through an analysis of four basic components: (1) the number of vessels currently utilizing moorage space in the existing harbor; (2) the characteristics of vessels wait-listed for space; (3) the number of transient vessels that use harbor facilities throughout the year; and (4) an estimate of growth in the number of commercial fishing, charter boats, and other vessels that would use Valdez harbor space.

As shown in Table B-32, Valdez harbor has moorage for 560 vessels. In addition, 382 harbor users (excluding tenders) have expressed interest in permanent slips or transient space. Furthermore, the harbor frequently experiences heavy use from trailered boats during the peak periods. An estimated 700 harbor users trailer their boats in and out of the harbor on weekends during the summer. These boats are a combination of recreational, charter, and subsistence vessels.

The opportunity to moor year-round at Valdez would be a desirable alternative for Fairbanks boat owners who transport their boats 360 miles by trailer. Savings would accrue to boat owners in terms of travel time and fuel costs, boat preparation time, wear-and-tear on the boat and trailer, and improved highway safety.

Three primary factors make launching a boat each day less appealing than mooring overnight or for a season: (1) the inconvenient location of the launch ramp; (2) the lack of parking for vehicles with boat trailers; and (3) the conveniences of wet moorage. Moorage space at the Valdez small boat harbor is leased at an annual rate of $22.00 per vessel foot (approximately $66 per meter) or by stall length, whichever is greater as indicated in Table B-33. Stall lengths have been converted to meters.

Table B-33. Valdez Small Boat Harbor Moorage Fees: Annual Slip Rentals, 2010

Float	Length of Stall (m)	Rate ($)
A, B, H	15.2	$1100
C	12.8	924
I	12.2	880
D, E	9.8	704
J, K	9.1	660
F, G	7.3	528
M	6.1	440
Tour dock		$69.46 /foot

Source: Valdez Harbormaster's Office – rates established as of January 1, 2010.

3. Permanent Berth Holders

Valdez harbormaster records indicate that 500 of the harbor slips are allocated to permanent recreation and commercial users and are fully rented. Commercial vessels can be generally classified into three categories: commercial fishing, cruise/charter boats, and others (fish tenders, work boats, and so forth). Table B-34 presents the number of permanent slips by length of vessel and category.

Table B-34. Valdez Permanent Moorage Distribution

Vessel Category	0-6.4 m	6.7-11 m	11.3-16.8 m	>16.8 m	Total
Recreation	64	263	52	2	399
Fishers	0	6	13	5	24
Charters	15	33	19	10	77
Totals	**79**	**302**	**84**	**17**	**500**

Source: Valdez Harbormaster's Office

Recreation Vessels. About 65 percent (327) of the vessels presently using permanent harbor facilities are recreation crafts, 11 meters and smaller. Most vessel owners are either residents of the Valdez area or are from interior parts of Alaska.

Commercial Fishers. Currently, 24 commercial fishing vessels are berthed at the harbor year-round. These vessels are mostly in the 11.3-16.8 meter range and operate from the harbor with an unloaded draft of about 1-2 meters. Most commercial fishing boats are locally owned and operated, with about one-third owned by Alaska residents not living in Valdez.

Commercial Charters. Although a significant portion of year-round users is recreational, the number of charter boat operators using permanent space in Valdez has increased dramatically during recent years. The number of charter boats operating out of Valdez increased from 37 in 1991 to 77 in 2005. These vessels are similar in size to commercial fishing vessels, with a quarter of the charter boats in the 11.3-16.8 meter range. There are six charter boats operating from the harbor over 21.3 meters long, drafting from 4-8 feet. The majority of these boats are owned and operated by local residents. The trend is towards larger boats that can accommodate more passengers (16.8 meters and longer).

Transient Floats. Requests for transient moorage occur throughout the year, with the peak periods from Memorial Day to Labor Day. The harbormaster does not prohibit entry of vessels into the harbor, primarily due to the liability to the City if a vessel is turned away. Usually, the boat owner determines whether attempts to moor will put the vessel in danger. The current transient float system has approximately 274 meters (900 ft.) of space. The float system provides moorage for 30 transient vessels at any one time and about 60 boats when double berthed. During peak summer days as many as 200 boats request transient moorage.

The harbormaster must accommodate this demand through the extensive use of hot berthing and stacking (rafting) as many as six or seven boats deep along the transient piers. When vessel stacking is extended to more than two, boats begin to experience a variety of damages that could be avoided with improved harbor conditions. During a single-peak day as many as 200 vessels have been rafted. Because transient floats can safely accommodate only 60 vessels rafted two deep, when rafting 200 boats, damages occurs to vessels on the entire raft.

Table B-35. Valdez Transient Vessel Distribution Usage, 2005

Vessel Type	<6.7 m	6.7-11 m	11.3-16.8 m	>16.8 m	Total
Recreation	220	274	35	6	535
Fishers	0	9	64	11	84
Charters	0	17	3	1	21
Total	**220**	**300**	**102**	**18**	**640**

Harbormaster's office records show that 640 individual transient vessels used moorage facilities in Valdez harbor in 2005. (See Table B-35.) Transient charter boat operators are significant harbor users during the summer months. In fact, almost all charter boats on the current wait-list use the harbor on a transient basis. While the majority of transient boats were recreation boats, 84 of them were fishing vessels and 21 were charter boats.

Using the information above, estimates were made by prorating the 640 transient vessels and distributing the results to 200 transients that visit Valdez in a single day during peak periods. These numbers are shown in Table B-36. It is possible that vessels may trailer their boats rather than take transient moorage so this table likely understates the number of vessels seeking transient moorage on peak days.

Table B-36. Valdez Transient Vessel Distribution During a Single Day Peak Season

Vessel Type	<6.7 m	6.7-11 m	11.3-16.8 m	>16.8 m	Total
Recreation	69	86	11	2	168
Fishers	0	3	20	3	26
Charters	0	5	1	0	6
Totals	**69**	**94**	**32**	**5**	**200**

Valdez Harbor has safe moorage capacity for 500 permanently assigned vessels and up to 60 transients allowing for a total of 560 boats. This distribution is presented in Table B-37

Table B-37. Moorage Capacity at Valdez (Permanent Slips and Transient Float System, Two Deep)

Vessel Type	<6.7 m	6.7-11 m	11.3-16.8 m	>16.8 m	Total
Permanent Slips					
Recreation	64	273	60	2	399
Fishers	0	6	13	5	24
Charters	15	33	19	10	77
Total	**79**	**312**	**92**	**17**	**500**
Existing Transient Floats	**<6.7 m**	**6.7-11 m**	**11.3-16.8 m**	**>16.8 m**	**Total**
Recreation	21	25	4	1	50
Fishers	0	1	6	1	8
Charters	0	2	0	0	2
Total	**21**	**28**	**10**	**2**	**60**
Grand Total	**100**	**340**	**102**	**19**	**560**

Moorage fees for transient boats vary by vessel size and duration of stay. A schedule of daily transient moorage fees is shown below (Table B-38).

Table B-38. Valdez Daily Transient Moorage Fees

Moorage	Fee ($)/per foot
Paid in advance:	
Daily	$ 0.70
Monthly	8.75
Yearly	25.30
Billed by harbormaster:	
Daily	$ 1.05
Monthly	13.13

Note: Transient fees apply to vessels moored more than three hours.

4. Wait-listed Vessels

In 2005, 243 vessels were wait-listed for space. As shown in Table B-39, a significant number of vessels are from Valdez, Anchorage, or Fairbanks. However, a noticeable number of wait-listed vessels are from out-of-state and other Alaskan communities. About one-quarter of the recreation vessels, one commercial fisher, and one charter are out-of-state or from another community in Alaska.

Table B-39. Valdez Wait-Listed Vessels by Owner's Place of Residency

Vessel Type	< 6.7 m	6.7-11 m	11.3-16.8 m	>16.8 m	Total
Recreation					
Valdez	4	30	10	1	45
Anchorage	0	6	1	2	9
Fairbanks	3	85	22	2	112
Out of State	2	11	3	0	16
Other AK Community	0	26	6	2	34
Total	**9**	**158**	**42**	**7**	**216**
Fishers					
Valdez	0	2	2	1	5
Anchorage	0	0	0	1	1
Fairbanks	0	0	1	0	1
Out of State	0	0	0	1	1
Other AK Community	0	0	0	0	0
Total	**0**	**2**	**3**	**3**	**8**
Charters					
Valdez	0	8	3	3	14
Anchorage	0	2	0	0	2
Fairbanks	0	1	0	1	2
Out of State	0	0	0	0	0
Other AK Community	0	1	0	0	1
Total	**0**	**12**	**3**	**4**	**19**
Summary					
Recreation	9	158	42	7	216
Fishers	0	2	3	3	8
Charters	0	12	3	4	19
Grand Total	**9**	**172**	**48**	**14**	**243**

Source: Valdez Harbormasters office.

5. Discouraged Vessel Owners

A $50 annual fee is charged to individuals added to the wait list. The turnover rate for permanent slips is very low in Valdez, which is characteristic of most small boat harbors in Alaska. It often takes years to obtain permanent moorage space. When considering the yearly cost to be actively on the wait-list, and the extended wait period to obtain permanent space, many harbor users become discouraged over the prospects of obtaining permanent space. Therefore, many vessel-owners do not place their names on the wait-list. Discussions with harbormaster officials indicate that approximately 10-20 commercial vessels not currently on the waitlist but currently using the harbor on a transient basis would use the harbor year-round if space were available.

F. Tenders' Delays and Demand for Moorage

In 2000, 31 tenders used transient moorage in Valdez. Approximately 13 tenders worked for two processors inside the existing harbor: Peter Pan and Seahawk Seafoods. Of the remaining tenders, at least six have been identified as desiring permanent year-round moorage in Valdez. However, because of the difficulty in locating potential tenders interested in permanent moorage, there may be more. Tenders keep very busy and mobile during the fishing season; therefore, it is difficult to contact them. Only those tenders that have been located and expressed an interest in securing moorage at Valdez are included in this analysis. Operators of tenders may also be discouraged vessel owners; operators do not ask for space when it is not available. In addition, moorage depths in the existing harbor limit vessels with drafts greater than 3.7 meters (12 feet) to higher tide conditions for entry and exit from the harbor. The fish tenders' vessel sizes are 26.2 meters, 29 meters, and four at 30.5 meters (86, 95, and 100 feet respectively).

Under with-project conditions, tenders that homeport in the Pacific Northwest (PNW) prefer Valdez for a variety of reasons. Vessel owners from both the PNW and other parts of Alaska find Valdez appealing because of the climate. Valdez's climate has less damaging impacts on their vessels than the high-wind, high precipitation climates typical of most of coastal Alaska. Valdez also offers easier access to road and air transportation than many other Alaskan ports.

According to the trade magazine Pacific Fishing, finding moorage in the PNW may become more difficult as the demand for moorage for recreation vessels has increased. For example, the Fishermen's Terminal in Bellingham, WA, modified their rules to accommodate large pleasure craft (yachts). In addition, the Port Commission is considering allowing the harbor to be used for recreation vessels. If it is opened up to recreation boats and a wait list develops, a commercial boat that comes in later will automatically have top priority. The Commission is interested in generating higher revenues for Fishermen's Terminal because it needs major reconstruction. The plan is to obtain higher fees from the recreation fleet without closing out the commercial boats.

Interviews with the fish processors conducted as part of this study indicate that while their docks can accommodate most of the tenders; they need to rotate the fleet for unloading. One processor estimated that between 2 and 5 tenders (23.2 meters to 42.7 meters) from the PNW typically wait an hour for moorage inside the Valdez Harbor; another processor indicates

about two to three tenders (ranging in size 24.4 meters to 42.4 meters) often wait about a half hour to get inside the harbor to moor. Therefore, approximately 3 tenders (in the 30 meter range) from the PNW are consistently delayed about 45 minutes when seeking transient moorage during the fishing season.

G. Other Potential Harbor Users

A number of other commercial vessels operating in the area could potentially benefit from improved harbor conditions. These vessels use the existing harbor on an infrequent basis because of crowded conditions and the limitations of the entrance channel depth. These additional vessels include cruise ships, landing craft carrying bulk commodities, and support vessels providing services to the Alyeska marine terminal.

Discussions with the harbormaster, the Valdez Port manager, and industry officials suggest that there is a need to provide dock space within the harbor for a number of these vessels. These bigger vessels currently use the large container facility to dock and off-load passengers. This facility is a considerable distance from the downtown area, and access is fairly limited. With improvements at the City dock – including a new fender system, increased depth, and off-loading facilities – cruise ships will be able to dock within walking distance of the downtown area.6 However, many existing City dock users would be displaced. These vessels use about 53.4 meters (175 ft.) of the 183 meter (600 ft.) City dock for limited stays. Most of the vessels are in the 30.5 to 61 meter range (100 to 200 ft.), and generally draft from 2.4 to 4.3 meters (8 to 14 ft.). Approximately 6 meters (20 ft.) of additional dock space would be needed to accommodate these displaced vessels.

Of the potential users, the most promising is Alyeska Pipeline's Ship Escort Response Vessel System (SERVS) fleet. SERVS has expressed interest in mooring some of their vessels in the new harbor. Details of their operations and needs are described below.

1. Ship Escort Response Vessel System (SERVS)

Alyeska Pipeline's Ship Escort/Response Vessel System (SERVS) mission is designed to prevent oil spills by assisting tankers in safe navigation through PWS. Their goal is to protect the environment by providing effective response services to the Valdez Marine Terminal and Alaska crude oil shippers, in accordance with oil spill response agreements and plans. SERVS provides tanker escorts during the 70-mile passage through Prince William Sound and mobilizes vessels, equipment, and personnel in the event of an oil spill. SERVS is the largest oil spill prevention and response organization in the world.

The Prince William Sound Escort System is broken into three zones: Northern PWS, Central PWS, and the Hinchinbrook Entrance. In the Northern PWS zone, two escort vessels must remain within one-quarter of a nautical mile of the tanker, except when one vessel serves as an ice scout. The primary escort, an ocean going tug, must remain tethered to the tanker as it

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[6] Princess Cruise Lines announced new stops at Valdez every two weeks beginning June 4, 2008. The Tahitian Princess with a capacity of 670 passengers now calls at the City dock. *New Alaska Shore Excursions on 2008 Princess Cruises* – January 11, 2008. http://www.princesscruisedeals.com/alaska-cruises/new-alaska-shore-excursions-on-2008-princess-cruises/

transits Valdez Narrows. The second escort vessel is a specially equipped Escort Response Vessel, or ERV. In the Central PWS zone, the primary escort must remain within one-quarter of a nautical mile of the tanker, while the second escort may be stationed underway off Bligh Reef, or east of Naked Island, or off of Montague Point, depending on the tanker's position in the Sound. At Hinchinbrook Entrance, outbound laden tankers must maintain two escorts within one-quarter of a nautical mile of the tanker. The Hinchinbrook tug may be one of the escorts. The outbound tanker maintains a sentinel escort between Cape Hinchinbrook and Seal Rocks until the tanker is 17 miles seaward of Cape Hinchinbrook. Inbound laden tankers must have two vessels within one-quarter of a nautical mile of the tanker beginning before they cross the line between Cape Hinchinbrook Light and Seal Rocks.7

Two new tankers on order to carry North Slope Crude from Valdez to the West Coast meet the Oil Pollution Act of 1990 requirements that older tankers be phased out and replaced with double-hulled vessels, meet or exceed state, federal, and international safety requirements and are designed to improve redundancy, maneuverability, and self-sufficiency.8 Only single hulled tankers are required to have two escort vessels according to Federal law and the PWS Tanker Spill Prevention and Response Plan. In 2007, the Trans-Alaska Pipeline tanker fleet is forecasted to consist entirely of double hulled tankers. The current Vessel Escort and Response plan developed by PWS tanker owners calls for the use of two escort vessels for all tankers operating in Prince William Sound. The Prince William Sound Regional Citizens' Advisory Council is advocating the continuation of the practice of escorting all tankers with two vessels.9

As part of the PWS Tanker Spill Prevention and Response Plan, Alyeska must be able to respond to several spill scenarios, including a large oil spill of 300,000 barrels within 72 hours dependent on tanker capacity. Alyeska provides initial response for a minimum of 72 hours, and then transitions response efforts to the responsible party.

2. SERVS Fleet

Approximately 350 fishing vessels are on contract with Alyeska to provide oil spill response assistance throughout Prince William Sound. Fifty vessels make up the core fleet to provide immediate and year-round response support. These vessels are currently moored in the Valdez Small Boat Harbor and participate in several drills during the year in addition to receiving specialized training.

Fishing Vessel Administrators (FVA) are located in Valdez, Cordova, Whittier, Tatitlek, Chenega Bay, Seward, Homer, and Kodiak. Fishing vessel support is an integral element for open-water, nearshore, wildlife protection, and burning response strategies. The protection of sensitive areas and six fish hatcheries exposed to the threat of a spill in PWS is a priority in

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[7] Source: http://www.pwsrcac.org/docs/d0003600.pdf

[8] http://www.anwr.org/Technology/New-Standard-Set-with-Double-hulled-Double-screw-Tankers.php edited from an article published earlier in the Petroleum News Alaska.

[9] Source: anwr.org/archives/ship_escortresponse_vessel_system_servs_.php and pwsrcac.org/projects/MaritimeOps/escort.html

the nearshore response strategies. Protection equipment has been identified, dedicated and pre-staged at operating hatcheries and sensitive areas in Prince William Sound including: Sawmill Bay, Cannery Creek, Lake Bay, Main Bay, Solomon Gulch, and ten Port Valdez sensitive areas. Additionally, the Valdez Duck Flats aquatic habitat has equipment pre-staged in the immediate vicinity. Other areas with pre-staged equipment include: Naked Island, Port Etches, Whittier, Cordova, Chenega Bay, and Tatitlek.10

3. SERVS Potential Harbor Use

According to interviews with the SERVS Maintenance and Logistics Response Coordinator, moorage in the new small boat harbor is desirable. A detailed discussion of SERVS activities and vessels is provided below. While the benefits for SERVS vessels are not included in our analysis, this discussion is provided because it is likely that once harbor expansion is complete, some of the SERVS fleet would use the new facility. SERVS vessels are used as full-time service boats and would occupy permanent moorage slips. Alyeska has their own dock facility but its exposed location is not protected during periods of adverse weather conditions. SERVS vessels are often subject to severe weather that can cause vessel damage and undesirable berthing conditions at the present facility.

The SERVS dock is located across the spit directly seaward of the Valdez Harbor providing oil spill response activities for marine areas in and adjacent to Valdez Arm. SERVS has docking tugs that shuttle back and forth regularly. SERVS vessels tend to be larger, 61 meters (200 ft.) with deep drafts of up to 6 meters (20 ft.), and can generally be accommodated at the terminal dock. The following SERVS vessels were identified as potential users of the new harbor:

The Valdez Star is one of the largest oil skimming vessels ever built in North America. As the ship cruises through an oil spill area, bow doors are opened revealing the skimmer systems. Two 2-meter (6.5 ft.) wide belts push the oil under the front of the vessel to a collection "cell" where pumps transfer the oil to on-board storage tanks. The Valdez Star can also tow barges, place containment boom, and serve as a base for scientific research. The ship carries a crew of four to eight members.

The Kvichak Personnel Vessel (9 meter length, 3 meter beam, 1 meter depth) is a boom towing utility vessel that is used to transport personnel and deploy, tow, and recover boom. There are two of these vessels that have the potential to the use the new harbor facility.

The Kvichak Oil Boom Tow Boat (6 meter length, 3 meter beam, 1 meter draft) is a boom deployment workboat. This vessel is stowed aboard the Escort Response Vessels (ERVs). During a drill or actual oil spill the boats are lowered over the side and are used to deploy, tow, and recover boom. SERVS has two of these vessels that are potential users of the harbor.

[10] Source: www.alyeska-pipe.com/pipelinefacts/servs.html

SERVS identified 5 other vessels as potential new boat harbor users: 4 workboats (Peggy-O, Rozema, River Boat, Brown Skill) ranging in sizes from 5 to 10 meters; and one small landing craft, the Grayling, at 8 meters. All of these are part of the 10-vessel, workboat, skiff fleet.

All of the SERVS vessels that may occupy space in the new small boat harbor are currently located in Valdez. Although there is strong evidence that SERVS is interested in permanent moorage at the proposed harbor, these boats have not been included in the demand figures. Of the SERVS vessels indicated above, SERVS would be interested in 4 to 8 slips in the 16 meter range and one or two spaces in the 42 meter range. From an economic perspective, there are potential benefits for including SERVS in the economic analysis. These benefits would accrue from reduced damages to their vessels and floats, savings in vessel operating costs by providing on-board generators with shore power, and reduced maintenance costs for protection to the SERVS shoreline and trestle.

SERVS armored the shoreline beneath their dock in approximately 1994 as a result of an active erosion problem due to wave and ice action. SERVS periodically shores up the armor (most recently in 2005). Divers make annual inspections of the dock's sheetpile wall and pilings in order to identify potential damages early. In the with-project condition, the rubblemound breakwaters of the new harbor would provide some protection to the SERVS site. There is a benefit to constructing a new harbor east of the SERVS dock. However, if a West site were selected, prevention benefits are not anticipated.

Because of the uncertainty of what vessels have the best potential for moving to the new facility, and the ambiguity of the repair costs of bank stabilization, benefits for SERVS vessels are not claimed at this time. SERVS representatives could not commit to using the newly expanded harbor. However, it is anticipated that once the harbor expansion is complete, the SERVS fleet will use the new facility.

H. Future of the Valdez Fleet

The future of commercial fishing, charter boats, and recreational vessels at Valdez is discussed below.

1. Commercial Fishers

The analysis of economic benefits to the fishing industry is based on current market conditions. The industry is economically viable and there is no evidence that there will be a reduction in the size of the fishing fleet in the future. This conclusion is supported by the fact that there are a number of basic fishery management tools (input and output controls) to limit either the number of people fishing or the efficiency of fishing: total allowable catch (TAC), licenses, trip limits and bag limits, Individual Fishing Quotas (IFQ), Individual Vessel Quotas (IVQs), and allocating quotas. These management tools are discussed below.

- *Input/Output Controls.* Input controls are the type of measures adopted when a fishery first comes under management contract. Input controls include restrictions in gear, vessels, area fished, time fished, or numbers of people fishing. They apply to both commercial and sport fisheries, and may be applied to an entire fishery or to segments of it. Input controls are considered to be an indirect means of limiting the exploitation of fish stocks because they do not directly control the amount of catch.

Output controls are management techniques that directly limit catch and hence a significant component of fishing mortality. Output controls can be used to set catch limits for an entire fleet or fishery, such as a total allowable catch (TAC). They can also be used to set catch limits for specific vessels (trip limits, individual vessel quotas), owners, or operators (individual fishing quotas), so that the sum of the catch limits for individuals or vessels equals the total allowable catch for the entire fishery.

- *Total Allowable Catch (TAC).* TAC is a management measure that limits the total output from a fishery by setting the maximum weight or number of fish that can be harvested. TAC-based management requires that landings be monitored and that fishing operations stop when the TAC for the fishery is met.
- *Licenses.* Licenses and license endorsement may be used to certify fishers or vessels without limitation on the number issued; they can also be used as a management measure to limit the number and types of vessels or fishers that can participate in the fishery. License limitations are intended to limit fishing capacity and effort, but their effect on either is indirect. Limited licenses are used both in federal and state fisheries, such as the Pacific groundfish fisheries. Licenses and endorsements can also be linked to vessel and gear requirements. In some fisheries, limited licenses are tradable.
- *Trip and Bag Limits.* Trip and bag limits are measures that pace landings by limiting the amount of harvest of a species in a given trip. Trip limits are applied to commercial fisheries when there is interest in spacing out the landings over time or a desire to specify maximum landing sizes and they are usually accompanied by a limit on the frequency of landings.
- *Individual Fishing Quotas* (IFQs*).* IFQs are a fishery management tool used in the Alaska halibut and sablefish fisheries. It allocates a certain portion of the TAC to individual vessels, fishermen, or other eligible recipients based on initial qualifying criteria.
- *Individual Vessel Quotas* (IVQs). IVQs are used in a number of fisheries and are similar to IFQs, except that they divide the TAC among vessels registered in a fishery, rather than among individuals.
- *Allocating Quotas.* Quotas are usually allocated free of charge to those fishers already participating in the fishery. Under these programs, fishers can sell or lease their quotas to others and gain windfall profits. Fishers or companies with more resources are able to buy out the fishing quotas of smaller competitors. New fishers have a difficult time gaining entry into a fishery. Moreover, because the goal of fishing quota programs is to reduce the number or fishers who have access to a participating stock or geographic area, some fishers ultimately lose their jobs, and the economics of surrounding communities become vulnerable.

One potential problem area that is important to note is that the success of the Valdez salmon fishery is due in large part to hatchery programs. One potential future problem area for hatcheries to overcome is resistance from fishers to the high cost-recovery percentages

necessary to fund the hatchery operations. Another area of potential concern is the specter of production failures of the hatchery programs due to the inherent difficulties in producing salmon in a hatchery environment.

However, salmon permit activity lends credence to the stability of the PWS fishery. Permits that are sold command a relatively high price. For example, information obtained from the State of Alaska Commercial Fisheries Entry Commission, Basic Information Tables presents data on the average price of permits. Drift gillnet and set gillnet salmon permits have remained at a relatively stable number in the last 15 years (1990 – 2005) while decreasing by about 4 and 11 percent in permit value, respectively.11 The purse seine salmon fleet experienced a marked contraction during this time going from 265 permits fished down to 101 and losing more than 1,000 percent of permit value (from $273,000 down to $19,000 and less).

Table B-40 shows the number of permits fished and annual average permit price from 1990 through 2005. The average salmon permit is $74,300 over a 15-year period. The average was obtained by multiplying the number of permits fished times the average permit price each year (1990-2005) for each gear type (purse seine, drift gillnet, set gillnet) and dividing the 15-year total price ($858,858,800) by permits fished (11,122).

[11] Permit values have not been adjusted for inflation. When adjusted for inflation using the Anchorage CPI, decreases in permit value exceed 100 percent for set gillnetters, 400 percent for drift gillnetters, and 5,000 percent for purse seiners.

Table B-40. PWS Total Permits Fished and Average Permit Price for Salmon, 1990-2005

	Total Permits Fished		Average Permit Price ($)	Total ($)
Set Gillnet Salmon	2005	26	62,700	1,630,200
	2004	27	62,800	1,695,600
	2003	28	59,900	1,677,200
	2002	28	59,200	1,657,600
	2001	30	60,300	1,809,000
	2000	29	60,500	1,754,500
	1999	22	51,000	1,122,000
	1998	17	51,000	867,000
	1997	27	50,000	1,350,000
	1996	26	59,000	1,534,000
	1995	27	63,000	1,701,000
	1994	26	75,000	1,950,000
	1993	30	95,000	2,850,000
	1992	30	95,000	2,850,000
	1991	29	90,000	2,610,000
	1990	29	86,700	2,513,300
	Total	**431**		**$21,101,800**
Drift Gillnet Salmon	2005	502	47,700	23,945,400
	2004	513	40,400	20,725,200
	2003	510	35,900	18,309,000
	2002	519	41,000	21,279,000
	2001	522	57,500	30,015,000
	2000	526	59,300	31,191,800
	1999	521	55,200	28,759,200
	1998	522	69,300	36,174,600
	1997	520	67,900	35,308,000
	1996	509	60,600	30,845,400
	1995	518	69,000	35,742,000
	1994	506	65,800	33,294,800
	1993	514	99,300	51,040,200
	1992	527	98,100	51,698,700
	1991	517	127,300	65,814,100
	1990	521	159,800	83,254,800
	Total	**8,267**		**$597,396,200**
Purse Seine Salmon	2005	101	19,200	1,939,200
	2004	104	14,000	1,456,000
	2003	105	13,500	1,417,500
	2002	120	20,000	2,400,000
	2001	147	21,400	3,145,800
	2000	130	22,000	2,860,000
	1999	138	23,100	3,187,800
	1998	148	36,600	5,416,800
	1997	114	36,400	4,149,600
	1996	90	33,800	3,042,000
	1995	187	65,300	12,211,100
	1994	171	35,300	6,036,300
	1993	144	88,900	12,801,600
	1992	207	98,300	20,348,100
	1991	253	215,500	54,521,500
	1990	265	273,300	72,433,500
	Total	**2,424**		**$207,357,800**

Source: State of Alaska Commercial Fisheries Entry Commission

Unique vessels using the Valdez Harbor in 2006 totaled 1,140. Recreation boaters represent 82 percent of the unique vessels visiting the harbor, while more than 9 percent are commercial fishing vessels, and another 9 percent are charter vessels.

Table B-41. Unique Valdez Harbor Vessel Summary (2006)

Types of Vessels	< 6.7 m	6.7-11 m	11.3-16.8 m	>16.8 m	Total
Permanent Slips					
Recreation	64	273	60	2	399
Fishers	0	6	13	5	24
Charters	15	33	19	10	77
Total	**79**	**312**	**92**	**17**	**500**
Waitlisted Vessels					
Recreation	9	158	42	7	216
Fishers	0	2	3	3	8
Charters	0	12	3	4	19
Total	**9**	**172**	**48**	**14**	**243**
All Other Transients Vessels					
Recreation	211	116	-7	-1	319
Fishers	0	7	61	8	76
Charters	0	5	0	-3	2
Total	**211**	**128**	**54**	**4**	**397**
Grand Total	**299**	**612**	**194**	**35**	**1,140**

Note: Negative numbers appear in the All Other Transient Vessel category as this number represents all vessels using the harbor in 2006 (one year's worth of data) while the waitlisted vessels are represented by a moment in time (the day the list was pulled). Vessels will come and go from the waitlist as permanent moorage becomes available so while all waitlisted vessels are transient, they may not all use the harbor in that particular year.

In summary, the existing commercial salmon fishing fleet is fairly well established. According to the ADF&G, an increase in commercial fishing permits, which limits the size of the commercial fishing fleet, is not anticipated. Likewise, a large increase in the fleet is not expected. With the help of the salmon hatcheries in Prince William Sound, the salmon biomass is expected to remain stable in the future and further contraction of the salmon fleet is not expected. This limits benefits of new protected navigation facilities to damage reductions and savings in delay time and opportunity costs due to less crowding. Development of additional harbor space in Valdez would reduce considerably the density and overcrowded conditions in the existing harbor. However, it is not likely to result in any shifting of commercial vessels from another harbor to Valdez.

2. Commercial Charters

As previously discussed, the number of charters operating out of Valdez harbor has grown significantly over the last decade. It has been estimated that about 10 new charter operations

would begin during the years following completion of a new harbor, and existing charters would increase the average annual days spent recreating in the Sound.12

3. Recreation Vessels

An increase in the recreation fleet requiring moorage space is primarily a function of waitlisted vessels obtaining permanent moorage and local population growth. Local population projections developed by the Alaska Department of Labor indicates fairly slow growth can be expected in Valdez for the foreseeable future. It is expected that moorage demand by recreation vessels is well represented by those currently using harbor facilities on a permanent or transient basis, as well as those waitlisted for space when it becomes available. Therefore, the recreation fleet is not anticipated to change substantially. However, the availability of permanent moorage space will increase the number of boating days for PWS recreational vessels based on responses to the November 2004 recreation vessel survey.

I. Summary of Overall Moorage Demand

The demand for additional moorage at Valdez is 389 slips: 333 recreation, 24 charters, 26 fishing vessels, and 6 tenders. Table B-42 summarizes total demand by type of vessel and size. Vessel sizes are expressed in ranges. Tenders are in the 30 meter range.

Table B-42. Moorage Demand Summary

	Vessel Type	<6.7 m	6.7-11 m	11.3-16.8 m	>16.8 m	Total
Wait-Listed	Recreation	9	158	42	7	216
	Fishers	0	2	3	3	8
	Charters	0	12	3	4	19
	Total	**9**	**172**	**48**	**14**	**243**
Transient	Recreation	48	60	8	1	117
	Fishers	0	2	14	2	18
	Charters	0	4	1	0	5
	Total	**48**	**66**	**23**	**3**	**140**
Tenders	Tenders	**0**	**0**	**0**	**6**	**6**
	Grand Total	**57**	**238**	**71**	**23**	**389**

Note: Tender vessels indicated here are currently on the Valdez Harbor waitlist for permanent moorage.

[12] The return of cruise ships to Valdez Harbor will increase the need for charter operations as the large cruise lines will sell excursions offered by charters to their passengers prior to arriving in port.

V. WITHOUT–PROJECT CONDITIONS

This section provides an analysis of the avoided damages with expanded moorage facilities at Valdez. Only those damages that can be assigned tangible monetary values directly resulting from harbor development are included.

A. Harbor Operations

Potential avoided damages for harbor operations are reductions in harbor personnel time and repairs to rafts, floats, and other harbor infrastructure.

1. Personnel Time

Valdez Harbor personnel spend a significant amount of time each year to move vessels in a hot-berthing situation or when boat owners cannot be located to move their own vessel. Hot-berthing (or hot-bunking) means placing a transient vessel in a permanently assigned stall when the assigned vessel is out of the harbor. The moorage agreement for assigned stalls is that the obligation of the harbor to an assigned vessel is to make the stall available when the craft is in port. The assigned vessel operator is also required to notify the harbormaster's office when the vessel is absent from the harbor. Hot-berthing helps minimize the many problems associated with overcrowding by allowing the harbor to use existing inner harbor facilities to the greatest extent possible. Hot-berthing helps to maximize use of the existing facilities year round but it has limitations and associated problems:

- Hot-berthing creates a burden on the harbormaster's staff. Notification of departures and arrivals is sporadic and often inaccurate, which forces harbor personnel to anticipate boat delays. When information regarding a vessel's arrival or departure is wrong, harbor personnel must tow the transient vessel out of the stall. This action results in a substantial towing bill for the boat owner.
- When an assigned vessel arrives in the middle of the night without proper notification, the vessel must be placed on a transient float until the next day. If a transient space is not available to the vessel, the boat must find moorage elsewhere. Generally speaking, Valdez vessel owners cannot respond quickly to move their boats.
- Hot-berthing also has a negative impact on public relations. Transient and assigned vessel owners feel that they are not getting the full value of their moorage fee paid when their space is reassigned to another vessel (this could help explain the sometimes sporadic notification to the harbormaster's office of departures and arrivals). Interviews confirm that vessel owners view this policy as unfair and unreasonable.
- Harbor personnel indicate that a minimum of two employees spend an average of 2.5 hours each day during the peak fishing season (or 130 days per year), moving vessels from rafts and for hot-berthing purposes. According to the City of Valdez, Office of the Manager, the straight-time hourly rate for a marine operator is $27.32.

So the value for the time harbor personnel spend moving vessels that are rafted or hot-berthed is: 2 harbor employees x 2.5 hours per day x $27.32/hour x 130 days = $17,759. The fully burdened rate for harbor personnel is approximately 30 percent of an employee's hourly rate for benefits (paid holidays, paid leave, health and medical insurance). So the total value for harbor personnel time spent moving rafted and hot-berthed vessels is $23,087 ($17,759 x 1.3). It is unlikely that harbor personnel will work fewer hours as a result of improved harbor conditions, however, the time currently spent moving rafted and hot-berthed vessels can be spent in more productive activity and overtime hours during peak moorage times can be minimized. There are 538 recreation vessels out of the potential 700 vessels that would use the harbor on peak days. So almost 77 percent of harbor operations are attributable to the recreation fleet (538 / 700 = 0.768) and the harbor personnel time attributable to commercial activities is $5,342 annually ($23,087 times (1 – 0.768)).

The present value of harbor personnel effort spent moving rafted and hot-berthed vessels over the 50-year period of analysis is $113,000 with an average annual cost of $5,300.

2. Damages to Rafts and Floats

According to the City's budget for the harbor, an average of $300,000 is spent each year to maintain, repair, and/or replace damaged docks and pilings. Excessive rafting decreases the useful life of the inner-harbor facilities. The highest degree of rafting occurs from Memorial Day through Labor Day, as increased pleasure boat activity and large numbers of salmon fishers generate more demand for limited moorage space. Problems identified with rafting include:

- Dissimilar vessels are often tied together, such as large vessels to small ones, steel vessels to fiberglass, and fishing vessels to sailboats. These conditions can cause damage to either or both vessels. Excessive stress or point loading on the hull is generally associated with crafts that do not have straight sides and powerboats that flare at the gunwales.
- Loss or lack of bumpers between vessels creates extensive damage to fiberglass and wooden vessels by the harmonic movement of the boats in the water. This is particularly noticeable between vessels of different sizes or design that have unequal pitch-and-roll cycles.
- A considerable amount of vessel maneuvering goes on to find the best spot to raft. The larger the vessel the more difficult and the greater skill is needed to move the craft. Crossing over (vessels) is done frequently and is extremely dangerous as many injuries occur each year by people attempting to walk across the decks of rafted vessels.
- Delays and added costs are associated with rafting. Harbor personnel are required to remove vessels to the outside for boats requesting to depart. Most boat owners do not want the responsibility nor do they have the ability to remove obstructions by themselves to allow use of their boats. Occasionally, inclement conditions will not

allow safe towing or moving of rafted vessels, and the owner is deprived of the use of his vessel.

- The potential for catastrophic fire loss increases in proportion to the degree of rafting in the harbor. Access with gear to fight fires on a boat in a raft is difficult, and the probability of other vessels in the raft catching fire is much greater. These factors also increase the risk of injury to firefighters.

Rafting is allowed on about 35 percent of the total float space in the Valdez small boat harbor. Rafting is not allowed on the remaining 65 percent of float space. Floats where rafting is not allowed require roughly 35 percent less in annual repair and maintenance costs than do floats that are rafted. Life expectancy of rafted floats is about one-third of normal float life. Annual raft and float repairs at the harbor are estimated at $300,200. If we were to designate these costs based on total float space, non-rafted floats would cost $173,900 annually and rafted floats would cost $126,300. Assuming that the non-rafted floats number about 325 vessels and the rafted floats number 175 vessels, the value per float is $535 per non-rafted floats and $722 per rafted float. Normal wear and tear for the rafted floats is $93,600 while actual wear and tear is $126,300, a difference of $32,700.

The difference between the present value of float and dock repair expenses in the rafted versus non-rafted floats over the 50-year period of analysis are $5,664,000 with average annual costs of $32,700.

B. Commercial Fleet

1. Vessel Damages

To accommodate the overflow of 200 vessels during the peak 4-month period, rafting and hot-berthing practices are utilized. If towed inappropriately, damages occur to the vessel. When a vessel is rafted, it rubs, bumps, and collides with other boats and sometimes results in damages to rails, guards, planking, and fiberglass. This can result in damages beyond normal wear and tear to a vessel.

Although existing floats can accommodate 60 vessels, mooring six or seven deep puts all boats in the raft at equivalent risk of damage. Damage profiles were developed from information obtained from marine surveyors, Valdez fishers, harbor personnel, and marine repair shops. Two levels of damages (major and minor) were identified.

- **Minor Damages.** Those damages that allow the vessel to continue to operate, even if impaired; examples include chafed lines, broken cleats, cosmetic scratches to paint, deep scratches through the gel coat exposing the underlayment, nonstructural hull damage, and other types of damages up to 20 percent of replacement costs.

- **Major Damages.** Damages that can interrupt vessel operations and is costly to the boat owner to repair or replace are considered to be major. Examples include damage to the engine, shaft, keel, hull, fractures, and dents that impact displacement and performance, mechanical and electrical failures and malfunctions, and drive units unusable without major repair work.

The vessel damages calculation is based on several inputs as follows: 1) a survey of current and prospective harbor renters who were asked about damages from hull punctures and scratches, broken cleats, and line damages while moored at Valdez. The survey (Exhibits 2 and 3) was specific in identifying only those damages resulting from crowded conditions at Valdez and stated that "Do not include damages incurred while away from Valdez Harbor." 2) Telephonic interviews with commercial vessels using the harbor asked about damages to vessels "outside normal wear and tear". An expanded question to commercial users was used to detail damages due to rafting/congestion at the harbor. Exhibit 1 to the Economics Appendix details these discussions. 3) Telephonic interviews with repair shops in the area were used to verify the cost of repair.

According to the November 2004 survey results and updating costs using the Anchorage Consumer Price Index, current recreation slip renters experience vessel damages on average of $314.97 annually and waitlisted recreation vessels experience vessel damages of $85.15 annually. Similarly, current charter vessel boats experience damages on average of $426.66 while waitlisted charter vessels had damages of $203.50 on average. Commercial fishing vessel owners experienced damages of $216.89 on average based on expert interviews conducted in 2000 and updating to 2009 dollars. There are 500 current slip renters and during the peak season the harbor can accommodate up to 200 transient vessels. Average damages cost vessel owners $188,600 annually (See Table B-43). This is a conservative figure as many lesser damages go unreported and/or un-repaired and some of the damages to transient fleet (640 vessels in 2006) have not been captured. All values cited are for those damages that occurred as a result of current harbor conditions. Calculations do not include damages that can be attributed to "normal wear and tear".

Table B-43. Average Annual Vessel Damages Outside of Normal Wear and Tear Based on Vessel Type

Slip Renter Type	Average Annual Damages	Existing Fleet	Total Damages
Recreation permanent	$ 314.97	399	$ 125,700
Recreation waitlisted	85.15	139	11,800
Charter permanent	426.66	77	32,900
Charter waitlisted	203.50	20	4,000
Commercial fishing permanent	216.89	24	5,200
Commercial fishing waitlisted	216.89	41	9,000
Total Damages		**700**	**$ 188,600**

Notes: Average annual damages to recreation and charter vessels based on November 2004 survey results and do not include damages that can be attributed to "normal wear and tear". Commercial fishing vessel average annual damages based on expert interviews conducted in 2000. Damages have been adjusted to 2009 dollars using the Anchorage Consumer Price Index (CPI). Fleet based on permanent vessels moored at the harbor in 2006 and the maximum 200 transient vessels accommodated by the harbor during the peak season.

The present value of vessel damages that could be avoided with-project is $3,993,000 over the 50-year period of analysis with an average annual damage value of $188,600.

2. Commercial Vessel Delays

Delays for commercial vessels including tenders occur up to 130 days each year during the peak use months (mid-May through September). We have previously shown the total commercial, charter, and tender vessels using the Valdez Harbor. However, the harbor can only accommodate 200 transient vessels at any given time. If more than 200 vessels arrive on any given day, the vessel is alerted to the congestion in the harbor and may seek shelter or moorage elsewhere. Table B-44 shows what might be a typical configuration of vessels for moorage distribution on a peak day at Valdez Harbor. This includes 500 vessels occupying permanent slips, 60 transient vessels (double rafted) at the existing floats, and 140 (200 transients - 60 at the floats) other transients seeking space. Therefore, during a single peak day as many as 700 boats (500 permanents slip holders and 200 transients) experience delays.

Table B-44. Valdez Total Moorage Distribution by Accommodation

Types of Vessels	< 6.7 m	6.7-11 m	11.3-16.8 m	>16.8 m	Total
Permanent Slips					
Recreation	64	273	60	2	399
Fishers	0	6	13	5	24
Charters	15	33	19	10	77
Total	**79**	**312**	**92**	**17**	**500**
Existing Floats					
Recreation	12	6	3	1	22
Fishers	0	2	18	3	23
Charters	0	11	3	1	15
Total	**12**	**19**	**24**	**5**	**60**
Transient Vessels					
Recreation	57	65	8	1	131
Fishers	0	1	2	0	3
Charters	0	6	0	0	6
Total	**57**	**72**	**10**	**1**	**140**
Grand Total	**148**	**403**	**126**	**23**	**700**

Note: This moorage distribution table is based on a peak day when up to 200 transient vessels can be accommodated at the harbor.

Delay times for recreation vessels are not included for this analysis. However, it should be noted that part of the reason for commercial vessel delays is that Valdez is a popular recreation vessel destination and the recreation and commercial vessels are all attempting to use the same harbor entrance, boat ramp, and other facilities. These boats are basically stumbling over one another. Delays for fishing, charter, and tender vessels are included in this analysis. Delays for permanently moored vessels differ from the delays experienced by transient vessels. Further on in this analysis, we will note that not all delays will be eliminated as a result of improved harbor conditions in Valdez.

Permanent Moorage Delays. There are 500 slips for permanent moorage (399 pleasure boats and 101 commercial vessels). Commercial delays for 24 commercial fishers and 77

charters averages 15 minutes a day inside and an additional 15 minutes outside the harbor for each vessel during the peak fishing season. On average, commercial vessels with permanent moorage experience 30-minute delays. All types of vessels including recreation boats experience delays, but only commercial vessels are considered in the delay analysis.

Transient Moorage Delays. During the peak season on a typical day, 200 transients seek moorage in Valdez. According to our analysis, there are 9 commercial boats (3 fishers and 6 charters) that are transients and 38 other commercial boats at the existing floats (23 fishers and 15 charters) experience an average daily delay of 45 minutes inside and an additional 15 minutes outside the harbor per boat; total delay time is one hour during the peak season. Also, 6 transient tenders experience an average delay of one hour (45 minutes inside and 15 minutes outside the harbor) during the tending season.

The following table presents a summary of the variables used to calculate the annual costs associated with delays at the Valdez Harbor. This table shows the time delayed, the vessel operating costs, the opportunity cost of time for crew, the crew size, and the peak operating days in the season based on the size of the vessel and whether they are commercial fishers or charter/tender boats.

Table B-45. Vessel Operating Cost Variables

Variables	< 6.7 m	6.7-11 m	11.3-16.8	16.8-30 m
Commercial Fishers				
Delay Time - Permanent	30 min.	30 min.	30 min.	30 min.
Delay Time - Transient	1 hr.	1 hr.	1 hr.	1 hr.
Hourly Variable Operating Costs	$ 15.79	$ 36.10	$ 73.56	$ 90.65
Opportunity Cost of Time – Work per vessel	$139.29	$201.31	$ 201.31	$ 263.34
Opportunity Cost of Time – Leisure per vessel	$ 46.43	$ 67.10	$ 67.10	$ 87.78
Crew Size	2	3	3	4
Peak Operating Days	60	120	130	130

Note: The opportunity cost of time for both work and leisure time for commercial vessels is shown. In subsequent calculations, 57 percent of commercial fishers are expected to use the time gained from delays to continue fishing while 43 percent would use this time for leisure activity. Hourly variable cost estimates are based on the mid-range cost previously described.

Table B-46 presents commercial vessel delay hours for fishers, charters, and tenders based on the peak day with 200 transient vessels at the harbor. The delay hours depicted here are a conservative estimate and do not capture all the annual delays as shown in Table B-46 but do capture the delays that would be experienced on a typical peak day in Valdez Harbor. Annual delay hours are based on a peak fishing season when delays are likely to occur, the number of vessels in each class category, with half-hour delays for permanently moored vessels and one-hour delays for transient vessels. Peak fishing season depends on the size of the vessel. Delay hours for commercial vessels total more than 14,000 hours annually. Vessels that are turned away, seek moorage elsewhere, or must trailer their boats are not included in the delay analysis. In addition, this delay analysis captures only those delays experienced entering and exiting the harbor channel, delays experienced at the boat ramp for vessels entering the harbor have not been quantified.

Table B-46. Distribution of Commercial Vessel Delays at Valdez Harbor (Annual Hours)

Commercial Vessels		< 6.7 m	6.7-11 m	11.3-16.8 m	>16.8 m	30m	Total
Permanent Slips							
Fishers		-	360	845	325	-	1,530
Charters		450	1,980	1,235	650	-	4,315
	Total	**450**	**2,340**	**2,080**	**975**	**-**	**5,845**
Existing Floats							
Fishers		-	240	2,340	390	-	2,970
Charters		-	1,320	390	130	-	1,840
	Total	**-**	**1,560**	**2,730**	**520**	**-**	**4,810**
Transient Vessels							
Fishers		-	236	1,820	313	-	2,369
Charters		-	446	85	28	-	560
	Total	**-**	**683**	**1,905**	**341**	**-**	**2,929**
Tenders							
	Total	-	-	-	-	780	780
Grand Total		**450**	**4,583**	**6,715**	**1,836**	**780**	**14,364**

Note: Delays calculated by taking number of boats and multiplying by peak fishing/charter days and time period delayed (0.5 hours for permanently moored vessels and 1.0 hour for the transient fleet).

Table B-47 shows the distribution of commercial vessels currently using the Valdez boat harbor; 24 permanently moored commercial fishers and 41 transient commercial fishers. (Transient charter and tender vessels desiring space at Valdez Harbor are treated separately in this evaluation.)

Table B-47. Commercial Vessels Using Valdez Harbor in 2006

Commercial Fishing Vessels	< 6.7 m	6.7-11 m	11.3-16.8 m	16.8-30 m	30 m	Total
Permanent slips	0	6	13	5	0	**24**
Transient vessels	0	4	32	5	0	**41**
Total Vessels	**0**	**10**	**45**	**10**	**0**	**65**

Source: Valdez harbormaster's office. These are unique vessels using the harbor.

Total annual hours delayed for each vessel range is calculated by multiplying the daily delay (30 min. for permanent or one hour for transient vessels) by the number of days in the peak season, and then multiplying the number of vessels in each range. Results of these calculations are presented in Table B-48. For example, a permanently moored commercial vessel in the 11.3 – 16.8 meter range experiences a half hour delay each day during a 130 season (0.5 hr x 130 days = 65 hours per vessel, per season). This is multiplied times the number of permanent commercial vessels in the 11.3 – 16.8 meter range taken from Table B-44 (13 vessels x 65 hrs = 845 delay hours annually).

Table B-48. Delay Hours per Season by Vessel Size, Valdez Commercial Fleet

Commercial Vessels	< 6.7 m	6.7-11 m	11.3-16.8 m	16.8-30 m	30 m	Total
Permanent	-	360	845	325	-	1,530
Transient	-	476	4,160	703	-	5,339
Total Delay Time (hrs)	**0**	**836**	**5,005**	**1,028**	**0**	**6,869**

Table B-49 shows some typical vessel characteristics for commercial boats in Prince William Sound. These vessel characteristics were used as a starting point to determine average hourly costs. Investment values for each of the commercial vessel types were obtained from previous Corps studies, interviews with commercial vessel brokers and vessel operators. Smaller vessel investments are under $100,000 while larger vessel investments can easily approach $600,000.

The estimated investment cost for commercial fishing vessels was determined by comparing listings of commercial fishing vessels. The data reveals that as of June 2010, the typical investment cost for a drift gillnet vessel under 6.7 meters is approximately $49,400. A larger 6.7-11 meter longline/net vessel requires an investment of $103,500, and the 11.3-16.8 meter (seiner/longliner) requires an approximate investment of $251,400. The 16.8-30 meter group (seiner/longline/crabber) investment is approximately $608,900.

Table B-50 presents common operating conditions for Valdez vessels including horsepower of motors needed for each size vessel, average fuel consumption, and typical hours of operation for both charter and commercial fishing vessels. This discussion provides the context for assessing the costs of delays for commercial fishing vessels.

Table B-49. Characteristics for Typical Valdez Harbor Commercial Vessels

Description	< 6.7 m net	6.7-11 m Longline/net	11.3-16.8 m Seine /Longline/pot/jig	16.8-30 m Seine/ Longline/Crab
Investment average [1]	$49,400	$103,500	$251,400	$608,900
Length x Beam in feet and (meters) [2]	22 x 9 (7 x 2)	32 x 13 (9.7 x 4)	45 x 17 (13.7 x 5.2)	58 x 19 (18 x 5.8)
Draft in feet (meters)	3 (0.9)	4 (1.2)	6 (1.8)	8 (2.4)
Fish Hold (lbs)	n/a	12,000	30,000	60,000
Main Power load rate	Volvo Penta gas I-O	Single Cat 3208 turbo	Twin Cat 3208 turbo	Twin Cat 3208 turbo

Source: Based on the October 2005 Navigation Improvements Final Interim Feasibility Report for Port Lions, Alaska and updated to reflect current market information and Valdez fleet characteristics.

Notes: 1. Based on similar analysis conducted for Port Lions. Data was updated to reflect current investment obtained through 2010 sales listings for commercial vessels.
2. Vessel characteristics (draft, beam, etc.) are based on information from the Port Lions study.

Table B-50. Operating Data for Typical Valdez Harbor Commercial Vessels

	<6.7 m net	6.7-11 m Longline/net	11.3-16.8 m Seine/ Longline/pot/jig	16.8-30 m Seine/ Longline/Crab
Horsepower (hp) [1]	180	340	430	590
Fuel Consumption-Low Rate – gph [2]	6	5	10	10
Fuel Consumption-High Rate - gph	12	14	28	28
Commercial Fishing Crew [3]	2	3	4	4
Number of peak fishing days [4]	60	120	130	130
Commercial Vessel Hours (14 hour days) [5]	840	1,680	1,820	1,820
Man hours per commercial fishing vessel [6]	1,680	5,040	7,280	7,280

Source: Based on a listing of 871 Commercial Fishing vessels operating in Prince William Sound salmon registration area.

1. Horsepower rates obtained from the 2006 Alaska Commercial Fisheries Entry Commission database of commercial fishing vessels. Average HP was calculated for each vessel range and are based on a listing of 871 vessels operating in Prince William Sound Salmon registration area, and rounded to the nearest tenth.

2. Fuel consumption rates are based on previous studies and/or obtained from manufacturer's specifications and performance curves for typical engine configurations used in marine/commercial fishing applications.

3. Information gathered from previous studies and interviews with Valdez vessel operators.

4, 5, 6. Typical operating hours and days were obtained through interviews with vessel operators.

Annual Operating Costs. Total annual operating expenditures, both fixed and variable, include all costs that a vessel owner would be expected to spend in a given year. (See Table B-51 and Table B-52.) Fixed costs include return on investment, insurance, license and permit fees, business and food expenses, and crew shares for commercial vessels. Variable operating costs include fuel, maintenance and repair costs. The fixed expenses for any given vessel operating out of Valdez will be unchanged with improved harbor conditions. However, the variable expenses for Valdez Harbor users will be changed as a result of harbor improvements. Therefore, operating costs hourly savings are the total variable costs divided by total operating hours. The average hourly cost range for each type of vessel is dependent on what is assumed to be the number of hours of operation. For commercial vessels, 14-hour crew days are typical during the peak fishing season. A brief description of each line item follows.

Fixed Costs. These are costs that would be incurred by the vessel owners whether or not a boat was put to any productive use. Two major fixed cost categories are the vessel (investment) and return-on-investment. Fixed costs also include association dues, license and permit fees, aquaculture assessment, fishing and charter crew food, and fishing crew shares. These expenditures are discussed further below.

- *Insurance.* Two types of insurance are particularly important to a fishing operation: one is "hull and machinery" and the other is "protection and indemnity" (P&I). Hull and machinery insurance provides vessel owners with coverage for damage to or the total loss of the vessel and its machinery under a wide range of circumstances. P&I insurance provides vessel owners with protection against liabilities arising from death and injury to the crew, property damage, and certain other events. The number of months spent fishing and the size of the crew primarily determine the type and cost of this insurance. Our analysis shows that these costs range from $2,500 a year for a small vessel to a high of $30,400 for larger vessels.

  Total insurance costs and coverage depends on the terms of the particular contract, the characteristics of the vessel involved, the nature of the fisher's operation, and certain aspects of the fisher's personal history including loss record. Based on previous studies, the typical cost of hull insurance for commercial fishing vessels is estimated to be five percent of the value of a vessel, and the typical P&I insurance is estimated to be two percent of vessel value. Therefore, the total annual estimated cost of insurance for a typical vessel in the 18 meter (59 ft.) range averages $42,600. Smaller fishing vessels (10 meter (33 ft.)) averages $7,300 insurance and the cost of insurance for a mid-size vessel (14 meter (46 ft.)) is $17,600 annually. The estimated cost for insuring a 7 meter (23 ft.) vessel is about $3,500.

- *Licenses/Permit Fee*. The State of Alaska charges fees for salmon drift gill net and purse seine permit renewal and for vessel licenses. The license is good for all fisheries. The annual cost of fishing licenses and permits spans a broad range. Estimates for this report are based on the October 2005 Navigation Improvements report prepared for Port Lions, Alaska by the Corps of Engineers. These fees range from a low of $900 to a high of $18,300.

- *Association Dues.* The cost for this item is small in comparison to other line items. Commercial Fisherman operating in Valdez are eligible to become members of Cordova District Fisherman United, a nonprofit organization that represents the interests of area E fisherman and supporting businesses. Dues, on average, are progressively priced and vary based on equipment types. Basic membership for a single permit holder is $200 and multiple memberships are available at an additional cost. Estimates for association dues in Valdez are $200, $300, $500, and $1,000 for each of the vessel size classes.
- *Business Expenses*. Business fees are estimated to be about 2 percent of capital investment and are treated as a fixed cost. Vessel operators incur a variety of related business expenses during the season including, but not limited to: office-related expenses, legal and accounting costs, freight costs, travel expenses, and vehicle costs. Expenses range from $1,000 for small vessels, to $2,100 for mid-size crafts, $5,000 for large boats, and $12,200 for 18 meter fishing vessels annually.
- *Food Expenses.* Expenses per crewmember for food depends on the number of weeks preparing to fish, the time spent traveling to and from Valdez, the weeks fishing, the time securing the operation at the end of the season, the proximity of the fishery to the homes of the crew, and the crew's habits and preferences. Twenty dollars ($20) per person represents a reasonable daily cost of food as used in previous studies. Annual food costs were determined by applying $20 per day, per crewmember, and multiplied by the number of estimated operating days. Estimates range from a low of $2,400 to a high of $10,400 for larger vessels.
- *Return on Capital.* Another fixed cost would typically be the debt payment for an investment in business assets. Absent information on debt service for commercial vessels in Prince William Sound, we have used the return on capital mechanism to capture the value of vessel investment. The return on capital would be the expected return of investment for the business enterprise in its next best alternative. Using the federal interest rate of 4.375 percent for FY2010 and a life expectancy for commercial vessels of 30 years, the estimated return on capital is $27,200 for the 30 meter (98 ft.) vessels, $36,800 for 18 meters (59 ft.), $15,200 for 14 meters (46 ft.), $6,300 for 10 meters (33 ft.), and $3,000 for 7 meter (23 ft.) vessels.
- *Fishing Crew Shares.* The method of payment for crew of commercial fishing vessels is generally based on crew shares; it is considered a fixed cost. This item is not included in the variable cost calculations. Crew shares are a function of the fishery participation, expertise, and experience of the individual. Typical crew shares including the Captain are based conservatively on 50 percent of gross harvest value at a harvest level equivalent to a break-even operation for the year. Lost time by crewmembers is captured later in the opportunity cost of time calculation. Commercial crew shares are estimated to be $30,000 for small vessels up to $330,000 for larger vessels.

Variable Costs. These are costs that can be foregone when the vessel is not in operation. Variable costs include: diesel fuel, vessel repairs and maintenance, lube oil and hydraulic fuel. The following expenditures are presented.

- *Diesel Fuel.* The fuel price ($3.16/ gallon) used to calculate annual fuel cost was a 24-month average (July 2008-June 2010) for the Southcentral Alaska communities of Cordova, Homer, Kodiak, and Seward.[13]

  Fuel consumption estimates are based on previous Corps studies and interviews with knowledgeable individuals. Fuel costs depend on the vessel characteristics and the skipper's strategic and tactical fishing decisions. All of these factors interact. Among important physical vessel characteristics are the compatibility of the propeller, hull, engine, reduction gear, the vessel's bow entrance angle, and the size and the power of its engine. A typical vessel in the 18-meter (59 ft.) range is powered by a 590 hp Twin Cat 3208 turbo or equivalent, with a fuel consumption rate of 10-28 gallons per hour (gph). Vessels in the 10-meter (33 ft.) range are typically powered by a 340 hp, Single Cat 3208, and maintain a fuel consumption rate of 5-14 gph. The smallest vessels in the fleet (7-9 meter (23-30 ft.) range) are typically powered by various 100-200 horsepower rated engines with fuel consumption rates of 6-12 gph. The largest vessels in the fleet are fishing tenders in the 30-meter (98 ft.) range. A sample of sale listings found that the most common engine configuration currently used by large tenders was a Twin Detroit Diesel 8V-71 power train. The manufacturer's specification and performance curves revealed that this configuration operates in the 800-900 hp range and has an estimated fuel consumption rate of 13-43 gph.

- *Vessel Repairs and Maintenance.* This category includes the costs of preparing the vessel to fish in the spring, preparation for winter storage in the fall, in-season maintenance, and planned major repairs to the engine, shaft, and keel. The cost of all these repairs depends on the vessel's characteristics, the record of past vessel maintenance and repairs, the skipper's habits, current and prior patterns of vessel use, number of vessel operating hours during the year, and the nature of the insurance package purchased. General minor and major vessel repairs and maintenance were combined into one line item because the distinction between minor and major repairs varies and is ambiguous at times. Included in this estimate are lube, oil, parts, labor, and gear storage. Previous studies and information gathered via interviews led us to conclude that these costs are approximately 11 percent of the vessel value, and vary by vessel type. Expenditures for the small, mid-size, large and largest commercial fishing vessels are estimated to be $5,400, $11,400, $27,700, and $67,000 respectively.

[13] Source: http://www.psmfc.org/efin/data/fuel.html

Annual operating costs of a typical purse seine/drift gillnet vessel operating out of Valdez by vessel size are shown Table B-51.

Table B-52 shows the calculations for hourly variable expenses by size of vessel. The high range for fuel costs is based on average annual fuel consumption by vessel size and vessel activity during active fishing. (See Table B-50 for hours by vessels size.) For example the high range fuel costs of $16.31 for vessels in the <6.7 meter range is derived by dividing the annual fuel costs of $13,700 by the commercial vessel hours of 840 (assuming 14-hour days during peak fishing season). The low range for fuel costs is based on average annual fuel consumption by vessel size and additional time spent motoring between fishing sites, for vessel repairs, and other time not actively fishing. The mid-range used for hourly variable costs is an average of the high and low ranges.

Table B-51. Annual Commercial Vessel Operating Costs Summary by Vessel Size

	<6.7 m net	6.7-11 m Longline/net	11.3-16.8 m Seine/ Longline/pot/jig	16.8-30 m Seine/ Longline/Crab
Fixed Costs				
Hull Insurance	$ 2,500	$ 5,200	$ 12,600	$ 30,400
P&I Insurance	1,000	2,100	5,000	12,200
License/permit fees	900	5,400	9,000	18,300
Association dues	200	300	500	1,000
Business expenses	1,000	2,100	5,000	12,200
Food	2,400	7,200	10,400	10,400
Return on Capital	3,000	6,300	15,200	36,800
Crew Share (Commercial)	30,000	105,000	227,000	330,000
Variable Costs				
Fuel	13,700	65,200	141,400	141,400
Repair/maintenance	5,400	11,400	27,700	67,000
Annual Costs-Commercial Fishing	**$ 60,100**	**$ 210,200**	**$ 453,800**	**$ 659,700**

Source: Based on previous corps studies and updated to reflect current commercial fishing practices for Valdez. Fuel prices of $3.16 per gallon were estimated using the 24-month average for 2008-10 for the communities of Cordova, Homer, Kodiak, and Seward.

Table B-52. Hourly Variable Cost Summary by Vessel Size for Commercial Fishing Vessels

	<6.7m net	6.7-11 m Longline/net	11.3-16.8 m Seine/Longline/pot/jig	16.8-30 m Seine/Longline/Crab
Fuel cost – High range	$ 16.31	$ 38.81	$ 77.69	$ 77.69
Fuel Cost – Low range	6.34	22.64	45.32	45.32
Variable repair and maintenance	6.43	6.79	15.22	36.81
Charter/tender crew wages	68.40	92.59	92.59	116.78
Hourly Variable Costs				
High	$ 23	$ 46	$ 93	$ 115
Low	9	27	54	67
Mid	16	36	74	91

Note: Hourly variable costs have been rounded off to the nearest dollar.

The value of the delay time is based both on the number and size of vessels and the vessel operating costs previously presented. As shown previously in Table B-47, 24 permanent commercial fishers and on peak days 41 commercial fishing transients experience time delays averaging 30 minutes and one hour per vessel, respectively. A total of 65 commercial fishing vessels in the existing harbor are experiencing delays because of overcrowding and congestion. Charter vessels and tenders delays will be discussed later. The following table summarizes these calculations for commercial fishing vessels:

Table B-53. Summary of Delays for Commercial Fishing Vessels

Vessel moorage type	< 6.7 m	6.7-11 m	11.3-16.8 m	>16.8 m	30m	Total
Permanent						
Number of vessels	-	6	13	5	-	**24**
Multiply by hours	30 min.	30 min.	30 min.	30 min.	-	
Multiply by days	60	120	130	130	-	
Delay hours annually	-	360	845	325	-	**1,530**
Multiply by vessel operating costs	$15.79	$36.10	$73.56	$90.65	$-	
Subtotal Permanent Commercial Vessel Delay Damages	**$ -**	**$13,000**	**$62,200**	**$29,500**	**$-**	**$104,700**
Transient						
Number of vessels	0	4	32	5	0	**41**
Multiply by hours	1 hr.	1 hr.	1 hr.	1 hr.	1 hr.	
Multiply by days	60	120	130	130	0	
Delay hours annually	-	476	4,160	703	-	**5,339**
Multiply by vessel operating costs	$15.79	$36.10	$73.56	$90.65	$ -	
Subtotal Transient Commercial Vessel Delay Damages	**$ -**	**$17,200**	**$306,000**	**$63,700**	**$ -**	**$386,900**
Total Delay Damages for Commercial Vessels	**$ -**	**$30,200**	**$368,200**	**$93,200**	**$ -**	**$491,600**

The present value of delays for commercial fishing vessels under existing conditions totals $10,407,000 over the 50-year period of analysis with an average annual damage value of $491,600.

3. Harbor of Refuge

The impact on National Economic Development (NED) of increased harbor-of-refuge opportunities would be more days available for vessels to take refuge in the harbor during severe weather. Harbor-of-refuge benefits represent protection from risk of damage to which the fleet would otherwise be exposed. The Valdez Harbor location at the head of the Valdez Arm makes its location as a harbor of refuge somewhat limited. The harbor acts as an arrival and departure point for vessels proceeding into Prince William Sound or further into the Gulf of Alaska. Once in the Sound, vessels elect to seek refuge in the closest protected harbor which may be Cordova, Whittier, or Tatitlek. For medical emergencies, a vessel would probably elect to traverse to Whittier before traveling to Valdez due to the availability of road access to the urban hospitals in Anchorage.

The National Weather Service office in Valdez reported that oil tanker traffic in the Sound is suspended whenever the seas at Station 46061 – Seal Rocks 55NM South of Valdez reach 4.57 meters (15 feet). Telephone calls to the Valdez Fisheries Development Foundation and the Valdez Harbor Association reveal that commercial fishing vessels suspend operations when the seas reach 3.05 to 3.66 meters (10-12 feet). Smaller commercial fishing vessels, in the 40 to 50-foot range suspend operations when the seas reach 10 feet while larger vessels, in the 50 to 70-foot range, may continue to fish in slightly higher seas. The following graphic shows the average number of times the seas at Station 46061 have reached higher than 15 and 12-foot heights in the period 1996 through 2007.

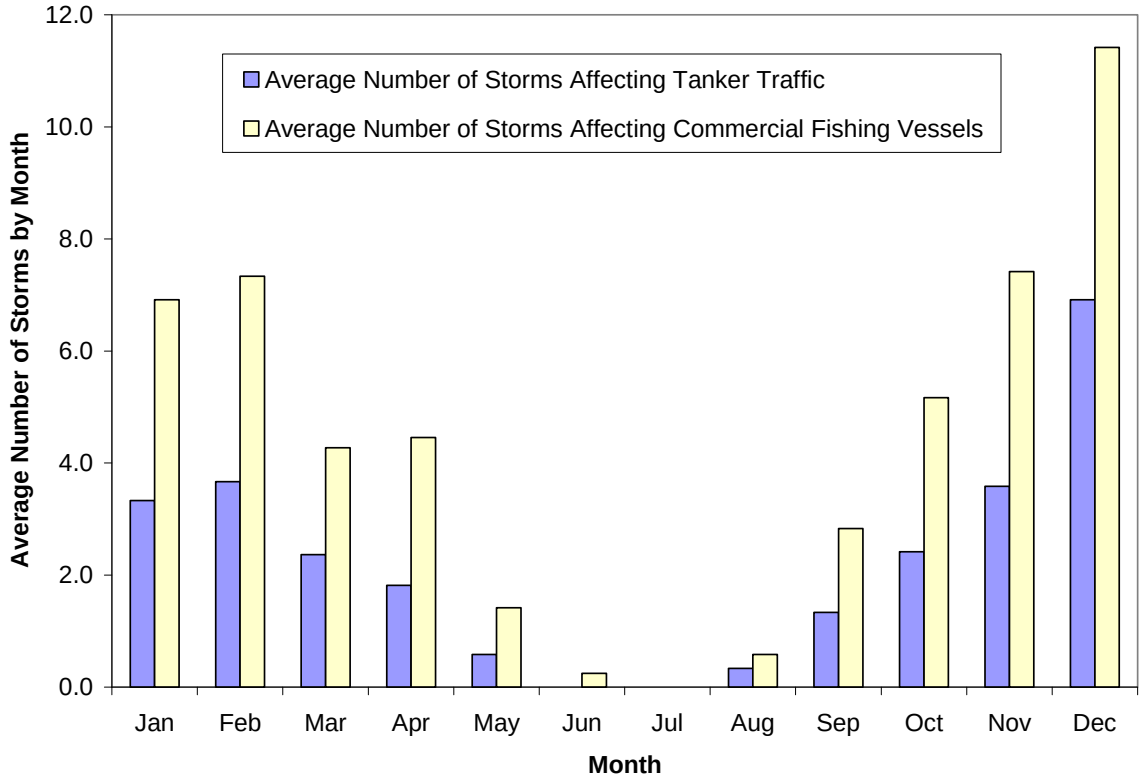

Figure B-22. High Seas at Seal Rocks 55NM South of Valdez, 1996 - 2007

Source: National Oceanic and Atmospheric Administration – National Data Buoy Center.

Note: Tanker traffic operations are suspended when seas at Seal Rocks reach 15 feet or higher. Commercial fishing vessels will suspend operations when seas reach 10-12 feet. The number of storms affecting commercial fishing vessels shown in this graph are based on higher than 12 feet data. Number of storms depicted in this table may be understated as the data buoy is periodically inoperational as a result of storm activity.

As the graph shows, most severe storms occur during the winter months when the Valdez Harbor does not experience crowded conditions and could potentially provide refuge for vessels operating in the Sound. On average there are more than 26 storm days annually that affect tanker traffic and more than 52 storm days annually that would affect commercial fishing vessels. Crowded conditions at the harbor occur during the busy summer salmon season, mid-May through September. From May through September there have been an

average of 2.3 storm days annually that halted tanker traffic through Seal Rocks and 5.1 storm days on average that would have kept commercial fishing vessels in the harbor or caused them to seek shelter. See Table B-54.

Table B-54. Historical Storm Days Affecting Vessels in Prince William Sound

Storm Days with 15-foot (4.57 meters) Wave Heights												
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
1996	0	3	1	2	0	0	0	0	3	2	0	4
1997	3	5	0	3	0	0	0	0	1	1	7	9
1998	3	5	3	1	3	0	0	0	1	5	3	1
1999	3	2	3	2	2	0	0	0	2	2	4	7
2000	6	2	3	2	0	0	0	0	1	3	4	9
2001	14	1	No Data	No Data	1	0	0	2	0	1	3	6
2002	6	8	1	0	0	0	0	0	0	7	7	3
2003	0	3	1	0	0	0	0	0	1	0	1	10
2004	1	6	4	3	0	0	0	0	2	0	4	4
2005	0	1	5	2	0	0	0	0	2	3	3	11
2006	2	8	3	2	1	0	0	2	2	3	1	13
2007	2	0	2	3	0	0	0	0	1	2	6	6
Average # of Storms Affecting Tanker Traffic	**3.3**	**3.7**	**2.4**	**1.8**	**0.6**	**0.0**	**0.0**	**0.3**	**1.3**	**2.4**	**3.6**	**6.9**
Storm Days with 12-foot (3.66 meters) Wave Heights												
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
1996	0	8	2	5	1	0	0	0	5	6	2	7
1997	11	10	2	4	3	0	0	0	4	3	8	14
1998	4	14	3	8	3	0	0	1	4	7	6	7
1999	7	8	8	4	2	0	0	1	2	5	11	11
2000	8	4	5	3	0	0	0	0	1	8	9	16
2001	19	2	No Data	No Data	5	0	0	2	3	6	6	7
2002	10	12	3	1	0	3	0	0	0	10	12	8
2003	7	4	3	2	0	0	0	0	1	1	2	14
2004	4	10	6	7	0	0	0	0	2	3	11	10
2005	1	7	8	3	0	0	0	1	5	4	7	14
2006	5	8	3	5	3	0	0	2	5	5	3	18
2007	7	1	4	7	0	0	0	0	2	4	12	11
Average # of Storms Affecting Commercial Fishing Vessels	**6.9**	**7.3**	**4.3**	**4.5**	**1.4**	**0.3**	**0.0**	**0.6**	**2.8**	**5.2**	**7.4**	**11.4**

Source: National Oceanic and Atmospheric Administration – National Data Buoy Center.

Note: Number of storms depicted in this table may be understated as the data buoy is periodically inoperational as a result of storm activity.

Fishing vessel safety is a significant concern in Alaska and on the West Coast in general. The Pacific States Marine Fisheries Commission, in cooperation with the National Research Council Committee on Fishing Vessel Safety, produced a lengthy report on West Coast vessel safety (Jacobson, Goblirsch, and Van Noy - 1990). The study drew from several data sources, including the NMFS vessel operating units database, the Pacific Fisheries Information Network database, the U.S. Coast Guard casualty data, the Washington Department of Health occupational mortality data, and interviews with fishers.

Data cited in the report was used to estimate historical annual weather-related losses among vessels larger than 24 meters (79 ft.). Weather-related losses include capsizing, flooding, foundering, sinking, and disappearance, which accounted for about 51 percent of losses from all sources. Average annual weather-related losses during the 1982-1987 period were $5.2 million, unadjusted for price-level effects on replacement costs.

The West Coast vessel safety survey estimated that the $5.2 million annual loss is equivalent to a fleet daily loss of $14,247 using a 365-day year, or $40,000 using the 130 average days in which the Valdez fleet is actively fishing. The previously mentioned study identified 41 vessels in the 24 meter (79 ft.) category with a sample error indicating the number of vessels could be as high as 84. The range of expected loss per vessel day is $14,247/84 = $170 at the low end of vessel cost, to $40,000/41 = $976 at the high end. The high-end data is more realistic, because none of the fleet fishes 365 days per year, and there is a high confidence level in the vessel database with the data accounting for 99 percent of the samples. However, Valdez Harbor's location limits its ability to serve as a harbor of refuge for Prince William Sound fishing vessels. Therefore, the mid-point of the high and low loss estimates is used for calculating harbor of refuge benefits.

The NOAA buoy data shows that there are about 5.1 storm days during the busy summer season when commercial fishing vessels might need to seek shelter. Using a conservative estimate that there is at least one vessel per storm day seeking refuge as the basis for harbor of refuge benefits, and the midpoint of $572.50 of expected vessel losses per day gives us an expected weather-related loss in PWS of $2,920 annually. Adjusting the basic loss data for price level effects on replacement costs, the $2,920 becomes $5,400 in 2009 prices based on adjustments from the Anchorage Consumer Price Index. This likely underestimates the harbor of refuge damages as smaller vessels must also seek refuge from storms.

The cost for providing a harbor of refuge is estimated to have a present value of $114,000 with an average annual equivalent value of $5,400.

4. Opportunity Cost of Time

Captain and crewmembers incur an opportunity cost of time (OCT) associated with unplanned down time. OCT is the value of work or leisure activities forgone because of travel to alternate ports or incurring delays when the Valdez Harbor is overcrowded. For OCT calculations, a value of next best use of time is calculated. For this analysis, a separation

between charter and tender wages and commercial fishermen crew shares has been made. Furthermore, in calculating the OCT for commercial fisherman, a distinction has been made between those who would rather fish and those who would engage in leisure activities if not delayed. This distinction is based on the September 2006 Cornell University study for Alaska salmon fishers hourly wage estimates and responses for activity if delays were eliminated. The leisure time estimate is valued at one-third the wage rate.

The following table shows the number of permanent and transient vessels currently using the Valdez Harbor by commercial activity and size of vessel. This configuration will be used in the upcoming calculations to arrive at delay times and the opportunity cost of time.

Table B-55. Permanent and Transient Commercial Vessel Moorage Slips

Permanent Moorage Slips						
	< 6.7 m	**6.7-11 m**	**11.3-16.8 m**	**16.8-30 m**	**30 m**	**Total**
Commercial Fishing	0	6	13	5		24
Charters	15	33	19	10		77
Totals	**15**	**39**	**32**	**15**	**0**	**101**

Transients Vessel Slips						
	< 6.7 m	**6.7-11 m**	**11.3-16.8 m**	**16.8-30 m**	**30 m**	**Total**
Commercial Fishing	0	4	32	5	0	41
Charters	0	15	4	1	0	20
Tenders	0	0	0	0	6	6
Total	**0**	**19**	**36**	**6**	**6**	**67**
Total Transient and Permanent Vessel Slips	**15**	**58**	**68**	**21**	**6**	**168**

Source: Valdez harbormaster's office for vessel traffic during the calendar year 2006.

5. Commercial Fishers' OCT

Cornell University analyzed the opportunity cost of time (OCT) for commercial fisherman in Alaska in 2006. In that report, a survey was used to estimate the hourly value, in monetary terms, of various increments of time saved by commercial fisherman in Alaska. The specific objectives of this study were to: 1) determine what commercial fishers in Alaska would do with more amounts of time saved; 2) determine the monetary value of time saved; and 3) determine if the results of objective 2 differ based on the length of the delay, type of fishery, region fished, or employment status (captain versus crew).

The study found that the monetary value of time saved by Alaska commercial fisherman varied depending on the length of delay, species fished, and in some cases the region fished or whether the fisher is a captain or crewmember. The survey also found that for delays of one hour or less, the majority (57 percent) of Alaska fisherman would engage in fishing or fishing related activity if not delayed, as opposed to leisure time or a non-fishing job (43 percent). The report determined that the fishing wage rate per hour calculated for salmon fishers (excluding western Alaska) is $71.17 for captains and $57.13 for crew members. Using the

Bureau of Labor Statistics Employment Cost Index for 2010, these wage rates become $77.27 for captains and $62.02 for crewmembers. Therefore, the calculation for the opportunity cost of time for leisure time (one-third of this wage rate) would equal $25.76 for captains, and $20.67 for crew members. The calculation used to estimate the OCT for commercial fishers for Valdez was adjusted to reflect the findings included in the Cornell study. This method provides a more realistic measurement of the opportunity costs for commercial fishers because if not delayed, most salmon fishers in Prince William Sound would utilize that time to continue fishing.

Table B-56. Average Wage Rates for Commercial Vessels in PWS

Hourly Wage Rates		
	Work Time	**Leisure Time**
Commercial Fishing Captain	$77.27	$25.76
Commercial Fishing Crew	$62.02	$20.67

Source: Commercial fishing wage rates obtained from survey results for salmon fishers in the September 2006 Cornell University study Value of Time Commercial Fishermen in Alaska Could Save with Improved Harbor Facilities. Wage rates are adjusted to 2010 levels using the Bureau of Labor Statistics Employment Cost Index.
Note: Leisure time is calculated as one-third of the hourly wage rate.

The question then becomes whether there are sufficient resources in Prince William Sound to allow this increased fishing effort. Several recent articles speak to the "problem" of abundant fish in Valdez. The following is taken from an Alaska Department of Fish and Game Division of Commercial Fisheries news release dated January 13, 2006:

> **2005 PWS Commercial Salmon Fishery Season Summary**
>
> *The unexpectedly large run of hatchery pink salmon outpaced harvest and processor capacity and resulted in a build-up of poor quality fish in Port Valdez. As of July 15 an estimated 3.0 million fish in the port had deteriorated to the point that their flesh had become unmarketable. If left unharvested, a significant number of the hatchery salmon could be expected to stray into 39 nearby pink salmon streams and interfere with natural stocks. To prevent further waste, hatchery salmon straying, and accumulations of dying salmon, the Commissioner of ADF&G allowed roe stripping. Even with roe fishery regulations implemented, large numbers of rotting carcasses were reported in the harbor, at the boat ramp, stream mouths, and throughout the port.*

This was not a one-time event. A July 15, 2005 article in the Anchorage Daily News titled "In Alaska, an embarrassment of pink-salmon riches" by Wesley Loy says:

> *For the second time in three years, Alaskan officials will allow Prince William Sound commercial fish processors to strip valuable eggs from millions of pink salmon and throw away the unwanted carcasses.*

Not only are there more pink salmon returning to PWS but stockpiles of canned salmon are low. In previous years, pink salmon have fetched mere pennies per pound of harvest in part

because of a glut of canned salmon on the larger world market. This has changed, however. The Alaska Seafood Marketing Institute says in its October 2006 newsletter:

> *SMIS anticipates continued increases for canned pink salmon prices. Estimated 2006 inventory of canned pinks is significantly below the five-year average sales volume, due to an unusually small harvest and the ongoing product-form shift toward frozen production. The 2006 pack estimate is 1.8 million 48-tall case equivalent, well below typical production of over 3 million cases. The chronic oversupply of canned pink salmon appears to have ended.*

So then the question becomes about markets for this increased supply of pink salmon. The Anchorage Press report in November 2006 that Anchorage resident William Lathan was trying to get state funding for a new method of harvesting pink salmon for sale to Chinese residents. His plan was to harvest the fish with a pump that transfers them to a brine tank where they would die naturally while maintaining an unblemished look. (Fish caught in nets often get damaged in the process.) Another article in the Alaska Journal of Commerce on January 8, 2006 by Bob Tkacz indicates that Korea has now become an importer of seafood and is looking to Alaska to help fill some of that void.

The discussion so far has been on traditional markets for whole or headed and gutted fish product. However, there has been a push for value-added fish products in recent years as well. This push has been as a result of Alaska's desire to improve employment conditions in rural communities and retain fishing dollars in state. The Valdez Fisheries Development Association has trained fishers in the methods and techniques for adding value to their product; packaging, mailing, and marketing. An offshoot to this program is the plan by VFDA to build a value-added seafood processing plant in Valdez using waste heat from the Petro Star oil refinery to fuel a cold storage facility and grant funding to obtain the needed processing equipment. At this time, VFDA has most of the funding to start building the cold storage facility. Currently, when harvesting is taking place, commercial fishers need to get product on ice or make deliveries to the shoreside processor quickly. A cold storage facility in Valdez will allow commercial fishers to harvest and freeze product in Valdez thereby giving them the needed time to add value before sending their product to market.

The VFDA plan is not limited to typical value-added activities of filleting, adding spice, or smoking and packaging the product. Another news release by Alaska Sea Grant on August 1, 2004 says:

> *Chinese children and their parents overwhelmingly preferred the taste of new protein supplements made from Alaska pink and chum salmon to their traditional supplements made from carp according to a study conducted by University of Alaska Fairbanks (UAF) researchers. Some 90 percent of those surveyed chose Alaska salmon powder over powder made from Chinese grass carp. The finding, based on surveys and taste tests conducted with 250 parents and their children in five large cities in China, may help Alaska's salmon industry create new products and markets for abundant but low-value pink and chum salmon.*

With the success of the hatchery production in PWS, the increased ability to reach global markets for salmon, and the potential for value-added product, it is anticipated that commercial fishers at Valdez will use whatever increases in time they can garner to harvest more fish. In past years, excess fish harvest from Prince William Sound has been donated to charitable organizations, used as fish meal and ingredients for dog treats, and given away as visitor prizes to Valdez. This suggests that, in some years, the PWS salmon fishery is abundant with uncaptured harvest benefits for the commercial vessels operating from Valdez.

So the opportunity cost of time for commercial fishers in PWS are assumed to be spent based on their preference for continued fishing or leisure time. The crew requirements for each vessel type are calculated based on previous Corps studies and published reports and are presented in Table B-57. The typical crew size for fishing vessels in the < 6.7 meter range is a captain and 1 crew member. For the larger size vessel 6.7 to 11 meter range, a captain and 2 crew members. The largest vessels 11 to 30 meters require a captain and 3 crew members.

Using the previously described hourly rates, the commercial vessel opportunity cost of time is $143.60 per hour (0.57 times (77.27 + 62.02 + 62.02) – the fishing wage rates for captain and two crew - plus 0.43 times (25.76 + 20.67 + 20.67) - the leisure time rates). Using the number of vessels from Table B-55 and the delay hours for transient vessels reveals that the opportunity cost of time for transient commercial vessels in the 6.7 to 11 meter class is $33,900. (See Table B-58.) Similar calculations were performed for the remaining commercial vessel sizes. If all delays were eliminated by the improved harbor, we would expect to have total benefits from the Opportunity Cost of Time for commercial vessel delays of over $1 million.

In summary, 57 percent of Alaska fishers engaged in the salmon fisheries (open-access fishery) would use the delay times to conduct other fishing activity while 43 percent would use that additional time for leisure activity. Average hourly wage rate for captains on a salmon fishing vessel is $77.27 with a leisure value of $25.76. Average hourly rates for crew on salmon fishing vessels is $62.02 with a leisure value of one-third that rate at $20.67. Opportunity cost of time evaluation is based on the vessel size and associated crew and the number of peak fishing days as previously described in this report.

The present value of the opportunity cost of time for commercial fishing crews is $21,848,000 with an average annual value of $1,032,000.

Table B-57. Calculation Inputs for Commercial Fishing Fleet

Vessel Size	< 6.7 m	6.7-11 m	11.3-16.8 m	16.8-30 m	30 m
Total Number of Crew (including captain)	**2**	**3**	**3**	**4**	**4**
Total Hourly Wages for Commercial Vessel	$139	$201	$201	$263	$263
Leisure wage for Commercial fishers (1/3 wage rate)	$46	$67	$67	$88	$88
OCT (57% fishing and 43% leisure activity)	$99	$144	$144	$188	$188
Typical Delay times					
Permanent Slipholders (hrs)	0.5	0.5	0.5	0.5	0.5
Transient vessels (hrs)	1.0	1.0	1.0	1.0	1.0
Delay days in season	**60**	**120**	**130**	**130**	**130**

Note: Delay days in season is an estimate of the number of days vessels of various class sizes are experiencing delays during a typical season and not the total number of days in the season as previously described in this report.

Table B-58. Opportunity Cost of Time per Season, Valdez Commercial Fleet

Commercial Fishers	< 6.7 m	6.7-11 m	11.3-16.8 m	16.8-30 m	30 m	Total
Permanent berths	$ -	$ 51,700	$ 121,300	$ 61,100	$ -	$ 234,100
Existing Floats	-	34,500	336,000	73,300	-	443,800
Transients	-	33,900	261,400	58,800	-	354,100
Total OCT for Valdez	**$ 0**	**$ 120,100**	**$ 718,700**	**$ 193,200**	**$ 0**	**$ 1,032,000**

Note: Commercial fishing opportunity cost of time is divided between those that would use this added to time to continue fishing and those that would prefer more leisure time based on the September 2006 Cornell University statewide survey of Alaska fishers. Hourly wage rates are adjusted to 2010 levels using the Bureau of Labor Statistics Employment Cost Index.

C. Tender Fleet

1. Travel Related Expenses

Travel of any kind imposes costs on the fleet; these costs include additional operating expenses for vessels. Traveling from Valdez to alternate harbors to secure moorage space adds costs in operating the vessel above and beyond tending duties. Operating costs measure the direct out-of-pocket expenses associated with searching for harbor space. Information is not available on the number of commercial fishing and charter vessels that must seek alternate moorage and where they would go. However, some information is available on tender vessels travel to alternate ports.

During the off-season, tenders without permanent moorage in Valdez are required to return to their homeport to store their vessel. Travel to Pacific Northwest ports is also necessary for periodic vessel maintenance and repair. This is because some major repairs are not available in Valdez.

As previously noted, 13 tenders work for processors in Valdez. Attempts to contact tenders were moderately successful. For example, through the Coast Guard Vessel documentation retrieval system, pertinent information exists about the vessel characteristics (vessel name, hailing port, boat length, hull depth, gross and net tonnage) and the owner's name and address. However, some of the information in the database was missing; therefore, 6 listings (almost half) lacked sufficient data to locate the tenders. Of the remaining 7 listings, 4 tenders expressed interest in permanent moorage at Valdez. Three of the 4 tenders are moored in the Pacific Northwest (Bellingham, Lake Washington, Vancouver, B.C.) and one tender is from Seward. Three other tenders desired only transient moorage. Only one of the PNW tenders is on the Valdez harbormaster's waitlist so this analysis takes a conservative approach and has limited the PNW tender travel related expenses to one vessel.

In addition to the one PNW tender on the waitlist, there are five other tender vessels that desire permanent moorage at Valdez Harbor. Three are moored at other Alaska ports, and two vessels are transient vessels that stay year-round in Valdez. The transient vessels that remain year round suffer no travel related damages since they are already at the harbor, although they are paying higher moorage fees for transient rather than permanent moorage space. The other Alaskan communities and the PNW vessel, however, do suffer travel related damages. These six vessels will seek permanent moorage at the harbor with improved conditions and forego the annual trip to distant ports.

Table B-59 summarizes the average operating costs tenders incur making annual trips to their homeport.

Table B-59. Tenders' Annual Travel Related Expenses from Valdez to Homeport

Tenders' Homeport	# of Tenders	# Round Trips	Nautical Miles RT	Hours	Vessel Operating Hourly Rate	Captain Hourly Leisure Rate	Crew Hourly Leisure Rate	# of Crew	Roundtrip Cost
PNW	1	1	2,468	288	$ 201	$ 14.74	$ 8.06	3	$ 69,000
Girdwood/Anchorage	1	1	770	90	181	14.74	8.06	3	19,700
Homer	1	1	534	62	201	14.74	8.06	3	14,900
Anchorage	1	1	770	90	181	14.74	8.06	3	19,700
Valdez	2	1	-	0	201	14.74	8.06	3	-
Total Annual			**4,542**	**530**					**$ 123,400**

Source: Based on 2006 waitlist of tender vessels seeking permanent moorage at the Valdez Harbor and interviews with harbor staff. Distances between ports based on the 2002 9th edition publication by the National Oceanic and Atmospheric Administration. Trip hours based on average speed of 8.5 knots per hour.

Note: Vessel operating costs are detailed in Section III.D.2. Captain and crew hourly rates are based on one-third the Alaska Department of Labor and Workforce Development wage rates and number of crew is less than required when actively engaged in fishing activity.

Pacific Northwest Travel. A one-way trip from Valdez to the PNW is 6 days (1,234 nautical miles one way) travel time. The round trip takes 288 hours (6 days x 24 hours x 2 one-way trips). The hourly vessel operating cost for a tender is $200.57 and crew's hourly rate is $38.93 (using the leisure rate for the captain of $14.74 and three crewmembers at $8.06). The cost to travel to and from the PNW for tenders and their opportunity cost of time (OCT) is as follows: 1 tenders x 1 round-trip each year x 288 hrs x $239.50 operating costs = $68,975 annually.

Other Alaskan Community Travel. The other three tender vessels are currently homeported out of Girdwood (90-hour roundtrip), Homer (62-hour roundtrip), and Anchorage (90-hour roundtrip). According to the harbormaster's waitlist, two of these vessels are the smaller 60-foot tenders. Using the appropriate vessel operating and crew costs, roundtrip travel to Girdwood is $19,739, roundtrip travel to Homer is $14,941, and roundtrip travel to Anchorage is $19,739.

The present value of the total tender travel related expenses that could be avoided over the 50-year period of analysis with the expanded harbor is $2,612,000 and the average annual value of foregone travel to distant ports is $123,400.

2. Tender Vessel Delays

Calculations for tender vessel delays are similar to the commercial fishing vessels with the following exceptions.

The investment value for a 30-meter tender was determined through an interview with a commercial fishing vessel broker based in Seattle, WA. The typical sales price for a 30-meter tender, fully loaded and ready to operate was quoted as $450,000. (See Table B-60.)

Table B-60.
Characteristics for Typical Valdez Harbor Tender Vessel

Description	30 m Tender
Investment average	$450,000 [1]
Length x Beam in feet and (meters)	100 x 28 (30 x 8.5)
Draft in feet (meters)	14 (4.3)
Fish Hold (lbs)	300,000
Main Power load rate [2]	Twin 8V71-Detroit Diesel

Source: Based on Port Lions Study and updated to reflect current market information and Valdez fleet characteristics.

Notes: 1. Typical sales price for a 30-meter vessel was quoted from a commercial fishing vessel broker and is assumed to be "ready to operate" and not needing additional repair.

2. Engine characteristics for a 30-meter tender were based on the most common engine configuration found in December 2006 sales listings of commercial fishing tenders.

Table B-61 presents common operating conditions for Valdez vessels including horsepower of motors needed for tender vessels, average fuel consumption, and typical hours of operation.

Table B-61.
Operating Data for Typical Valdez Harbor Tender Vessel

	30 m Tender
Horsepower (hp) [1]	925 [2]
Fuel Consumption-Low Rate – gph [3]	13
Fuel Consumption- High Rate - gph	43
Tender Crew [4]	4
Number of peak fishing days [5]	130
Commercial Vessel Hours (14 hour days) [6]	1,820
Man hours per tender vessel [7]	7,280

Source: Based on a listing of 871 Commercial Fishing vessels operating in Prince William Sound salmon registration area.
1. Horsepower rates were obtained from the 2006 Alaska Commercial Fisheries Entry Commission database of commercial fishing vessels. Average HP was calculated for each vessel range and are based on a listing of 871 vessels operating in Prince William Sound Salmon registration area, and rounded to the nearest tenth.

2. Twin Detroit Diesel 8V-71 was the most common configuration found in December 2006 sales listings of 20 commercial fishing tenders. Horsepower and fuel consumption rates were obtained from manufacturer's specifications and performance curves.

3. Fuel consumption rates were based on previous studies and/or obtained from manufacturer's specifications and performance curves for typical engine configurations used in marine/commercial fishing applications.

4 Information gathered from previous studies and interviews with Valdez vessel operators.

5, 6, and 7. Typical operating hours and days were obtained through interviews with vessel operators.

Table B-62. Annual Tender Vessel Operating Costs Summary

	30 m Tender
Fixed Costs	
Hull Insurance	$ 22,500
P&I Insurance	9,000
License/permit fees	4,000
Association dues	1,000
Business expenses	9,000
Food	10,400
Return on Capital	27,200
Variable Costs	
Wages	207,000
Fuel	204,600
Repair/maintenance	49,500
Annual Costs Tender	**$ 544,200**

Source: Based on previous corps studies and updated to reflect current commercial fishing practices for Valdez. Fuel prices of $3.16 per gallon were estimated using the 24-month average for the communities of Cordova, Homer, Kodiak, and Seward.

Business expenses for 30-meter tenders are estimated at $9,000. The repair and maintenance cost for a 30-meter (100 ft.) fishing tender is estimated to be $49,500. Total annual costs for tender vessels are $544,200. See Table B-62.

Table B-63.
Hourly Variable Cost Summary for Tender Vessels

	30m Tender
Fuel cost – High range	$ 112.42
Fuel Cost – Low range	65.58
Variable repair and maintenance	27.20
Tender crew wages	85.00
Hourly Variable Costs	
High	$ 253
Low	148
Mid	201

The value of the delay time is based on six tender vessels, four in the 30-meter range and two in the 16.8 to 30 meter range, and the vessel operating costs previously presented. The vessels are delayed on average 780 hours annually at a mid-range cost of $200.57 or $156,400 in total annual damages.

The present value of average delays of tender vessels under existing conditions totals $3,311,000 over the 50-year period of analysis with an average annual damage value of $156,400.

3. Opportunity Cost of Time

Captain and crewmembers incur an opportunity cost of time (OCT) associated with down time for delays. For OCT calculations, a value of next best use of time is calculated and for tender vessels, this down time is considered leisure time.

Tender vessels are in the 30-meter (100 ft.) size category with a captain and three crewmembers. Tender vessels experience delays entering and exiting the harbor during the peak season. The opportunity cost of time wage rate is $38.93 ($14.74 plus 3 times $8.06) for the vessel's crew. Tenders are all transient vessels so the delay time for them during the peak 130-day season is one hour daily. Total delay hours for tenders is 780 during the peak season making the opportunity cost of time for tender vessels a total of $30,400 (780 hours times the vessel leisure wage rate of $38.93).

The present value of the total opportunity cost of time for captain and crew of the tender vessels is $644,000 with an average annual value of $30,400.

D. Charter Fleet

1. Vessel Delays

The following table presents a summary of the variables used to calculate the annual costs associated with delays of charter vessels at the Valdez Harbor. This table shows time delayed, vessel operating costs, opportunity cost of time for crew, crew size, and peak operating days in the season based on the size of the vessel.

Table B-64. Charter Vessel Operating Cost Variables

Variables	< 6.7 m	6.7-11 m	11.3-16.8 m	16.8-30 m
Commercial Charter/Tenders				
Delay Time - Permanent	30 min.	30 min.	30 min.	30 min.
Delay Time - Transient	1 hr.	1 hr.	1 hr.	1 hr.
Hourly Variable Operating Costs	$ 111.17	$ 111.50	$ 144.94	$ 180.50
Opportunity Cost of Time	$ 22.80	$ 30.86	$ 30.86	$ 38.93
Crew Size	2	3	3	4
Peak Operating Days	60	120	130	130

For charter vessels, crew salary is included as a variable cost since wages are paid hourly and not based on vessel activity.

Table B-65. Hourly Variable Cost Summary by Vessel Size for Charter Vessels

	<6.7m net	6.7-11 m Longline/net	11.3-16.8 m Seine/Longline/pot/jig	16.8-30 m Seine/Longline/Crab
Fuel cost – High range	$ 16.31	$ 38.81	$ 77.69	$ 77.69
Fuel Cost – Low range	6.34	22.64	45.32	45.32
Variable repair and maintenance	6.43	6.79	15.22	36.81
Charter crew wages	68.40	92.59	92.59	116.78
Hourly Variable Costs				
High	$ 155	$ 135	$ 175	$ 218
Low	67	88	115	143
Mid	111	112	145	181

For charter vessels, 12.5-hour crew days are used to account for preparation and clean-up after the excursion is complete.

Wages for Valdez charter industry crew and operator are shown as a variable cost line item in vessel operating costs. Estimates for charter wages are based on survey data obtained from the Alaska Department of Labor and Workforce Development for hourly wage rates and a typical 180-day charter vessel season.

As presented in Table B-55, there are 77 permanent charter vessels and 20 charter transients that experienced time delays averaging 30 minutes and one hour per vessel, respectively. The

value of the delay time is based on the number and size of vessel and the vessel operating costs as presented in Table B-65. A total of 97 charter vessels in the existing harbor are experiencing delays because of overcrowding and congestion. The following table details these calculations:

Table B-66. Delay Damage Summary for Charter Vessels

Vessel moorage type	< 6.7 m	6.7-11 m	11.3-16.8 m	>16.8 m	30m	Total
Permanent						
Number of vessels	15	33	19	10	0	77
Multiply by hours	30 min.	30 min.	30 min.	30 min.	30 min.	
Multiply by days	60	120	130	130	130	
Delay hours annually	450	1,980	1,235	650	-	4,315
Multiply by vessel operating costs	$111.17	$111.50	$144.94	$180.50	$200.57	
Subtotal Permanent Charter Delay Damages	**$50,000**	**$220,800**	**$179,000**	**$117,300**	**$ -**	**$567,100**
Transient						
Number of vessels	0	15	4	1	0	20
Multiply by hours	1 hr.	1 hr.	1 hr.	1 hr.	1 hr.	
Multiply by days	60	120	130	130	130	
Delay hours annually	-	1,766	475	158	-	2,400
Multiply by vessel operating costs	$111.17	$111.50	$144.94	$180.50	$200.57	
Subtotal Transient Charter Delay Damages	**$ -**	**$196,900**	**$68,900**	**$28,600**	**$ -**	**$294,400**
Total Delay Damages for Charter Fleet	**$50,000**	**$417,700**	**$247,900**	**$145,900**	**$ -**	**$861,500**

The present value of average delays of charter vessels under existing conditions totals $18,238,000 over the 50-year period of analysis with an average annual damage value of $861,500.

2. Opportunity Cost of Time

Charter vessel crews are paid an hourly wage as opposed to commercial fishers who are paid a share of the catch. Wages for Valdez charter industry crews and operators are based on net income estimations and data from the Alaska Department of Labor and Workforce Development 2010 Alaska Wage Rates collected through the Occupational Employment Statistics (OES) survey. Results from this survey are used to represent the average hourly wage rate for charter operators.

The OES survey is a semiannual mail survey that measures occupational employment and wage rates for wage and salary workers in non-farm establishments. The reference periods are May and November of each year. The OES survey is organized to provide estimates based on six periods (3 years) of data. The May 2010 estimates for the OES survey are based on data collected from firms in November 2007, May and November 2008, May and November 2009 and May 2010. Aggregating prior and current data improves reliability of estimates by

utilizing a larger sample base. Reductions in sampling errors can be achieved by taking advantage of survey data from prior years.

In 2010, wage data was available for the following areas: Alaska statewide, Anchorage / Mat-Su Area, Fairbanks North Star Borough, Southeast Region, and the Balance of the State. Valdez data is included in the Balance of the State region. For this analysis, the experienced wage rate was used to calculate vessel captains and the inexperienced wage rate was used to calculate the employment cost for crew members. Average hourly wage for captains is $44.21, and the average hourly wage for crew members is $24.19. The wage rates for commercial and charter vessel captains and crews are presented in Table B-67.

Table B-67. Average Wage Rates for Charter Vessels in PWS

Hourly Wage Rates		
	Work Time	**Leisure Time**
Charter Captain	$44.21	$14.74
Charter Crew	$24.19	$ 8.06

Source: Charter wages obtained from the Alaska Department of Labor and Workforce Development Occupational Employment Statistics (OES) survey.
Note: Leisure time is calculated as one-third of the hourly wage rate.

Table B-68 shows the inputs used in the calculation of OCT for charter vessels. The number of crew required for the charter/tender fleet differs slightly from the commercial fishing vessels. Vessels < 6.7 meters have a captain and one crewmember, 6.7 – 16.8 meters have a captain and two crewmembers, and > 16.8 meters have a captain and 3 crewmembers. Delay times for commercial, charter, and tender vessels did not vary by vessel type but did vary by whether the vessel had permanent or transient moorage at Valdez Harbor. Permanent slipholders experienced 30 minute delays during the peak fishing season while the transient slipholders experienced one hour delays. The smaller vessels tend to have a shorter season length targeting individual fisheries while the larger vessels are operating the entire 130-day peak season and targeting more than one fishery.

Using the estimates of delay hours by vessel size and activity and the average hourly wage rates for charter boat operators reveals that opportunity cost of time savings for the Valdez charter fleet is more than $210,100 annually. See Table B-69.

The crew requirements for a charter vessel vary by length and number of passengers that can be accommodated. Captain and crew on the charter vessels would probably use additional time gained from lost delays in a leisure fashion, although some might use this time for onshore productive activity. This analysis assumes that foregone delays would result in additional leisure time for the charter crew. Total delay hours for the charter vessels is over 6,700 during the peak season with an opportunity cost of time for the crew of $22.80 for the smaller vessels and $38.93 for the larger vessels.

The present value of opportunity cost of time for charter vessels totals $4,448,000 over the 50-year period of analysis with an average annual damage value of $210,100.

Table B-68. Calculation Inputs for Charter Fleet

	< 6.7 m	6.7-11 m	11.3-16.8 m	16.8-30 m	30 m
Total Number of Crew (including captain)	**2**	**3**	**3**	**4**	**4**
Total Hourly Wages for Charter Vessels	$68	$93	$93	$117	$117
Leisure wage for Charter Vessels (1/3 wage rate)	$23	$31	$31	$ 39	$ 39
Typical Delay times					
Permanent Slipholders (hrs)	0.5	0.5	0.5	0.5	0.5
Transient vessels (hrs)	1.0	1.0	1.0	1.0	1.0
Delay days in season	**60**	**120**	**130**	**130**	**130**

Note: Delay days in season is an estimate of the number of days vessels of various class sizes are experiencing delays during a typical season and not the total number of days in the season as previously described in this report.

Table B-69. Opportunity Cost of Time per Season, Valdez Charter Fleet

Charter Vessels	< 6.7 m	6.7-11 m	11.3-16.8 m	16.8-30 m	30 m	Total
Permanent berths	$ 10,300	$ 61,100	$ 38,100	$ 25,300	$ -	$ 134,800
Existing Floats	-	40,700	12,000	5,100	-	57,800
Transients	-	13,800	2,600	1,100	-	17,500
Total OCT for Valdez	**$ 10,300**	**$ 115,600**	**$ 52,700**	**$ 31,500**	**$ 0**	**$ 210,100**

Note: Charter and tender vessels opportunity cost of time is based on the leisure rate of one-third the hourly wage rate.

3. Guaranteed Space Premium

Current slip renters and those on the waitlist were asked on the 2004 survey what the highest amount was that they would be willing to pay above the current slip rental fees in order to have guaranteed space in Valdez Harbor. Respondents circled the highest value they would be willing to pay ranging from a high of $3,000 to $0 per year for guaranteed space. Sorting the survey responses for charter vessels currently renting and those on the waitlist reveals that current charter slip renters would be willing to pay an average of $622 annually for guaranteed space while waitlisted vessels were willing to pay on average $270 annually for guaranteed space. In 2006, there were 77 permanent charter slip renters and 20 waitlisted charter vessels. Charter vessels, both current slip renters and waitlisted vessels, expressed a willingness to pay for guaranteed space of $53,000 annually over and above existing slip rental fees (77 current renters x $622 plus 20 waitlisted vessels x $270 = $53,300).

The present value over the period of analysis of charterboat operator's willingness to pay for guaranteed space at Valdez Harbor is $1,128,000 or $53,300 averaged annually.

E. Recreation Activity

Visitation was estimated by converting Valdez Arm boat angler days to Valdez area boating recreation days with some adjustments to account for use information obtained in the Valdez Harbor Recreational User Survey. The Valdez Arm boat angler days were obtained from Alaska Department of Fish and Game (ADF&G) sport fishing survey results. For the purposes of this study the Valdez area is considered equivalent to the vessels reporting trips to Valdez, Valdez Arm, and shoreline Valdez road system. Boating recreation days are the number of boating trip days multiplied by the number of persons per boat. An angler day approximates a boating recreation day.

Occupants of recreational boats with slips are assumed to spend the same proportion of Valdez area boating days in fishing activities as those without slips. It is further assumed that the number of boating days under with- and without-project conditions is the same. A significant number of recreation vessels use the Valdez Harbor (399 of the 500 permanently rented slips). Recreation boats make up almost 90 percent of the waitlist (216 out of 243 boat owners). In addition, there are currently 77 commercial charter operators with another 20 charter vessel owners on the waitlist.

1. Unit Day Value Estimation

To estimate the economic value of lost recreation use, the user day value method (UDV) is used as described in Corps Economic Guidance Memorandum (EGM-10-03) dated 20 November 2009. The EGM provides guidelines for assigning point values to general recreation activities and provides a table showing the range of daily values that correspond to point value scores.

The guidelines for assigning values address five criteria: recreation experience, availability of opportunity, carrying capacity, accessibility, and environmental. Workshop meetings were held in Valdez and Fairbanks in October 2004 to determine the appropriate value to assign to

the recreation criteria for this study. The workshops were attended by 13 and 28 harbor users, respectively. Attendees included 16 recreation boaters without slips, 14 current recreational slip renters, 7 charter owners or users, and 4 members of the Valdez Harbor staff. A separate point value was assigned for each of three different types of boat use (slip enters, boaters without slips, and charter users and operators) and for each of three different scenarios (without project conditions, with a project that increased the number of slips by about 230, and with a project that increased the number of slips by 330). Harbor users who felt they lacked enough information to assign point values for any criterion, user group, and/or scenario were asked to write "n/a" rather than assign a numerical value. Table B-15 summarizes the results of the panel expert's evaluation of the five recreational criteria. Recreation experience, availability of the opportunity, carrying capacity, accessibility, and environment are all estimated to improve markedly under the with-project conditions.

Angler days for Valdez Harbor users are based on ADF&G Sport Fishing Surveys for the Prince William Sound Area (North Gulf Coast – Area J). Angler days were increased by 50 percent to reflect those individuals enjoying the recreation experience but not actually fishing. Unit Day Values (UDVs) have been weighted to reflect those fishing (36 percent) and those recreating (64 percent). Charter passengers experience is slightly different in that UDVs have been calculated to reflect those fishing (13 percent) and those recreating (87 percent) based on harbormaster staff evaluation and ADF&G sport fish surveys.

Table B-70 shows the weighted unit day values used for each category of harbor user.

Table B-70. Comparison Unit Day Values –Without-Project to With-Project Conditions

Without-Project	**Slip Renter Passengers**	**Launch Craft Users**	**Charter Boat Passengers**
Recreation Experience (0 – 30)	6.0	4.3	3.6
Availability Of Opportunity (0 – 18)	13.0	10.7	12.5
Carrying Capacity (0 – 14)	4.1	3.1	2.3
Accessibility (0 – 18)	5.6	4.4	3.3
Environmental (0 – 20)	4.2	4.7	4.3
Total Point Value	**32.9**	**27.2**	**25.9**
Corresponding Unit Day Value	$21.20	$20.58	$18.37
With-Project Adding 230 Slips to Harbor	**Slip Renter Passengers**	**Launch Craft Users**	**Charter Boat Passengers**
Recreation Experience (0 – 30)	16.9	15.8	15.9
Availability Of Opportunity (0 – 18)	15.5	15.4	15.7
Carrying Capacity (0 – 14)	8.6	7.8	8.6
Accessibility (0 – 18)	11.9	11.4	11.6
Environmental (0 – 20)	12.0	11.7	10.7
Total Point Value	**64.9**	**62.2**	**62.4**
Corresponding Unit Day Value	$28.67	$27.52	$25.56
With-Project Adding 330 Slips to Harbor	**Slip Renter Passengers**	**Launch Craft Users**	**Charter Boat Passengers**
Recreation Experience (0 – 30)	22.8	20.7	22.6
Availability Of Opportunity (0 – 18)	16.3	16.3	15.8
Carrying Capacity (0 – 14)	10.5	10.1	10.9
Accessibility (0 – 18)	14.2	13.1	13.9
Environmental (0 – 20)	13.4	14.3	13.4
Total Point Value	**77.2**	**74.6**	**76.5**
Corresponding Unit Day Value	$33.34	$32.16	$31.79

Note: Unit Day Values are based on EGM 10-03 dated 20 November 2009. The corresponding Unit Day Value is weighted for charter boat passengers, 13 percent are enjoying Specialized Fishing and Hunting while 87 percent are Specialized Recreation other than Hunting and Fishing. Slip Renter Passengers and Launch Craft Users are enjoying these experiences in slightly different ratios of 36 percent and 64 percent, respectively.

Table B-71. Calculation of Unit Day Value Local Recreation Benefits for Valdez Harbor Based on Without-Project Conditions

Year	Valdez Arm Angler Use[1]	Total Boat Rec Use	Current Rec Slip Renter Use [2]	Rec Renter UDV [3]	Current Renter Benefits	Non-Slip Boater Use	Non-Slip Boater UDV [3]	Non-Slip Boater Benefits	Chrt User	Chrt User UDV [3]	Charter User Benefits	Total Annual Benefits
	(days/yr)	(days/yr)	(days/yr)	($/day)	(FY09 $)	(days/yr)	($/day)	(FY09 $)	(days/yr)	($/day)	(FY09 $)	(FY09 $)
1990	71,250	106,875										
1991	67,891	101,837										
1992	59,450	89,175										
1993	52,546	78,819										
1994	54,854	82,281										
1995	74,681	112,022										
1996	49,051	73,577										
1997	46,358	69,537										
1998	45,617	68,426										
1999	58,030	87,045										
2000	70,105	105,158										
2001	67,117	100,676										
2002	55,728	83,592										
2003	72,761	109,142										
2004	76,385	114,578										
2005	71,234	106,851										
2006	74,983	112,475										
2007	86,891	130,337										
2008	73,420	110,130										
2009	74,761	112,141										
2010	76,102	114,153										
2011	77,443	116,164	43,597	$21.20	$924,040	72,567	$20.58	$1,493,653	97,949	$18.37	$1,799,783	$4,217,475
2012	78,784	118,176	43,597	$21.20	$924,040	74,579	$20.58	$1,535,054	97,949	$18.37	$1,799,783	$4,258,877
2013	80,125	120,187	43,597	$21.20	$924,040	76,590	$20.58	$1,576,456	97,949	$18.37	$1,799,783	$4,300,278
2014	81,466	122,199	43,597	$21.20	$924,040	78,602	$20.58	$1,617,857	97,949	$18.37	$1,799,783	$4,341,680
2015	82,807	124,210	43,597	$21.20	$924,040	80,613	$20.58	$1,659,258	97,949	$18.37	$1,799,783	$4,383,081
:	:	:	:	:	:	:	:	:				:
2020	89,512	134,267	43,597	$21.20	$924,040	90,670	$20.58	$1,866,266	97,949	$18.37	$1,799,783	$4,590,088
:	:	:	:	:	:	:	:	:				:
2030	102,921	154,382	43,597	$21.20	$924,040	110,785	$20.58	$2,280,280	97,949	$18.37	$1,799,783	$5,004,103
:	:	:	:	:	:	:	:	:				:
2040	116,331	174,496	43,597	$21.20	$924,040	130,899	$20.58	$2,694,295	97,949	$18.37	$1,799,783	$5,418,117
:	:	:	:	:	:	:	:	:				:
2050	129,740	194,611	43,597	$21.20	$924,040	151,014	$20.58	$3,108,309	97,949	$18.37	$1,799,783	$5,832,132
:	:	:	:	:	:	:	:	:				:
2060	143,150	214,725	43,597	$21.20	$924,040	173,140	$20.58	$3,522,324	97,949	$18.37	$1,799,783	$6,246,146

[1] *Source:* Alaska Department of Fish and Game Sport Fishing Surveys

[2] Extrapolation of data provided by slip renters who returned the Valdez Harbor Slip Renter Survey, Nov. 2004.

[3] Unit Day Value worksheet data provided by users and operators of boats in Valdez Harbor at workshops in Valdez, Alaska October 11, 2004 and Fairbanks, Alaska October 12, 2004. UDV values based on weighted average of 36% specialized fishing and hunting and 64% specialized recreation values other than fishing and hunting from the Economics Guidance Memorandum, 10-03 dated 20 November 2009.

2. Recreation Experience

Values for the improved recreation experience are based on harbormaster staff evaluations and ADF&G sport fish surveys showing that 13 percent of charter passengers in Valdez are there for the specialized fishing and hunting opportunities while 87 percent are there for the specialized recreation – wildlife and glacier viewing. For all other harbor users in Valdez, 36 percent participate in specialized fishing and hunting while 64 percent are there for the specialized recreation.

Table B-72. Comparison of Without- and With-Project Local Recreation Values (Selected Years)

Without Project		With Project										
Year	Recreation Value	Current Renter Use	Current Renter Benefits @ $33.34	New Slip Renter Use	New Slip Renter Benefits @ $32.16	Non-Slip Boater Use	Non-Slip Boater Benefits @ $32.16	Charter Use	Charter User Benefits @ $31.79	New Charter Use	New Charter User Benefits @ $31.79	Total Annual Recreation Value
		(days/yr)	(FY10 $)	(days/yr)	(FY10 $)	(days/yr)	(FY10 $)	(days/yr)	(FY10 $)	(days/yr)	(FY10 $)	(FY10 $)
2011	$4,217,475	45,186	$1,506,339	27,318	$878,490	74,156	$2,384,688	97,949	$3,113,935	14,497	$460,885	$8,344,338
2012	4,258,877	45,186	1,506,339	27,318	878,490	74,156	2,384,688	97,949	3,113,935	14,497	460,885	8,334,338
2013	4,300,278	45,186	1,506,339	27,318	878,490	74,156	2,384,688	97,949	3,113,935	15,950	507,080	8,390,534
2014	4,341,680	45,186	1,506,339	27,318	878,490	74,156	2,384,688	97,949	3,113,935	15,950	507,080	8,390,534
2015	4,383,081	45,186	1,506,339	27,318	878,490	74,156	2,384,688	97,949	3,113,935	17,403	553,276	8,436,729
2020	4,590,088	45,186	1,506,339	27,318	878,490	74,156	2,384,688	97,949	3,113,935	20,310	645,667	8,529,120
2030	5,004,103	45,186	1,506,339	27,318	878,490	74,156	2,384,688	97,949	3,113,935	27,575	876,645	8,760,098
2040	5,418,117	45,186	1,506,339	27,318	878,490	74,156	2,384,688	97,949	3,113,935	29,028	922,841	8,806,294
2050	5,832,132	45,186	1,506,339	27,318	878,490	74,156	2,384,688	97,949	3,113,935	29,028	922,841	8,806,294
2060	6,246,146	45,186	1,506,339	27,318	878,490	74,156	2,384,688	97,949	3,113,935	29,028	922,841	8,806,294

Present Recreation Value Without-Project	**$ 103,648,000**
Present Recreation Value With-Project	**$ 182,505,000**
Difference Between With- and Without-Project Conditions	**$ 78,857,000**

Using unit day values described in Economics Guidance Memorandum, 10-03 for fiscal year 2010, angler days reported by the Alaska Department of Fish and Game Surveys, and results of the Corps November 2004 survey of existing and potential harbor users reveals that the average annual value of the existing recreation experience in Valdez is $5,138,600 and with improved conditions the average annual value of the recreation experience would be $9,048,100, a difference of $3,909,500.

The present value over the period of analysis of improved recreation experiences at Valdez Harbor is the difference between the without-project and with-project conditions, $78,857,000 or $3,909,500 averaged annually.

F. Subsistence Fleet Activity

Under current Alaska and Federal law, subsistence is defined as customary and traditional, non-commercial uses of wild resources for a variety of purposes. The uses include harvest and processing of wild resources for food, clothing, fuel, transportation, construction, arts, crafts, sharing and customary trade. As such, subsistence cuts across Native cultures and is significant to survival well beyond basic food needs.

Alaska has a subsistence law because subsistence supports a major part of the State's rural economy and culture. Alaska is unique in this regard. The intent of the Federal and State subsistence laws was to provide the opportunity for the traditional cultures and economies to co-exist with Alaska's urban centers.

Under Corps guidance, ER-1105-2-100 allows subsistence fishing to be considered commercial fishing for cost allocation purposes (Appendix E, E-14 Special Considerations a.4.d. Subsistence Fishing, page E-66). The following describes the subsistence activities in Valdez with the most recent subsistence data obtained from the Alaska Department of Fish and Game Subsistence Division.

Traditional Uses. Statewide, non-commercial fishing and hunting provided between 35-44 million pounds of food annually to rural areas during the 1980s, about 318-400 pounds per person a year or one pound per person per day for the 110,000 subsistence users.

While subsistence is important to the Native population, it represents a comparatively small portion of wild resources harvested annually in Alaska. In the salmon fishery, subsistence represents less than one percent of the total harvest. Of all fish and game harvested in the state less than four percent goes to subsistence, about one percent to sport use, and 95 percent to commercial uses.

Subsistence use of fish and wildlife continues to be an important component of the economies of Alaska. In Native communities, harvest and use of wild resources supported the subsistence-based economy that predated the introduction of cash income. In the modern era, beginning in the late 1700s, the economies of Native communities have undergone a progressive transformation, incorporating cash income into the subsistence-based system. Alaska communities settled primarily by non-Native immigrants have also depended on a mix of subsistence use of wild resources and cash income.

Cash income in most rural communities is limited and intermittent; this cash income frequently supports the purchase of fuel and equipment that are part of subsistence harvest

technology. Subsistence harvests have been found to fill essential food needs in most rural communities in the region. These harvests are also customarily shared among community residents and between members of different communities. Some subsistence products are traded and bartered within the region. Subsistence harvests are not geared toward market sale or accumulated profit. A mixed subsistence-market economy in which subsistence harvests and cash income is complementary characterizes the economies of most of the region's rural communities.

Estimating Subsistence Values. There are three major variables involved in estimating the subsistence benefit: (1) useable weight conversion, (2) projected increase in subsistence harvest, and (3) the value per pound of the harvest. In all cases, harvest is expressed in pounds of usable weight. Skins and hides are not included in usable weight even though these provide needed material for clothing, tools, and other uses. Conversion weights were computed by taking live weight samples, and then a usable weight factor. Selected usable weights are well documented by field studies referenced in ADF&G publications, and are listed on the following table.

Table B-73. Usable Weight of Selected Subsistence Harvest

Species	Useable Weight (lb)
King Salmon	19.8
Other Salmon Species	2.5 - 6.7
Cod	1.4 - 4
Herring	6 - 7 per gallon
Smelt	3.5 per gallon
Chitons	4 per gallon
Clams	3 per gallon
Sea urchins	0.5 per gallon
Crab	0.7 - 1.6
Sea Lion, Seal, Porpoise	37 - 100
Bear, Deer, Mountain Goat	58 - 70
Ducks	0.4 - 1
Canada Geese	3.6
Grouse, Ptarmigan	0.7
Cormorant	2.5
Berries	4 per gallon

Source: Alaska Department of Fish and Game,
Division of Subsistence, Juneau, Alaska

Economic benefits that are anticipated as a result of the navigation improvements for Valdez will come from increased subsistence production by residents of the community. Because subsistence production is consumed in the household, there is no market value associated with this subsistence production. In this aspect of their economy, Valdez is similar to many rural communities in Alaska.

There are four communities that make up the bulk of the population in Prince William Sound: Valdez, Cordova, Chenega, and Tatitlek. Chenega and Tatitlek have small populations, lack connecting roads, and have little in the way of economic activity. For this reason, we see active subsistence harvesting in these two communities in excess of 300 pounds per capita. See Table B-74. Valdez and Cordova, however, have much more vibrant communities, similarly sized populations, active fish processing plants, and airports and marine highway systems that support the population's need for travel. Valdez also has a road connection to Interior and Southcentral Alaska with the community being 305 miles east of Anchorage and 365 miles south of Fairbanks. It is not uncommon for Valdez residents to travel to Anchorage or Fairbanks to stock up on non-perishable supplies. However, this does not explain why Cordova resident's participation in subsistence activity is nearly twice that of Valdez residents.

Table B-74. Subsistence Harvest Comparison to Other Prince William Sound Communities

Community	Average pounds per household	2006 Population	Average per capita pounds	Comparison to Valdez
Valdez	278	3,675	90	100%
Cordova	515	2,237	176	195%
Chenega	1,125	85	340	377%
Tatitlek	1,198	117	334	371%

Note: Averages represent several study years. Cordova (1985, 1988, 1991, 1992, 1993, 1997, 2003), Chenega (1984, 1985, 1989, 1990, 1991, 1992, 1993, 1997, 2003), Tatitlek (1987, 1988, 1989, 1990, 1991, 1993, 1997, 2003), and Valdez study years (1991, 1992, 1993).

Cordova residents do not have to compete with recreational vessels using the harbor ramp and entrance to enter Prince William Sound. Whereas, Valdez residents must time their subsistence activity around congestion at the harbor. Subsistence fish harvests specify daily limits so Valdez subsistence harvesters will forego this activity if it means long waits to get out to the fishing grounds. Given that there is excess supply of fish in Prince William Sound and that similarly sized communities in the Sound are harvesting almost twice as much, we can expect that Valdez resident's subsistence activity will increase as a result of improved conditions at the harbor.

The subsistence benefit depends on what changes in harvest practices and success rates villagers will realize as a result of improved conditions at the boat harbor. Another point of view treats the harvest as a multi-purpose resource. The rationale is that the harvest represents goods such as clothing, fuel, transportation, construction, arts, crafts, and trade in addition to the household needs for the kitchen table. Using that viewpoint, harvest values shown in State studies are between $3 and $5 per pound. There is little research to support the range. However, one attempt calculated the weights and costs of outdoor type equipment listed in a mail order catalog and the cost per pound was well beyond the upper end of the range.

To evaluate the potential benefits resulting from the project in a typical benefit-cost format, an economic value associated with the increased subsistence production in the with-project condition needs to be calculated. Economic methods provide a number of alternate ways to approach the problem of valuing non-market goods, including alternative cost (product

substitutes), travel cost models, and contingent valuation methods (i.e. willingness to pay, willingness to accept). All of these methods are generally accepted by the economic community of practice.

An alternative cost methodology is used for its relative straightforward application, while recognizing that the method overlooks cultural values inherent in production and consumption of subsistence foods (Peterson, et. al., 1992). This limitation provides an inherent bias in underestimating the value of subsistence production. This bias is noted, but for this report, it is not addressed in the valuation methodology.

In addition to cultural values, the issue of substitutability is further muddied by real nutritional benefits that are inherent in Native subsistence foods as opposed to purchased foods. In a 1992 article, author Elizabeth Normann described Alaska Native subsistence meats as lower in fat and saturated fat than meats purchased from stores (E. D. Normann, 1992). She also noted that Alaska Natives consume six times more fish than the average household in the United States, providing overall health benefits.

The Braund report (Stephen Braund and Associates, 1977) on subsistence activities provides a general overview of the role of subsistence. It also estimates per capita consumption of subsistence foods. Taking an equivalent replacement cost, based on previous fieldwork in nearby communities, Braund translates the total subsistence production into a replacement value on an annual basis. In his report, he places a value on the current replacement cost per pound for equivalent food in the community. This methodology is used as the basis for calculations of project benefits.

Without-Project Subsistence Values. Subsistence values are based on the replacement cost analysis of information collected at two full-line grocery stores in Valdez: Three Bears and Eagle/Safeway Quality Center. Individual meat prices (retail) in the stores were obtained from each store manager as of November 30, 2006. For the purposes of confidentiality, the prices of both food stores are presented as averages and shown in Table B-75.

The Community Subsistence Information System (CSIS) developed by Alaska Department of Fish and Game is a repository of Alaska community harvest information. Table B-76 shows the subsistence harvest for Valdez residents for the years 1991 through 1993 which ADF&G has indicated are representative years for the community.14 Subsequent subsistence harvest information for Valdez is not comprehensive. However, marine mammal consumption was gathered most recently in 2004 and the table has been updated to reflect this recent information. Average subsistence consumption per capita for Valdez residents is 90.5 pounds annually.

[14] The Alaska Department of Fish and Game Subsistence harvest data was collected as part of an investigation of the Sociocultural Consequences of Outer Continental Shelf Development in Alaska, OCS Study MMS 95-012. The report provides selected findings from a 3-year study to investigate the long-term social and cultural consequences of the development of the resources of Alaska's Outer Continental Shelf (OCS), especially as these affect the subsistence uses of fish and wildlife. Investigation of the consequences of the *Exxon Valdez* oil spill of March 1989 was a major focus of the research.

Table B-75. Average Prices of Meats and Related Products in Valdez

Item	Average per Pound ($)
BEEF	
beef liver	$ 1.69
beef patties [1]	2.41
beef tongue	3.76
beef #1, ground	3.14
beef, corn	3.39
chuck roast	4.14
short ribs	2.89
steak, N.Y. strip	9.99
steak, rib	10.24
steak, sirloin tip	4.84
steak, T-bone	9.44
steak, Top round	4.73
stew meat	4.19
top sirloin	6.74
PORK	
pork chops, center cut	$ 3.89
pork chops, center cut, boneless	4.74
pork spareribs	4.59
pork steak	2.39
CHICKEN	
chicken breast, boneless	$ 4.34
chicken patties [1]	3.79
chicken thighs	2.14
CANNED[2]	
canned chicken [1]	$ 5.35
canned sardines	3.44
canned sausage [1]	2.22
canned SPAM	3.36
canned tuna	2.32
MISCELLANEOUS	
bacon, regular[1]	$ 4.38
bacon, Canadian	7.89
beef jerky	15.88
hot dogs	1.92
Average Price Per Pound	**$ 4.81**

[1]Actual price; item available only in one store.
[2]Pricing of canned item converted from ounces to pounds.

Table B-76. Summary of Valdez Subsistence for 1991, 1992, and 1993 (Average per capita harvest in pounds)

Harvest	1991	1992	1993	Average
Salmon	35.1	44.5	22.6	34.1
Other Fish	21.9	32.3	24.5	26.2
Marine Invertebrates	5.4	3.2	4.9	4.5
Land Mammals	20.9	19.1	20.7	20.2
Marine Mammals*	0.6	0.8	2.2	1.2
Birds and Eggs	1.2	1.4	1.1	1.2
Wild Plants	2.8	3.0	3.4	3.1
All Resources	**87.9**	**103.5**	**79.4**	**90.5**

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Surveys conducted in 1992-1994.
* Marine mammals consumption for 1992 has been updated using 2004 ADF&G Subsistence Division data, the most recent year available.

1. Value of Subsistence Activity

This report analyzes non-market value of the additional subsistence production that would be generated in the with-project condition. Insufficient information from community residents was available to determine the degree to which subsistence production could be expected to increase in the with-project situation. However, similarly situated Cordova residents are participating in subsistence harvests at nearly twice the rate. A recent subsistence harvest report (2004) produced by the Alaska Department of Fish and Game reveals that there are at least 60 households in Valdez participating in marine mammal harvests. The 1991 – 93 surveys found that 90 percent of all Valdez households (1,645 total households according to 2000 Census) participate in subsistence activity. Other harvest activity (i.e. fish, berries, plants, and land mammals) also occur. These activities often require access to the water as households travel to nearby areas to hunt, fish, and pick berries that are not accessible by road.

Problems associated with the existing small boat harbor restrict access to the water during peak periods. July, August, and September are perhaps the most important times for subsistence production. During those months, congestion and overcrowding at the small boat harbor (existing conditions) may occur for the 130-day peak season. If we use Cordova as a proxy for the potential subsistence harvest, Valdez residents could harvest up to 95 percent more product than is currently occurring. However, given that Valdez is on the road system (albeit 300 miles from the nearest town) and the community is about a third larger than Cordova, the need for subsistence harvesting may not be as great.

Much of Prince William Sound is still recovering from the effects of the Exxon-Valdez oil spill in 1989 and many traditional harvesting grounds are no longer suitable. In addition, increased security around the Trans-Alaska Pipeline Terminal in the wake of 9-11 may have further limited traditional subsistence activity. To accommodate uncertainty, and to ensure a conservative approach, a 15 percent subsistence production increase is assumed for the with-project condition. In a community such as Valdez with finite employment and income

opportunities, the cost of the additional labor used in subsistence production can be assumed to be very low.

The Alaska Department of Fish and Game subsistence surveys reveal that 385,877 pounds were harvested, 90.5 pounds per capita. See Table B-76. We used this per capita harvest and adjusted for the present population. A 15-percent increase is 13.6 pounds per capita (90.5 to 104.1 pounds with project) in subsistence harvest valued at $4.81 per pound. Valdez subsistence vessels are currently harvesting about half of the Cordova residents harvest and about one-quarter of the effort of Tatitlek and Chenega, a 15 percent increase provides a conservative estimate for growth in harvest. The opportunity to utilize a less congested harbor will allow subsistence users more chances to conduct food collection likely increasing the subsistence harvest by an even greater amount.

The Alaska Department of Labor and Workforce Development recently released population estimates showing an average one percent increase in population per year for the foreseeable future. Assuming that the population will continue subsistence harvests at a similar rate of 104.1 pounds per capita annually represents a total economic benefit of almost $2 million annually.

The difference in subsistence harvest under the without-project conditions relative to the with-project conditions was estimated to have a present value of $5,819,000 with an average annual equivalent value of $288,500.

G. Summary of Without-Project Conditions

Without the Valdez Harbor project, potential losses to the Nation include damages to the:

- harbor from personnel time and float and dock repairs;
- commercial fishing fleet from boat repairs, delays, lack of harbor of refuge, travel related expenses, and opportunity cost of time for commercial fishers;
- tender vessels travel related costs, vessel delays, and opportunity cost of time for captain and crew;
- charter boat fleet from delays and opportunity cost of time;
- recreation fleet from diminished recreation experience; and
- subsistence fleet from lost harvest opportunity.

Table B-77 summarizes these damages showing the present value of the stream of damages given a 50-year project horizon and using the federal discount rate for FY2010 of 4 3/8 percent. Total present value from this project is more than $157 million with an average annual value of $7.4 million.

Table B-77. Summary of Valdez Harbor Without-Project Conditions

Damages to:	Present Value (FY10)	Average Annual Value ($)
Harbor Operations		
Harbor personnel time	$ 113,000	$ 5,300
Float and dock repairs	5,664,000	32,700
Commercial Fleet		
Vessel Damage	3,993,000	188,600
Vessel delays	10,407,000	491,600
Harbor of refuge	114,000	5,400
Opportunity Cost of Time	21,848,000	1,032,000
Tender Fleet		
Travel related expenses	2,612,000	123,400
Vessel delays	3,311,000	156,400
Opportunity Cost of Time	644,000	30,400
Charter Fleet		
Vessel Delays	18,238,000	861,500
Opportunity Cost of Time	4,448,000	210,100
Guaranteed space (CV)	1,128,000	53,300
Recreational Fleet		
Recreation experience	78,857,000	3,909,500
Subsistence Fleet		
Harvest value	5,819,000	288,500
Total Damages	**$ 157,196,000**	**$ 7,388,700**

VI. ALTERNATIVES CONSIDERED

One of the first considerations given to accommodate increased moorage demand is to redesign the existing small boat harbor. The City of Valdez contracted a study of options to redesign the existing harbor to accommodate more vessels. The results of that study indicated that redesign of the harbor would not result in additional moorage capacity. Furthermore, redesigning the harbor to accommodate vessels in the existing fleet would reduce the overall capacity of the harbor. While this action would reduce delay costs for some of the remaining vessels, displaced vessels would completely lose the use of the harbor. Although a detailed analysis of the NED costs that would be imposed on the displaced vessels was not performed, it is the District's judgment that the costs would far exceed the benefits that would accrue to those remaining vessels. For this reason, reconfiguration of the existing harbor to eliminate delays was not considered to be economically viable or an acceptable alternative.

The Valdez harbormaster's office reports that approximately half of the permanent slipholders are currently using stalls that are too small for their vessels. This has come about in part as a result of waitlisted vessels putting their names on more than one waitlist and taking the first available slot. With no Federal involvement, the no-action alternative would leave the harbor in its present condition. The identified purpose and need would not be met and Valdez would continue to be used beyond its design capacity. Damage to vessels and docking facilities from rafting and hot-berthing due to overcrowded conditions would continue; economic benefits to the fleet from improved and expanded harbor facilities would not be achieved.

A. Nonstructural Alternatives

Currently, the Valdez fleet has two viable options:

a. remove the vessel from the water, or
b. seek shelter in another port

When a large composite or wood vessel is removed from the water it is subject to dry-docking damages and could cause owners to incur additional expenses. Boats moved to the dry-dock area are not available for winter use in the fisheries. Therefore, this option is not advantageous. Likewise, leaving the Valdez area is not a desirable alternative as it exposes vessels to additional travel costs and possible inclement conditions in the Sound.

B. Alternatives Not Considered for Further Analysis

Several alternatives and sites were initially considered for navigational improvements at Valdez and then rejected. Reconnaissance-level investigations for Valdez indicated that boat harbors could be built at Mineral Creek, a southern harbor expansion, and possibly a southeastern harbor expansion. A small boat harbor plan was formulated for Mineral Creek and an engineering plan was prepared for the southeastern harbor. A benefit analysis was not done for the southeastern plan as the benefits that would accrue are similar to the benefits that would accrue to Mineral Creek. A southern harbor expansion was precluded from development at that time because of the lack of uplands for marina support. A plan was also

formulated for a boat launch facility at Old Valdez. Each of these alternatives is discussed below.

1. Mineral Creek

A 200-boat moorage basin with breakwaters and shoreside facilities could be built entirely on tidelands adjacent to Mineral Creek to the northwest. Such a scheme would satisfy the current demand for moorage at Valdez and would have the potential for future expansion of the moorage system. The Mineral Creek site would require a 1.7 kilometer (a little over one mile) access road to connect existing city streets. Utility access must also be extended along the same corridor. The Mineral Creek site is about 3 kilometers (almost 2 miles) from the existing harbor, the central business district and the tourist center, making it less effective for centralized harbor utilization. This plan was rejected because of the additional costs for a road and utilities to the site and the operational difficulties of locating a distance from the existing harbor.

2. Old Valdez

A protected boat launch could be built at the Old Valdez townsite requiring one offshore rubblemound breakwater. This option would have only minimum shoreside development because of seismic limitations. Furthermore, this facility would be away from the main boating and tourist center of Valdez. The benefits for this alternative would accrue entirely to recreational crafts. Federal policy states that recreational benefits may not exceed 50 percent of the benefits needed to justify a project. Therefore, the plan was not pursued further.

3. Southeastern Expansion of Existing Harbor

A 150-boat moorage basin with concrete floating breakwaters, entrance and access channels, a four-lane launch ramp, and parking facilities could be built offshore and to the east of the existing small boat harbor. Such a scheme would satisfy the current demand for moorage at Valdez, reduce overcrowding, and relieve congestion in the existing harbor. Future moorage expansion would be possible. The site is close to support facilities of the existing harbor, the tourist center, and the main business district of Valdez. However, this site would require converting the use of the existing uplands to marina support services. These uplands are currently being used for other purposes and the change of use to marina support is not likely in the foreseeable future. An adjacent southern expansion (to the east of the existing oil recovery support dock) may be possible if navigation interference with the oil recovery support facility can be minimized and road access would not interfere with existing upland development. This concept is more expensive than Mineral Creek but with similar benefits. A boat harbor at this site was not pursued further due to the lack of upland facility space and an alternative site offered similar benefits at a lesser cost.

C. Current Alternatives Considered

With the elimination from consideration of the southeastern expansion of the existing harbor, Old Valdez, and Mineral Creek, other options were explored. The options were narrowed down to two sites: east and west of the SERVS Docks. There are four East-Site rubblemound

alternatives and two West-Site wave barrier alternatives along with a West-Site rubblemound alternative. Alternatives were evaluated using established design guidance given in the appropriate Army Corps of Engineers Engineering Manuals (EM), the Shore Protection Manual (USACE, 1984), and the Planning Guidance Notebook, ER 1105-2-100 (USACE, 22 April 2000).

Fleet size for each of the alternatives is based on the existing permanently moored vessels, the Valdez waitlist, and the transient vessels using the harbor in 2006. The harbormaster will assign new harbor stalls in the following order: 1) those permanently moored vessels who would like to relocate to the new harbor; 2) those vessel owners who have been on the waitlist the longest; and finally, 3) transient vessels not on the waitlist desiring permanent moorage.

Knowing this procedure for allocating moorage allowed the study team to review the existing conditions at Valdez and arrive at a mix of commercial vessels, charter boats, and recreation vessels that would likely be offered space at the new harbor. According to the harbormaster's office, it is assumed that existing slipholders are unlikely to move to the new harbor since they would be located further from upland facilities. An examination of the waitlist vessels for Valdez reveals that there is what appears to be a natural break at 125 vessels that have been on the waitlist the longest. This includes a number of commercial vessels that have been on the waitlist since the summer of 2005. As such, this was the initial configuration considered. The existing harbor can accommodate up to 200 transient vessels on any given day using transient moorage, rafting, and hot berthing techniques and is often filled to capacity so this was an obvious second choice for a new harbor configuration. The third and fourth fleet size configurations are based on 243 vessels on the waitlist as of October 2006 and 320 vessels that comprise half of all the transient vessels from 2006. Our assumption being that there are many discouraged waitlist customers who would seek permanent moorage at Valdez if the waitlist were not already so long. Additionally, the waitlist continues to grow and as of January 2009 had reached 250 vessels. The 320-fleet size is also the physical limit for both the East-Site and West-Site alternatives. Harbor alternatives greater than the 320-fleet size would encroach on environmentally sensitive areas or into very deep water resulting in a much costlier project.

1. West-Site Alternatives

The shape of the West-Site harbor alternatives was primarily dictated by geography. The breakwaters are relatively close to the existing fill area, because the shelf is narrow before dropping off into deep water to the south. Thus, the basin area has to be excavated out of the existing filled tidelands. The larger portion of the basin would need to be excavated out of the present camper park. This is the only area that is reasonably available because of extensive development and private property in the area. The smaller portion of the basin remains seaward of the existing fill and extends eastward toward the SERVS Dock. There is no room for future expansion at this location. Two outfalls from the seafood processing plants will need to be relocated. The basin will be dredged in a steeped pattern shoreward to minimize

dredging. Dredge material is unknown, but expected to consist of previous fill that came from the expansion of the existing harbor and the underlying old ground.

Dredge material disposal will be a major concern. There is no adjacent area to fill, so the disposal could be in deep water or some upland location. Part of the existing filled area will need to be acquired by the City of Valdez for the dredge staging area. It will likely be expensive to provide the area necessary to support the new harbor. Access to the new harbor would be by the existing South Harbor Drive. Concern has already been expressed that existing activities combined with the traffic generated by the new harbor would cause South Harbor Drive to become very congested and a safety concern.

243-Slip West-Site Wave Barrier Alternative. The 243-slip West-Site wave barrier alternative would accommodate all of the vessels from the October 2006 harbormaster's waitlist. This site includes breakwaters, wave barrier, dredging, inner harbor floats, bank stabilization, and real estate acquisition for a total project cost of $37.1 million. Operations and maintenance for this alternative is based on two percent of the mobilization, demobilization, and wave barrier cost annually to account for annual inspections, cathodic protection, and replacement of worn panels. Operations and maintenance costs for this alternative are estimated at more than $2 million annually. In addition, complete harbor float replacement is expected to occur after 30 years and the wave barrier is replaced after 25 years.

320-Slip West-Site Wave Barrier Alternative. The 320-slip West-Site wave barrier alternative will accommodate half of the transient vessels using the Valdez Harbor in 2006. This site includes breakwaters, wave barrier, dredging, inner harbor floats, bank stabilization, and real estate acquisition for a total project cost of almost $46 million. Operations and maintenance for this alternative is based on two percent of the mobilization, demobilization, and wave barrier cost annually to account for annual inspections, cathodic protection, and replacement of worn panels. Operations and maintenance cost for this alternative are estimated at more than $2 million annually. In addition, complete harbor float replacement is expected to occur after 30 years and the wave barrier is replaced after 25 years.

Cost summaries are shown in Table B-78.

Table B-78. West-Site Alternatives Summary

Cost Category	West Site Alternatives	
	243-Slip Wave Barrier	320-Slip Wave Barrier
Mob and demobilization	$ 1,880,000	$ 1,880,000
Breakwaters	2,814,000	4,812,000
Wave barrier	14,207,000	18,585,000
Navigation Aids	18,000	18,000
Dredging	1,410,000	1,441,000
Log transfer beneficial use	533,000	662,000
Hydro survey	38,000	73,000
Inner harbor floats	5,403,000	6,870,000
Bank stabilization	1,274,000	252,000
Total Project First Costs	**$ 27,577,000**	**$ 34,593,000**
Real estate	691,000	691,000
Interest During Construction [1]	1,477,000	1,853,000
Preliminary Engineering and Design	855,000	855,000
Supervision and Administration	552,000	692,000
Contingency (20%)	5,935,000	7,366,000
Total Project Costs	**$ 37,087,000**	**$ 46,050,000**

Source: Tri-Service Automated Cost Engineering System (TRACES) provided by Corps of Engineers Cost Estimating at November 2006 price levels updated to August 2010 using the Civil Works Construction Index System for navigation ports and harbors. The TRACES estimates were based on a 227-fleet size configuration for the rubblemound structures and 228- and 323-fleet sizes for the wave barrier structures on the West-Site. The cost estimates presented area are extrapolations from those original estimates for cost categories that are expected to change for the different size structures (i.e. breakwaters, wave barriers, dredging, inner harbor floats, and bank stabilization.). Other cost estimates are expected to remain constant over each of the alternatives.

1. Interest During Construction is based on an 870 days.

2. East-Site Alternatives

Significantly more area is available for the East-Site locations between Hotel Hill and the point where the shelf drops off into deep water. GCI currently has a fiber optic communications cable in the area of the harbor basin. This cable serves most of interior Alaska. Costs to move the cable are included in each of the alternatives where the cable is affected. There would be room for future expansion in either location. Rubblemound breakwaters are specified because of wave conditions. Water depths are a little greater to the east minimizing dredging in addition to stepping the basin in a westerly direction generally upslope. Dredge material is expected to be mostly dredged sands, gravel, and boulders. However, some rock excavation requiring blasting is anticipated. About 10 percent of the excavation is considered rock. Disposal will be in tidelands adjacent to the harbor to provide access and a staging area and additional disposal at the Two Moon Bay log transfer location. Beaches will be created to maintain a more natural appearance and condition. Access could be at the west end of Hotel Hill, around the eastern end, or both. A 5-year monitoring plan for the Two Moon Bay disposal site is included in the operations and maintenance for the East Site rubblemound alternatives.

125-Slip East-Site Rubblemound Alternative. The 125-slip East-Site rubblemound alternative accommodates a natural break in the 2006 harbormaster's waitlist where several commercial vessels have been waitlisted for a number of years. This alternative includes relocation of the GCI cable, road construction, breakwaters, dredging, inner harbor floats, bank stabilization, and real estate acquisition. Total cost for this alternative is estimated at $20.9 million. Operations and maintenance for this alternative is based on replacement of two percent of the armor rock every five years at an estimated cost of $31,000. In addition, complete harbor float replacement is expected to occur after 30 years.

200-Slip East-Site Rubblemound Alternative. The 200-slip East-Site rubblemound alternative accommodates the maximum number of transient vessels that can currently access the Valdez Harbor on peak days. This alternative includes relocation of the GCI cable, road construction, breakwaters, dredging, inner harbor floats, bank stabilization, and real estate acquisition. Total cost for this alternative is estimated at approximately $28.1 million. Operations and maintenance for this alternative is based on replacement of two percent of the armor rock every five years at an estimated cost of $50,000. In addition, complete harbor float replacement is expected to occur after 30 years.

243-Slip East-Site Rubblemound Alternative. The 243-slip East-Site rubblemound alternative accommodates all of the vessels on the harbormaster's October 2006 waitlist. This alternative includes relocation of the GCI cable, breakwaters, dredging, inner harbor floats, bank stabilization, and real estate acquisition. Total cost for this alternative is estimated at $31.4 million. Operations and maintenance for this alternative is based on replacement of two percent of the armor rock every five years at an estimated cost of $61,000. In addition, complete harbor float replacement is expected to occur after 30 years.

320-Slip East-Site Rubblemound Alternative. The 320-slip East-Site rubblemound alternative accommodates half of all the transient vessels using the Valdez Harbor in 2006. This alternative includes relocation of the GCI cable, breakwaters, dredging, inner harbor floats, bank stabilization, and real estate acquisition. Total cost for this alternative is estimated at $35.1 million. Operations and maintenance for this alternative is based on replacement of two percent of the armor rock every five years at an estimated cost of $65,000. In addition, complete harbor float replacement is expected to occur after 30 years.

See Table B-79 for a cost summary of East-Site alternatives.

Table B-79. East-Site Alternatives Summary

Cost Category	East Site – Rubblemound Alternatives			
	125-Slip	200-Slip	243-Slip	320-Slip
Cable relocation	$ 506,000	$ 502,000	$ 502,000	$ 496,000
Road construction	129,000	128,000		
Mob and demobilization	426,000	387,000	394,000	331,000
Breakwaters	6,353,000	8,644,000	9,706,000	10,861,000
Navigation Aids	18,000	18,000	18,000	18,000
Dredging	1,071,000	1,571,000	1,815,000	2,107,000
Uplands fill	140,000	128,000	107,000	
Log transfer beneficial use	393,000	451,000	469,000	468,000
Hydro survey	37,000	36,000	36,000	36,000
Inner harbor floats	5,031,000	6,226,000	6,712,000	7,094,000
Bank stabilization	657,000	2,222,000	3,094,000	4,354,000
Total Project First Costs	**$ 14,761,000**	**$ 20,313,000**	**$ 22,853,000**	**$ 25,765,000**
Real estate	295,000	295,000	295,000	295,000
Interest During Construction [1]	791,000	1,088,000	1,224,000	1,380,000
Preliminary Engineering and Design	1,283,000	1,283,000	1,283,000	1,283,000
Supervision and Administration	443,000	609,000	686,000	773,000
Contingency (20%)	3,356,000	4,500,000	5,023,000	5623,000
Total Project Costs	**$ 20,929,000**	**$ 28,088,000**	**$ 31,364,000**	**$ 35,119,000**

Source: Tri-Service Automated Cost Engineering System (TRACES) provided by Corps of Engineers Cost Estimating at November 2006 price levels updated to August 2010 using the Civil Works Construction Cost Index System for navigation ports and harbors. The TRACES estimates were based on 178- and 323-fleet size configurations for rubblemound structures on the East-Site. The cost estimates presented area are extrapolations from those original estimates for cost categories that are expected to change for the different size structures (i.e. breakwaters, dredging, inner harbor floats, and bank stabilization.). Other cost estimates are expected to remain constant over each of the alternatives.

1. Interest During Construction is based on 870 days.

During the peak fishing season of mid-May through September, the Valdez Harbor is seriously congested. Commercial fishing vessels, recreation and charter boats, and tenders are all vying for use of the same facility, each with different needs. In order to evaluate various alternatives for an improved harbor at Valdez, optimization of the need for and benefit from the improved harbor was considered. In examining different harbor designs, the study team first evaluated whose needs would be met using real world conditions to arrive at the various size fleets.

According to the harbormaster's office the existing harbor has about 50 percent of its permanently moored vessels in slips that are too small for the vessel. The vessels in the existing harbor would be offered slip space in the new harbor before any waitlisted vessels are

offered space. The harbormaster's office has indicated however, that existing slip renters would be unlikely to move since the existing harbor's proximity to upland facilities makes the expanded harbor somewhat less attractive.

The with-project condition for the expanded Valdez Harbor realizes benefits for several broad categories: harbor operations, commercial fleet, tenders, charter fleet, subsistence, and recreational vessels. Project benefits are based on a 50-year period of analysis and the FY2010 Federal Discount rate of 4 3/8 percent. Table B-80 shows the incremental benefits realized under each of the fleet sizes just described. Benefit calculations that follow have been rounded off to the nearest 100 dollars. For the 125-slip configuration, less than 50 percent of the total potential benefits are captured. For the 320-slip configuration, about 70 percent of the total potential benefits are realized.

Table B-80. Benefits Associated with Optimized Fleet

Types of benefits realized:	Average Annual Benefits	Residual Damages	Total Damages
Option 1. Add 125 slips to accommodate natural break in the harbor waitlist.			
Harbor operations including dock and float avoided repairs and harbor personnel time	$ 14,900	$ 23,100	$ 38,000
Vessel damages	73,700	114,900	188,600
Vessel delays - commercial fishing, charter, and tender boats	811,000	698,500	1,509,500
Harbor of refuge	2,200	3,200	5,400
Avoided tender travel-related expenses	27,200	96,200	123,400
Opportunity cost of time - commercial fishing, charter and tender boats	542,800	729,700	1,272,500
Guaranteed space - charter vessels	49,000	4,300	53,300
Recreation experience	1,633,500	2,276,000	3,909,500
Subsistence increased activity	112,700	175,800	288,500
Total Benefits	**$ 3,267,000**	**$ 4,121,700**	**$ 7,388,700**
Option 2. Option 1 plus 75 slips to accommodate maximum transient traffic of 200 vessels on peak days.			
Harbor operations including dock and float avoided repairs and harbor personnel time	$ 23,700	$ 14,300	$ 38,000
Vessel damages	117,900	70,700	188,600
Vessel delays - commercial fishing, charter, and tender boats	887,000	622,500	1,509,500
Harbor of refuge	3,500	1,900	5,400
Avoided tender travel-related expenses	96,200	27,200	123,400
Opportunity cost of time - commercial fishing, charter and tender boats	643,400	629,100	1,272,500
Guaranteed space - charter vessels	50,300	3,000	53,300
Recreation experience	2,002,300	1,907,200	3,909,500
Subsistence increased activity	180,300	108,200	288,500
Total Benefits - Options 1 plus 2	**$ 4,004,600**	**$ 3,384,100**	**$ 7,388,700**

Types of benefits realized:	Average Annual Benefits	Residual Damages	Total Damages
Option 3. Option 2 plus 43 slips to accommodate all waitlisted vessels - 243 vessels total.			
Harbor operations including dock and float avoided repairs and harbor personnel time	$ 28,900	$ 9,100	$ 38,000
Vessel damages	143,200	45,400	188,600
Vessel delays - commercial fishing, charter, and tender boats	978,400	531,100	1,509,500
Harbor of refuge	4,300	1,100	5,400
Avoided tender travel-related expenses	123,400	-	123,400
Opportunity cost of time - commercial fishing, charter and tender boats	713,600	558,900	1,272,500
Guaranteed space - charter vessels	50,800	2,500	53,300
Recreation experience	2,214,800	1,694,700	3,909,500
Subsistence increased activity	219,100	69,400	288,500
Total Benefits - Options 1 plus 2 plus 3	**$ 4,476,500**	**$ 2,912,200**	**$ 7,388,700**
Option 4. Option 3 plus 77 slips to accommodate half of all transient vessels - total of 320 additional slips.			
Harbor operations including dock and float avoided repairs and harbor personnel time	$ 38,000	$ -	$ 38,000
Vessel damages	188,600	-	188,600
Vessel delays - commercial fishing, charter, and tender boats	1,072,800	436,700	1,509,500
Harbor of refuge	5,400	-	5,400
Avoided tender travel-related expenses	123,400	-	123,400
Opportunity cost of time - commercial fishing, charter and tender boats	821,900	450,600	1,272,500
Guaranteed space - charter vessels	51,400	1,900	53,300
Recreation experience	2,590,000	1,319,500	3,909,500
Subsistence increased activity	288,500	-	288,500
Total Benefits - Options 1 through 4	**$ 5,180,000**	**$ 2,208,700**	**$ 7,388,700**

D. West Site Alternatives

West site alternatives require excavation of the existing filled tidelands. Part of the existing filled area will need to be acquired by the City of Valdez for the dredge staging area and it will likely be expensive to provide the area necessary to support the new harbor. Congestion and safety are a concern for the west site alternatives as this is already a busy area. For each of the alternatives, life cycle project costs, damages reduced, and residual damages were calculated to characterize the with-project economic conditions. All costs are presented in November 2006 price levels updated to August 2010 using the Civil Works Construction Cost Index System for navigation ports and harbors. The cost estimates for the alternatives include construction costs, and operation and maintenance for a 50-year period of analysis. Annual costs are based upon the FY10 Federal Discount rate of 4-3/8 percent. Detailed cost estimates are provided in the Cost Appendix.

1. 243-Slip West Site Wave Barrier

New vessels accommodated under the 243-slip alternative are based on the existing waitlisted vessels that could use the harbor as follows:

Table B-81. 243-Slip Wave Barrier Alternative Vessels Accommodated

Vessel Type	< 6.7 m	6.7-11 m	11.3-16.8 m	>16.8 m	Total
Recreation	83	99	13	2	197
Fishers	0	3	24	4	32
Charters	0	11	3	0	14
Total	**83**	**113**	**41**	**7**	**243**

The 243-slip west site wave barrier alternative cost summary includes mobilization and demobilization, new wave barrier, new breakwaters, dredging, surveys, inner harbor floats, and real estate costs to complete the project. Total first costs are estimated at $27.6 million. Total project costs including contingency, preliminary engineering and design, interest during construction, and contract administration are estimated at $37.1 million. Annual operations and maintenance for the wave barrier project are two percent of the structure replaced annually, complete wave barrier replacement after 25 years, and float replacement at 30 years. The present value of operations and maintenance is $57.3 million. Average annual costs for this alternative are $4,677,800. (See Table B-82.)

Table B-82. 243-Slip West Site Wave Barrier Alternative Cost Summary

Cost Category	243-slip Wave Barrier
Mob and demobilization	$ 1,880,000
Breakwaters	2,814,000
Wave barrier	14,207,000
Navigation aids	18,000
Dredging	1,410,000
Log transfer mitigation	533,000
Hydro survey	38,000
Inner harbor floats	5,403,000
Bank stabilization	1,274,000
Total Project First Costs	**$ 27,577,000**
Real estate	691,000
Interest During Construction	1,477,000
Preliminary Engineering and Design (PED)	855,000
Supervision and Administration (S&A)	552,000
Contingency (20%)	5,935,000
Total Project Costs	**$ 37,087,000**
Present Value of Operations and Maintenance	**57,267,400**
Average Annual Costs (50 years at 4 3/8%)	**$ 4,677,800**

Source: Alaska District Corps of Engineers Cost Engineering estimate using Tri-Service Automated Cost Engineering System (TRACES) with November 2006 pricing levels updated to August 2010 using the Civil Works Construction Cost Index System for navigation ports and harbors. Present value calculations based on the Federal FY10 discount rate of 4 3/8 percent.

Note: Present value of operations and maintenance costs based on two percent of the wave barrier structure being replaced annually, complete wave barrier replacement after 25 years, and float replacement after 30 years.

The 243-slip benefits summary is based on accommodating all of the waitlisted vessels at Valdez Harbor. This benefit summary captures the portion of total benefits that could be realized for each of the benefit categories based on the waitlisted vessels that would be first offered space at the new harbor facility. Total present value of benefits for the 243-slip alternative is $92.3 million with average annual benefits of $4.5 million. (See Table B-83.)

Table B-83. 243-Slip West Site Wave Barrier Alternative Benefits Summary

Benefit Categories	Total Present Value of Benefits	Average Annual Benefits
Harbor Operations		
Harbor personnel time	$ 85,900	$ 4,100
Float and dock repairs	525,700	24,800
Commercial Fleet		
Vessel Damage	3,032,000	143,200
Vessel delays	5,351,900	252,800
Harbor of refuge	86,900	4,300
Opportunity Cost of Time	11,459,600	541,300
Tender Fleet		
Travel related expenses	2,612,300	123,400
Opportunity Cost of Time	213,800	10,100
Charter Fleet		
Vessel delays	15,361,400	725,600
Opportunity Cost of Time	3,433,900	162,200
Guaranteed space premium	1,075,500	50,800
Subsistence Fleet		
Harvest value	4,419,000	219,100
Recreational Vessels		
Recreational experience	44,675,000	2,214,800
Total Benefits With-Project	**$ 92,332,900**	**$ 4,476,500**

2. 320-Slip West Site Wave Barrier

New vessels accommodated under the 320-slip alternative are based on the existing waitlisted vessels that could use the new harbor as follows:

Table B-84. 320-Slip Alternative Vessels Accommodated

Vessel Type	< 6.7 m	6.7-11 m	11.3-16.8 m	>16.8 m	Total
Recreation	108	131	18	3	260
Fishers	0	5	32	6	42
Charters	0	14	3	1	18
Total	**108**	**150**	**53**	**9**	**320**

The 320-slip west site wave barrier alternative cost summary includes mobilization and demobilization, new wave barrier, new breakwaters, dredging, surveys, inner harbor floats, and real estate costs to complete the project. Total first costs are $34.6 million. Total project costs including contingency, preliminary engineering and design, interest during construction, and contract administration are $46 million. Annual operations and maintenance for the wave barrier project are two percent of the structure replaced annually, complete replacement of the wave barrier after 25 years, and float replace in 30 years. The present value of operations and maintenance is $62.5 million. Average annual costs for this alternative are $5,380,700. (See Table B-85.)

Table B-85. 320-Slip West Site Wave Barrier Alternative Cost Summary

Cost Category	320-slip Wave Barrier
Mob and demobilization	$ 1,880,000
Breakwaters	4,812,000
Wave barrier	15,585,000
Navigation aids	18,000
Dredging	1,441,000
Log transfer mitigation	662,000
Hydro survey	73,000
Inner harbor floats	6,870,000
Bank stabilization	252,000
Total Project First Costs	**$ 34,593,000**
Real estate	691,000
Interest During Construction	1,853,000
Preliminary Engineering and Design (PED)	855,000
Supervision and Administration (S&A)	692,000
Construction contingency (20%)	7,366,000
Total Project Costs	**$ 46,050,000**
Present Value of Operations and Maintenance	**62,482,400**
Average Annual Costs (50 years at 4 3/8%)	**$ 5,380,700**

Source: Alaska District Corps of Engineers Cost Engineering estimate using Tri-Service Automated Cost Engineering System (TRACES) with November 2006 pricing levels updated to August 2010 using the Civil Works Construction Cost Index System for navigation ports and harbors. Present value calculations based on the Federal FY10 discount rate of 4 3/8 percent.

Note: Present value of operations and maintenance costs based on two percent of the wave barrier structure being replaced annually, complete wave barrier replacement after 25 years, and float replacement after 30 years.

The 320-slip benefits summary is based on accommodating half of all the transient vessels at Valdez Harbor. This assumes that some of these vessel owners are discouraged and would be on the waitlist but for the large number already on the list. This benefit summary captures the portion of total benefits that could be realized for each of the benefit categories based on the transient vessels that would be first offered space at the new harbor facility. Total present value of benefits for the 320-slip alternative is $133.4 million with average annual benefits of $5.2 million. (See Table B-86.)

Table B-86. 320-Slip West Site Wave Barrier Alternative Benefits Summary

Benefit Categories	Total Present Value of Benefits	Average Annual Benefits
Harbor Operations		
Harbor personnel time	$ 113,100	$ 5,300
Float and dock repairs	692,300	32,700
Commercial Fleet		
Vessel Damage	3,992,800	188,600
Vessel delays	6,344,800	299,700
Harbor of refuge	114,400	5,400
Opportunity Cost of Time	13,521,600	638,700
Tender Fleet		
Travel related expenses	2,612,300	123,400
Opportunity Cost of Time	321,800	15,200
Charter Fleet		
Vessel delays	16,367,000	773,100
Opportunity Cost of Time	3,556,700	168,000
Guaranteed space premium	1,088,200	51,400
Subsistence Fleet		
Harvest value	5,819,200	288,500
Recreational Vessels		
Recreational experience	78,857,000	2,590,000
Total Benefits With-Project	**$ 133,401,200**	**$ 5,180,000**

E. East Site Alternatives

1. 125-Slip East Site Rubblemound

New vessels accommodated under the 125-slip alternative are based on the existing waitlisted vessels that could use the new harbor as follows:

Table B-87. 125-Slip Alternative Vessels Accommodated

Vessel Type	< 6.7 m	6.7-11 m	11.3-16.8 m	>16.8 m	Total
Recreation	42	52	7	1	101
Fishers	0	2	13	2	16
Charters	0	6	2	0	8
Total	**42**	**60**	**21**	**4**	**125**

The 125-slip east site rubblemound alternative cost summary includes relocating the utility cable, new breakwaters, dredging, surveys, inner harbor floats, and real estate costs to complete the project. Total first costs are $14.8 million. Total project costs including contingency, preliminary engineering and design, interest during construction, and contract administration are $20.9 million Annual operations and maintenance for the rubblemound project are two percent of the armor rock replaced every five years and a 5-year monitoring plan for the capping of the log transfer site. The present value of operations and maintenance is $1,654,800. Average annual costs for this alternative are $1,119,600. (See Table B-88.)

Table B-88. 125-Slip East Site Rubblemound Alternative Cost Summary

Cost Category	125-slip Rubblemound
Cable relocation	$ 506,000
Road construction	129,000
Mob and demobilization	426,000
Breakwaters	6,353,000
Navigation aids	18,000
Dredging	1,071,000
Uplands fill	140,000
Log transfer mitigation	393,000
Hydro survey	37,000
Inner harbor floats	5,031,000
Bank stabilization	657,000
Total Project First Costs	**$ 14,761,000**
Real estate	295,000
Interest During Construction	791,000
Preliminary Engineering and Design (PED)	1,283,000
Supervision and Administration (S&A)	443,000
Contingency (20%)	3,356,000
Total Project Costs	**$ 20,929,000**
Present Value of Operations and Maintenance	**1,654,800**
Average Annual Costs (50 years at 4 3/8%)	**$ 1,119,600**

Source: Alaska District Corps of Engineers Cost Engineering estimate using Tri-Service Automated Cost Engineering System (TRACES) with November 2006 pricing levels updated to August 2010 using the Civil Works Construction Cost Index System for navigation ports and harbors. Present value calculations based on the Federal FY10 discount rate of 4 3/8 percent.

Note: Present value of operations and maintenance costs based on two percent of the armor rock being replaced every five years. Included in the operations and maintenance calculations is a 5-year monitoring plan activity for the Two Moon Bay capping of the log transfer site with dredge material from the East Site alternatives.

The 125-slip benefits summary is based on accommodating a natural break in the waitlist vessels for Valdez Harbor. This benefit summary captures a portion of the total benefits that could be realized for each of the benefit categories based on the waitlisted vessels that would be first offered space at the new harbor facility. Total present value of benefits for the 125-slip alternative is $73.3 million with average annual benefits of almost $3.3 million. (See Table B-89.)

Table B-89. 125-Slip East Site Rubblemound Alternative Benefits Summary

Benefit Categories	Total Present Value of Benefits	Average Annual Benefits
Harbor Operations		
Harbor personnel time	$ 44,200	$ 2,100
Float and dock repairs	270,400	12,800
Commercial Fleet		
Vessel Damage	1,559,700	73,700
Vessel delays	3,827,600	180,800
Harbor of refuge	44,700	2,200
Opportunity Cost of Time	8,301,000	392,100
Tender Fleet		
Travel related expenses	576,000	27,200
Opportunity Cost of Time	52,900	2,500
Charter Fleet		
Vessel delays	13,341,700	630,200
Opportunity Cost of Time	3,137,500	148,200
Guaranteed space premium	1,037,400	49,000
Subsistence Fleet		
Harvest value	2,273,100	112,700
Recreational Vessels		
Recreational experience	38,815,000	1,633,500
Total Benefits With-Project	**$ 73,281,200**	**$ 3,267,000**

2. 200-Slip East Site Rubblemound

New vessels accommodated under the 200-slip alternative are based on the existing waitlisted vessels that could use the new harbor as follows:

Table B-90. 200-Slip Alternative Vessels Accommodated

Vessel Type	< 6.7 m	6.7-11 m	11.3-16.8 m	>16.8 m	Total
Recreation	69	86	11	2	167
Fishers	0	3	20	3	26
Charters	0	6	1	0	7
Total	**69**	**94**	**32**	**6**	**200**

The 200-slip east site rubblemound alternative cost summary includes relocating the utility cable, new breakwaters, dredging, surveys, inner harbor floats, and real estate costs to complete the project. Total first costs are almost $20.3 million. Total project costs including contingency, preliminary engineering and design, interest during construction, and contract administration are $28.1 million. Annual operations and maintenance for the rubblemound project are two percent of the armor rock replaced every five years and a 5-year monitoring plan for the capping of the log transfer site. The present value of operations and maintenance is $2,054,600. Average annual costs for this alternative are $1,494,400. (See Table B-91.)

Table B-91. 200-Slip East Site Rubblemound Alternative Cost Summary

Cost Category	200-slip Rubblemound
Cable relocation	$ 502,000
Road construction	128,000
Mob and demobilization	387,000
Breakwaters	8,644,000
Navigation aids	18,000
Dredging	1,571,000
Uplands fill	128,000
Log transfer mitigation	451,000
Hydro survey	36,000
Inner harbor floats	6,226,000
Bank stabilization	2,222,000
Total Project First Costs	**$ 20,313,000**
Real estate	295,000
Interest During Construction	1,088,000
Preliminary Engineering and Design (PED)	1,283,000
Supervision and Administration (S&A)	609,000
Contingency (20%)	4,500,000
Total Project Costs	**$ 28,088,000**
Present Value of Operations and Maintenance	**2,054,600**
Average Annual Costs (50 years at 4 3/8%)	**$ 1,494,400**

Source: Alaska District Corps of Engineers Cost Engineering estimate using Tri-Service Automated Cost Engineering System (TRACES) with November 2006 pricing levels updated to August 2010 using the Civil Works Construction Cost Index System for navigation ports and harbors. Present value calculations based on the Federal FY10 discount rate of 4 3/8 percent.

Note: Present value of operations and maintenance costs based on two percent of the armor rock being replaced every five years.

The 200-slip benefits summary is based on accommodating the maximum number of transient vessels appearing at the Valdez Harbor on peak days. This benefit summary captures a portion of the total benefits that could be realized for each of the benefit categories based on the waitlisted vessels that would be first offered space at the new harbor facility. Total present value of benefits for the 200-slip alternative is $84.7 million with average annual benefits of more than $4 million. (See Table B-92.)

Table B-92. 200-Slip East Site Rubblemound Alternative Benefits Summary

Benefit Categories	Total Present Value of Benefits	Average Annual Benefits
Harbor Operations		
Harbor personnel time	$ 70,700	$ 3,300
Float and dock repairs	432,700	20,400
Commercial Fleet		
Vessel Damage	2,495,500	117,900
Vessel delays	4,797,300	226,600
Harbor of refuge	71,500	3,500
Opportunity Cost of Time	10,308,000	486,900
Tender Fleet		
Travel related expenses	2,036,300	96,200
Opportunity Cost of Time	160,900	7,600
Charter Fleet		
Vessel delays	13,981,000	660,400
Opportunity Cost of Time	3,152,300	148,900
Guaranteed space premium	1,064,900	50,300
Subsistence Fleet		
Harvest value	3,637,000	180,300
Recreational Vessels		
Recreational experience	42,454,000	2,002,300
Total Benefits With-Project	**$ 84,662,100**	**$ 4,004,600**

3. 243-Slip East Site Rubblemound

New vessels accommodated under the 243-slip alternative are based on the existing waitlisted vessels that could use the harbor as follows:

Table B-93. 243-Slip Alternative Vessels Accommodated

Vessel Type	< 6.7 m	6.7-11 m	11.3-16.8 m	>16.8 m	Total
Recreation	83	99	13	2	197
Fishers	0	3	24	4	32
Charters	0	11	3	0	14
Total	**83**	**113**	**41**	**7**	**243**

The 243-slip east site rubblemound alternative cost summary includes relocating the utility cable, new breakwaters, dredging, surveys, inner harbor floats, and real estate costs to complete the project. Total first costs are $22.8 million. Total project costs including contingency, preliminary engineering and design, interest during construction, and contract administration are $31.4 million. Annual operations and maintenance for the rubblemound project are two percent of the armor rock replaced every five years and a 5-year monitoring plan for the capping of the log transfer site. The present value of operations and maintenance is $2,228,700. Average annual costs for this alternative are $1,665,400. (See Table B-94.)

Table B-94. 243-Slip East Site Rubblemound Alternative Cost Summary

Cost Category	243-slip Rubblemound
Cable relocation	$ 502,000
Mob and demobilization	394,000
Breakwaters	9,706,000
Navigation aids	18,000
Dredging	1,815,000
Uplands fill	107,000
Log transfer mitigation	469,000
Hydro survey	36,000
Inner harbor floats	6,712,000
Bank stabilization	3,094,000
Total Project First Costs	**$ 22,853,000**
Real estate	295,000
Interest During Construction	1,224,000
Preliminary Engineering and Design (PED)	1,283,000
Supervision and Administration (S&A)	686,000
Contingency (20%)	5,023,000
Total Project Costs	**$ 31,364,000**
Present Value of Operations and Maintenance	**2,228,700**
Average Annual Costs (50 years at 4 3/8%)	**$ 1,665,400**

Source: Alaska District Corps of Engineers Cost Engineering estimate using Tri-Service Automated Cost Engineering System (TRACES) with November 2006 pricing levels updated to August 2010 using the Civil Works Construction Cost Index System for navigation ports and harbors. Present value calculations based on the Federal FY10 discount rate of 4 3/8 percent.

Note: Present value of operations and maintenance costs based on two percent of the armor rock being replaced every five years.

The 243-slip benefits summary is based on accommodating all of the waitlisted vessels at Valdez Harbor. This benefit summary captures a portion of total benefits that could be realized for each of the benefit categories based on the waitlisted vessels that would be first offered space at the new harbor facility. Total present value of benefits for the 243-slip alternative is $92.3 million with average annual benefits of $4.5 million. (See Table B-95.)

Table B-95. 243-Slip East Site Rubblemound Alternative Benefits Summary

Benefit Categories	Total Present Value of Benefits	Average Annual Benefits
Harbor Operations		
Harbor personnel time	$ 85,900	$ 4,100
Float and dock repairs	525,700	24,800
Commercial Fleet		
Vessel Damage	3,032,000	143,200
Vessel delays	5,351,900	252,800
Harbor of refuge	86,900	4,300
Opportunity Cost of Time	11,459,600	541,300
Tender Fleet		
Travel related expenses	2,612,300	123,400
Opportunity Cost of Time	213,800	10,100
Charter Fleet		
Vessel delays	15,361,400	725,600
Opportunity Cost of Time	3,433,900	162,200
Guaranteed space premium	1,075,500	50,800
Subsistence Fleet		
Harvest value	4,419,000	219,100
Recreational Vessels		
Recreational experience	44,675,000	2,214,800
Total Benefits With-Project	**$ 92,332,900**	**$ 4,476,500**

4. 320-Slip East Site Rubblemound

New vessels accommodated under the 320-slip alternative are based on the existing waitlisted vessels that could use the new harbor as follows:

Table B-96. 320-Slip Alternative Vessels Accommodated

Vessel Type	< 6.7 m	6.7-11 m	11.3-16.8 m	>16.8 m	Total
Recreation	108	131	18	3	260
Fishers	0	5	32	6	42
Charters	0	14	3	1	18
Total	**108**	**150**	**53**	**9**	**320**

The 320-slip east site rubblemound alternative cost summary includes relocating the utility cable, new breakwaters, dredging, surveys, inner harbor floats, and real estate costs to complete the project. Total first costs are $25.8 million. Total project costs including contingency, preliminary engineering and design, interest during construction, and contract administration are $35.1 million. Annual operations and maintenance for the rubblemound project are two percent of the armor rock replaced every five years and a 5-year monitoring plan for the capping of the log transfer site. The present value of operations and maintenance is $2,423,000. Average annual costs for this alternative are $1,861,200. (See Table B-97.)

Table B-97. 320-Slip East Site Rubblemound Alternative Cost Summary

Cost Category	320-slip Rubblemound
Cable relocation	$ 496,000
Mob and demobilization	331,000
Breakwaters	10,861,000
Navigation Aids	18,000
Dredging	2,107,000
Log transfer mitigation	468,000
Hydro survey	36,000
Inner harbor floats	7,094,000
Bank stabilization	4,354,000
Total Project First Costs	**$ 25,765,000**
Real estate	295,000
Interest During Construction	1,380,000
Preliminary Engineering and Design (PED)	1,283,000
Supervision and Administration (S&A)	773,000
Contingency (20%)	5,623,000
Total Project Costs	**$ 35,119,000**
Present Value of Operations and Maintenance	**2,423,000**
Average Annual Costs (50 years at 4 3/8%)	**$ 1,861,200**

Source: Alaska District Corps of Engineers Cost Engineering estimate using Tri-Service Automated Cost Engineering System (TRACES) with November 2006 pricing levels updated to August 2010 using the Civil Works Construction Cost Index System for navigation ports and harbors. Present value calculations based on the Federal FY10 discount rate of 4 3/8 percent.

Note: Present value of operations and maintenance costs based on two percent of the armor rock being replaced every five years.

The 320-slip benefits summary is based on accommodating half of all the transient vessels at Valdez Harbor. This assumes that some of these vessel owners are discouraged and would be on the waitlist but for the large number already on the list. This benefit summary captures the portion of total benefits that could be realized for each of the benefit categories based on the transient vessels that would be first offered space at the new harbor facility. Total present value of benefits for the 320-slip alternative is $133.4 million with average annual benefits of $5.2 million. (See Table B-98.)

Table B-98.
320-Slip East Site Rubblemound Alternative Benefits Summary

Benefit Categories	Total Present Value of Benefits	Average Annual Benefits
Harbor Operations		
Harbor personnel time	$ 113,100	$ 5,300
Float and dock repairs	692,300	32,700
Commercial Fleet		
Vessel Damage	3,992,800	188,600
Vessel delays	6,344,800	299,700
Harbor of refuge	114,400	5,400
Opportunity Cost of Time	13,521,600	638,700
Tender Fleet		
Travel related expenses	2,612,300	123,400
Opportunity Cost of Time	321,800	15,200
Charter Fleet		
Vessel delays	16,367,000	773,100
Opportunity Cost of Time	3,556,700	168,000
Guaranteed space premium	1,088,200	51,400
Subsistence Fleet		
Harvest value	5,819,200	288,500
Recreational Vessels		
Recreational experience	78,857,000	2,590,000
Total Benefits With-Project	**$ 133,401,200**	**$ 5,180,000**

F. Summary of Costs and Benefits

Average annual benefits and costs for each of the alternatives are summarized in the following table.

Table B-99. Summary of Benefits and Costs for Valdez Harbor Alternatives

Alternatives	Number of Additional Slips	Average Annual Benefits	Average Annual Costs	B/C Ratio	Net Benefits
West Site Alternatives					
Alt 2 Wave Barrier	243	$ 4,476,500	$ 4,677,800	0.96	$ (201,300)
Alt 3 Wave Barrier	320	5,180,000	5,380,700	0.96	(200,700)
East Site Alternatives					
Alt 1 Rubblemound	125	$ 3,267,000	$ 1,119,600	2.92	$ 2,147,400
Alt 2 Rubblemound	200	4,004,600	1,494,400	2.68	2,510,200
Alt 3 Rubblemound	243	4,476,500	1,665,400	2.69	2,811,100
Alt 4 Rubblemound	320	5,180,000	1,861,200	2.78	3,318,800

The west site Valdez Harbor alternatives would require upland dredging for a loss of upland facilities and will increase congestion and safety issues at the harbor. For this reason and less than optimal annual net benefits, west-site alternatives are not preferred. The east-site 320-fleet rubblemound alternative has a benefit to cost ratio of 2.8 and the largest net benefits of the east-site alternatives considered and is therefore selected as the NED plan. See Figure B-23 for alternative comparison.

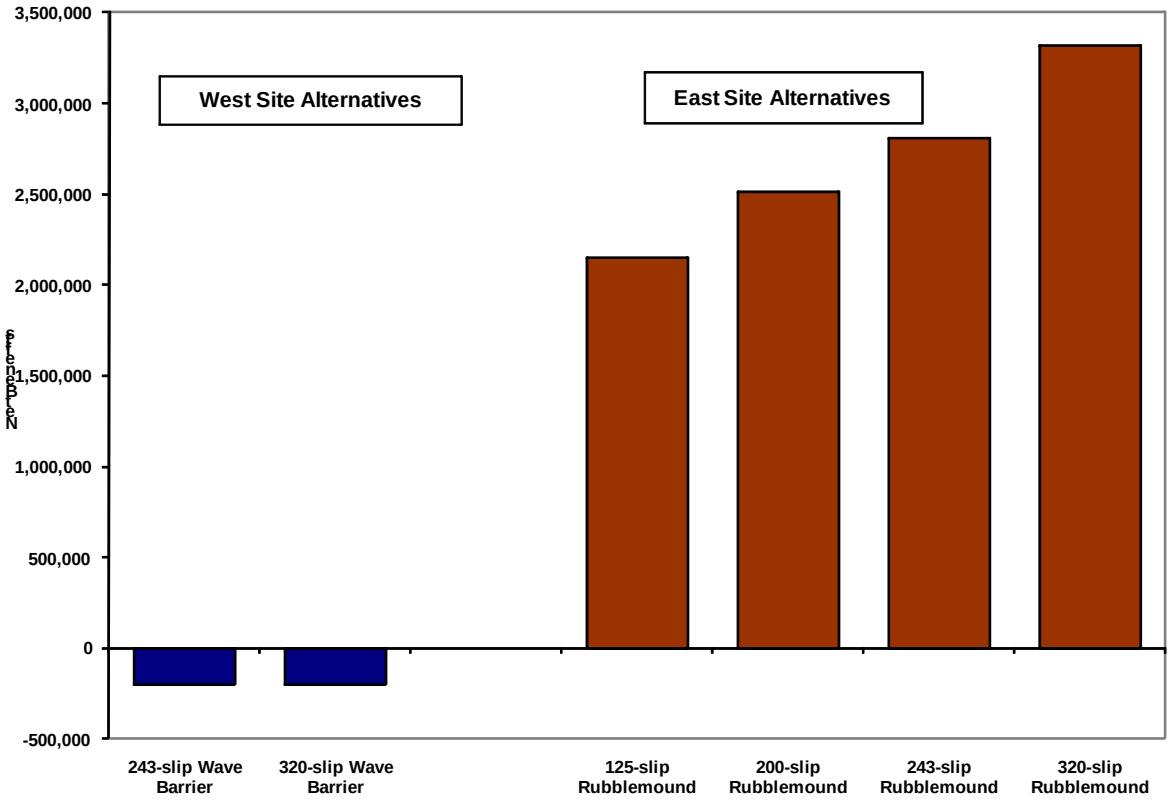

Figure B-23.
Annual Net Benefits of Valdez Harbor Alternatives

G. Updated Costs for 320-Slip East-Site Rubblemound Alternative

The 320-slip East Site Rubblemound Alternative cost estimates were updated to the August 2010 price levels as shown in the following table:

Table B-100. 320-Slip East Site Rubblemound Alternative Updated Cost Summary

Cost Category	320-slip Rubblemound
Mobilization/Demobilization	$ 1,983,000
Cable relocation	668,000
Breakwaters	11,739,000
Navigation Aids	6,000
Dredging and ocean disposal [1]	2,775,000
Land disposal	783,000
Hydro survey	143,000
Inner harbor floats	21,460,000
Bank stabilization	2,264,000
Total Project First Costs	**$ 41,821,000**
Real estate	335,000
Contingency (20%)	8,911,000
Preliminary Engineering and Design (PED)	950,000
Supervision and Administration (S&A)	1,450,000
Total Project Costs prior to IDC	**$ 53,467,000**
Interest During Construction	2,240,000
Total Project Costs with IDC	**$ 55,707,000**
Present Value of Operations and Maintenance[2]	**$ 6,398,900**
Average Annual Costs (50 years at 4 3/8%)	**$ 2,968,000**

Source: Tetra Tech Inc. Cost Engineering estimate using Tri-Service Automated Cost Engineering System (TRACES) with August 2010 pricing levels.

Notes: 1. Placement of material at Two Moon Bay is estimated at $2,152,592 along with hydro survey of $86,043, while Ocean Disposal is estimated at $472,654. The difference between the beneficial use of the dredged material at Two Moon Bay and the ocean disposal method is considered an NER cost and is not included in this estimate ($1,848,000). The harbor dredging ($2,214,368) and ocean disposal ($560,654) cost total $2,775,000.

2. Present value of operations and maintenance costs based on two percent of the armor rock being replaced every five years.

Updating costs to August 2010 pricing levels decreases the benefit/cost ratio to 1.75 and results in net benefits of $2,212,000.

VI. SENSITIVITY ANALYSIS

As in any planning process, some of the assumptions made in this report are subject to complex social, economic, and natural variables. These assumptions are also prone to risk and uncertainty. Therefore, the intent of this analysis is to test the sensitivity of project justification and scoping to changes in the major variables used to compute project benefits. The value of this test is to reveal how the economic analysis results might vary if inputs selected for the benefit evaluation are selected differently or applied differently; thereby providing insight to the amount of confidence one can have in the economic analysis. Issues that deal with variations in data and methods are sometimes referred to as risk and uncertainty (RU) issues, and one of the techniques of revealing their significance is referred to as Sensitivity Analysis.

Methodology used in this analysis is often based on more than one available choice and selection may be influenced by time and dollar budgets or by the anticipated significance of a variable in the overall study. Even in cases where data is based on a 100 percent sample, the results can be distorted by being out of date or by being inappropriately applied or misinterpreted. There is rarely such a thing as perfectly certainty, zero risk, or strictly up-to-date information.

Taken to the extreme one would need to examine and test the risk and uncertainty of every concept, assumption, bit of data, analysis, and conclusion, separately and in combination with one another to satisfy all of the possible outcomes. This effort would be impractical, so the scope and intent in the RU discussion is oriented toward identification of the degree to which changes in some of the major aspects of this analysis would have a material effect on the outcome.

Major categories of benefits for this evaluation are recreational experience, vessel delays, opportunity cost of time for commercial vessels, and subsistence harvest. Additionally, project costs might increase or decrease in the time from study completion to actual construction. The following table examines the change to net benefits and the benefit/cost ratio from a 20 percent increase or decrease in the major categories along with a change in the total benefits. Changes to total benefits are based on the NED plan for the East-Site Alternative that will accommodate 320 additional slips.

Table B-101 tests the sensitivity of the major benefits categories and the total benefit category along with the major cost categories and the total cost category to the annual net benefits before and after a 20 percent change for the East Side 320-slip alternative.

Table B-101. Sensitivity Analysis – East Site 320 Additional Slipholders Alternative (using Updated Costs)

Category	Average Annual Claimed	20% Increase	Net Benefits after Increase	BCR	20% Decrease	Net Benefits after Decrease	BCR
Changes to Benefit							
Recreation Experience	$ 2,590,000	$ 3,108,000	$ 2,730,000	1.92	$ 2,072,000	$ 1,694,000	1.57
Charter Fleet Delays	773,100	927,720	2,366,620	1.80	618,480	2,057,380	1.69
Commercial Vessel OCT	638,700	766,440	2,339,740	1.79	510,960	2,084,260	1.70
Subsistence Harvest	288,500	346,200	2,269,700	1.76	230,800	2,154,300	1.73
Total Benefits	$ 5,180,000	$ 6,216,000	$ 3,248,000	2.09	$ 4,144,000	$ 1,176,000	1.40

	Average Annual Claimed	20% Increase	Net Benefits after Increase	BCR	20% Decrease	Net Benefits after Decrease	BCR
Changes to Cost							
Breakwaters	$ 582,000	$ 698,400	$ 2,095,600	1.68	$ 465,600	$ 2,328,400	1.82
Operations and Maintenance	317,200	380,640	2,148,560	1.71	253,760	2,275,440	1.78
Total Costs	$ 2,968,000	$ 3,561,600	$ 1,618,400	1.45	$ 2,374,400	$ 2,805,600	2.18

Worst and Best Case Scenarios	Benefits	Costs	Net Benefits after Change	New BCR
Decrease benefits and increase costs (20% each)	$ 4,144,000	$ 3,561,600	$ 582,400	1.16
Increase benefits and decrease costs (20% each)	$ 6,216,000	$ 2,374,400	$ 3,841,600	2.62

Note: Costs in these tables have been updated to the August 2010 pricing level. Based on Fiscal Year 2010 Federal discount rate of 4 3/8 percent.

In the worst case scenario, with a 20 percent increase in costs accompanied by a 20 percent decrease in benefits (highly unlikely), the benefit/cost ratio drops to 1.16 with net benefits of $582,400. In the best case scenario, with a 20 percent increase in benefits accompanied by a 20 percent decrease in costs (also highly unlikely), the benefit/cost ratio rises to 2.62 with net benefits of $3.8 million.

The previous table makes adjustments to the large benefit and cost categories to test the sensitivity to the net benefits for reasonable increases and decreases to particular categories. Were the project to drop to just parity (1 : 1) for the benefit to cost ratio, the benefits would have to decrease by 43 percent or the costs would have to increase by 75 percent.

VII. REGIONAL ECONOMY

Expansion of the small boat harbor in Valdez will provide benefits to the community as well as to the nation as a whole. Local residents and community leaders have a need to know the likely impacts to the region from completion of the project.

Corps of Engineers project evaluation methodology provides a structured analysis focused on 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. Recent Corps guidance, however, reiterates the need to assess Regional Economic Development (RED) and Other Social Effects (OSE) as well (EC 1105-2-409).

While the national accounting stance is appropriate for the Corps of Engineers project evaluation, the local sponsor has a more focused concern. The City of Valdez needs to assess whether the facility will be a financial asset or potential drain on the community. The important questions for the local government sponsor are: Will the project add diversification and stability to employment in the region? Will annual revenues cover the annual operations costs for the facility? If not, what will the financial burden be on the city? Are there other benefits to the project that would induce the city to take on the financial responsibility in spite of potential losses? This section addresses some of the use and benefit questions from a local perspective.

The City of Valdez wishes to diversify the economic base of the community to help prepare for the eventual decline of oil-related employment and income. There is probably no other community in Alaska that has had greater experience in boom and bust cycles than Valdez. The prospect of an Alaska gas pipeline may be yet another boom in the foreseeable future for the city. The expansion of the small boat harbor will help diversify the economy through growth of the recreation/tourism and commercial fishing sectors of the economy.

A. Population

During the late 1970s and early 1980s, there was rapid growth in Valdez's population, due primarily to oil related activities. There was also a two year population and economic boom following the Exxon-Valdez oil spill in 1989 as government agencies and cleanup workers sought to mitigate the environmental effects of the spill.

In more recent years, Valdez's population has been relatively stable. The Alaska Department of Labor and Workforce Development estimates that the population has actually declined by about 300 persons since the 2000 Census. Valdez population has been generally declining since 1995. During this period, population hit a high in 1995 with 4,305 people and a low in 2004 with 3,721 people. According to the 2009 state demographer's estimate, the current population of Valdez is 3,475. Valdez population is expected to remain relatively stable in the future though resource activity associated with fishing or the Trans-Alaska Pipeline System could produce yet another boom.

B. Wage Employment in Valdez

Total employment in Valdez has been trending downwards between 1990 and 2005. In 1990, there were 2,330 jobs in Valdez – not including self-employed persons. In 2005, wage and salary employment totaled 1,919. Average employment for this time frame was about 2,248.

It is likely that this reduction actually stems from an inflated initial employment position. Employment in Valdez increased in response to clean up efforts from the 1989 Exxon oil spill. It is probable that employment is slowly trending back to pre-spill numbers. Most notably, the number of jobs in the state government sector has fallen by almost 300 jobs between 1990 and 2005. Though not necessarily related, the manufacturing sector also declined by approximately 100 jobs. Figure B-24 shows community employment by sector for 2005.

In 2005, the largest employment sector in Valdez was Trade, Transportation & Utilities with 576 jobs (about 30 percent). Government was the next largest sector with 463 employees, about 24 percent of the total: comprised of 25 federal, 125 state and 314 local government workers. Manufacturing includes an average of 94 jobs in seafood processing per year. This industry is highly seasonal by nature and employs around 300 people during the peak season. The services sector comprises 21 percent of total employment in Valdez with 408 jobs. It includes activities related to information, finance (finance, insurance and real estate), professional and business services, education and health services, and other services. Other major sectors include leisure and hospitality with 11 percent, manufacturing with 8 percent, and natural resources, mining and construction with a combined 6 percent of total Valdez employment.

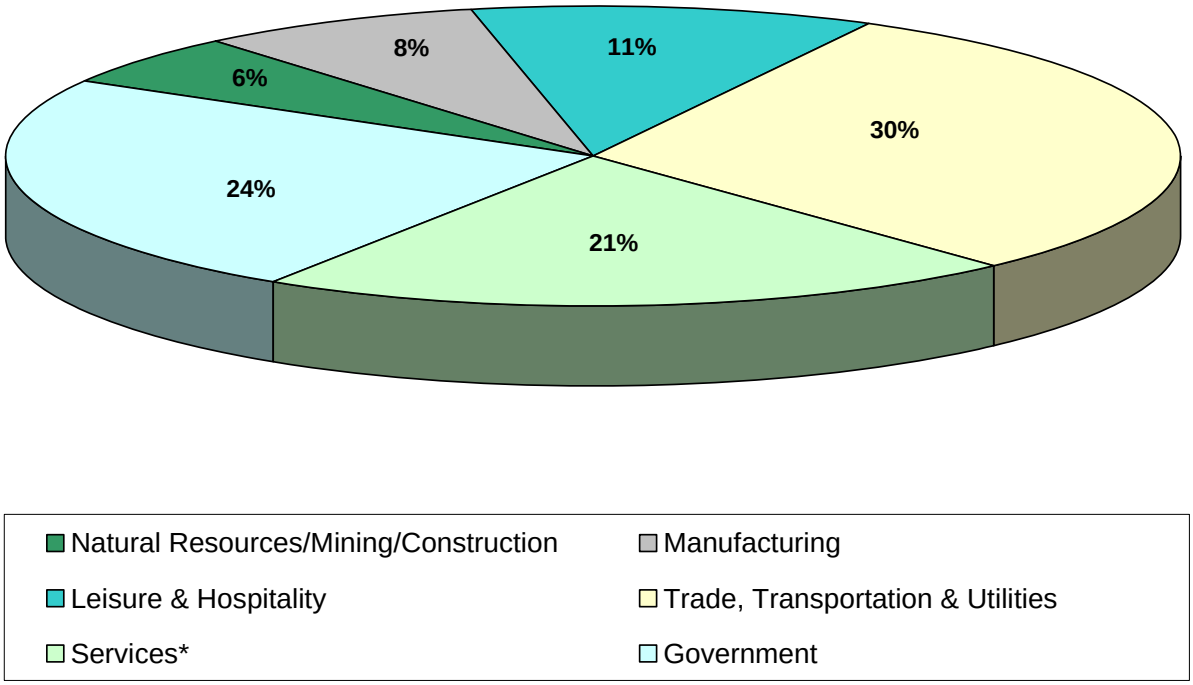

Figure B-24. Valdez Employment by Sector - 2005

* Includes: Information, Financial Activities, Professional and Business Services, Education and Health Services, and Other services
Source: Alaska Department of Labor and Workforce Development, Research and Analysis Section

C. Non-wage Employment in Valdez

Commercial fishermen, fishing boat crewmembers, and other self-employed persons are not included in the ADOL&WD employment figures for Valdez. Valdez residents hold a relatively small number of commercial fishing permits. In 2005, there were a total of 48 permit holders with 66 permits issued for various commercial fisheries (the largest categories are salmon with 33 permit holders and halibut with 13 permit holders – Alaska Department of Fish & Game – Commercial Fisheries Entry Commission 2006). In addition to vessel operators, there were 89 Valdez crew permit holders in 2005 (CFEC 2006).

Of the 48 Valdez permit holders in 2005, 26 actually fished 34 of the 66 permits issued. Collectively they landed about 7,796 metric tons of fish (about 17,186,500 lbs.). About 98.8 percent of this catch – 7,702 metric tons (16,980,000 lbs.) – came from salmon fishers. Total estimated gross earnings for Valdez fishers were approximately $2,886,610. Salmon accounted for about 84.1 percent of this figure.

There are also many small businesses operating in Valdez that provide employment and income for owner/operators that are not captured in the ADOL&WD data. These businesses serve the main sectors of the Valdez economy discussed below.

D. Oil Related Businesses

Alyeska operates the Trans Alaska Pipeline System and the Valdez Marine Terminal that moves oil from Prudhoe to Valdez and then on to markets via tankers. Valdez is the southern terminus of the pipeline as well as the location of the oil storage and tanker loading facility.

Ship Escort Response Vessel System is a subsidiary of Alyeska Pipeline Company. The operations of the company prevent oil spills by assisting tankers in safe navigation through Prince William Sound and protect the environment by providing effective response services to the Valdez Marine Terminal and Alaska crude oil shippers.

The Southwest Pilots Association represents vessel pilots that guide commercial freighters and tankers into and out of Valdez Arm. They have a limited presence in the Valdez small boat harbor, and operate primarily out of Rocky Point.

Annual oil shipments through the Trans Alaska Pipeline peaked in 1988 at 2.006 million barrels per day, and have declined every year since. Shipments in 2007 are estimated to be 0.74 million barrels per day, less than 40 percent of the peak production (Fall 2006 Revenue Sources Book, AK Department of Revenue). The State of Alaska predicts that North Slope production will increase slightly in 2008 and then remain stable for several years. A spike in production is expected in 2012 but declines are anticipated afterwards through 2016.

E. Commercial Fishing

There are two major fish processing plants located and operating in Valdez: Nautilus Foods and Peter Pan Seafoods. These plants operate seasonally and account for an average of 94 jobs annually. Employment grows significantly in June as the industry prepares for the

upcoming season. During the peak season, July through September, average employment jumps to 295.

The Solomon Gulch Hatchery operated by the Valdez Fisheries Development Association is located just outside Valdez and provides jobs as well as salmon that are the base for sport and commercial fishing in the area.

F. Visitor/Recreation

There are between 190,000 and 250,000 visitors to Valdez each year, with about 25 percent coming during winter months (Valdez Tourist and Convention Borough). Most of these visitors are seeking one of the various types of outdoor recreational activities available such as sightseeing (cruiseship and excursion boat passengers), sport fishing, boating, camping, and other potential experiences. There is a growing sector of the Valdez business community that provides services to visitors. Valdez also hosts the World Extreme Skiing Competition that has become a nationally recognized event. Table B-102 shows the different types of visitor/recreation businesses in Valdez. Note that these numbers are based on membership with the Valdez Visitors and Convention Bureau as well as conservative estimates of additional, non-member businesses. Most likely, these totals are slightly less than the actual number of tourist/recreation businesses in Valdez.

Table B-102. Visitor/Recreation Businesses in Valdez

Type of Business	Number
Hotels/Motels	7
Bed & Breakfast	27
Camping/RV Parks	9
Fishing Charters	80
Tours & Attractions	16

Source: Valdez Tourist and Convention Bureau

Valdez is the center of a large sport fishery, primarily conducted in saltwater. Access to the sport fishery is by boat and from shore. Excellent sport fishing for pink and coho salmon and halibut provides a focus for many of the visitors that fill campsites, RV parks, hotels and motels during the summer. Figure B-25 shows the overall level of effort (in angler days) for the fisheries of Valdez Bay and Valdez Arm between 1990 and 2008. Much of this fishing effort is supported through the salmon hatchery production from the Solomon Gulch Hatchery at Valdez.

Boats represented in Figure B-25 are predominantly private fishing vessels. Another important category of vessels serving the visitor/recreation industry is excursion boats. There are several excursion boat businesses that operate out of Valdez, for example Prince William Sound Tours and Cruises, and Lu-Lu Belle Tours. The harbormasters office estimates that there were 77 charter vessels operating out of Valdez in 2006. A survey conducted by the Corps of Engineers in November 2004 revealed that, on average, there are 4.05 persons per charter boat. Use statistics are not available for this group of private businesses, but they serve a large and growing number of Valdez visitors.

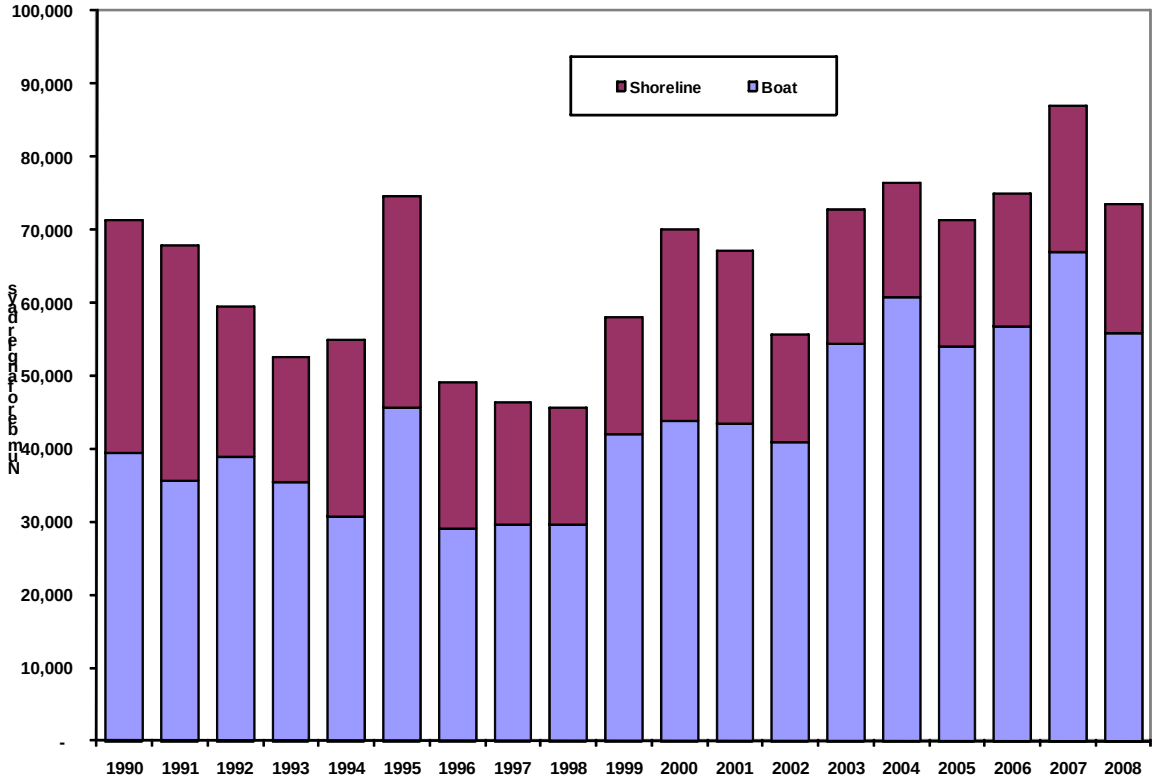

Figure B-25. Valdez Sport Fishing Effort: 1990-2008

Source: Alaska Department of Fish & Game Sport Fish Survey for Prince William Sound

At one point, cruiseship passengers were another important group of visitors to Valdez. However, the number has been significantly reduced in recent years. Scheduled cruiseship visits stopped in 2004 but have resumed again as of summer 2008. Impacts from cruiseship visitors may become important again in the coming years.

G. Municipal Government and Revenues

The City of Valdez provides services to residents based on revenues from taxes and license fees. Total general fund revenues in 2009 are projected to be over $45.7 million (City of Valdez, Finance Department). Valdez property taxes provide about 72 percent of this total and are the main source of funding for local government services. Property owners pay a 20-mill tax, with homeowners eligible for an exemption up to $10,000. The property tax base, which is primarily the section of the Trans Alaska Pipeline within municipal boundaries and the Valdez Marine Terminal are declining annually as this property depreciates.

Valdez has a public accommodation tax of 6 percent. Hotels, motels, bed and breakfasts, inns and boarding houses charge the tax on behalf of the city. Revenues, in part, finance the operation of the Valdez Visitor's & Convention Bureau to promote tourism.

In 1997, Valdez voters approved a charter amendment that created the City of Valdez Permanent Fund. The fund was created with one percent fee payment from the owners of the Trans Alaska Pipeline for the City of Valdez to issue tax-exempt bonds to build the pipeline and the Valdez Marine Terminal. Until 1983, the Valdez spent all of the earnings from the

fund for operating and capital budget expenditures. This was successively reduced in 1983 and 1985 to transfer 25 percent (1983) and then 50 percent (1985) of annual earnings to fund principal. From 1987 to 2006, Valdez did not appropriate fund earnings to the annual operating and capital budget. However, on June 6th 2006, the citizens of Valdez voted to allow an annual transfer of 1.5 percent of the previous year permanent fund value into the general fund. The current value of the fund is $115.6 million as of December 2009.

H. Valdez Community Impacts

The City of Valdez and its residents will benefit from completion of the proposed small boat harbor in several areas. The project will create direct jobs and increase city revenues through moorage fees and taxes. It will provide indirect benefits through increased sales for tourism and service related business in the community. Several of these benefits are discussed below.

The City of Valdez is in a strong financial situation, due primarily to the tax base provided by the Trans Alaska Pipeline and the Valdez Marine Terminal. However, the property tax valuation for these facilities declines each year with depreciation. In the future, Valdez intends to expand their economic base through recreation/tourism and commercial fishing.

I. Increased Moorage Revenues

There is a wait list for the Valdez Harbor of 243 vessels of various sizes as of October 25, 2006. If we assume that all of these boats gain moorage space with the construction of a new harbor, then we can estimate the additional moorage income to the Port of Valdez based on current slip fees. Table B-103 shows the results of these calculations. Total additional annual revenues to the Port of Valdez would be approximately $166,300. It is important to note that this is based on permanent moorage only. It does not include revenues from transient vessels, travel lift fees, or other miscellaneous fees associated with harbor usage.

Table B-103. Estimated Additional Moorage Income to the Port of Valdez *

Slip Size in Meters (Feet)	Number of Slips	Annual Slip Fees	Additional Annual Revenue
6.1 (20)	12	$ 440	$ 5,300
7.3 (24)	72	528	38,000
9.1 (30)	97	660	64,000
12.2 (40)	42	880	37,000
15.2 (50)	20	1,100	22,000
Total	**243**	--	$ 166,300

*Based on Valdez Harbor waitlist as of October 25, 2006
Source: Valdez Harbormaster's Office, 2010; Estimates made for this study.

J. Direct Employment

According to the harbormaster, between two and three marine operators would be required to help run the new facility. This employment was further defined as one part time and two full time employees. The finance Department at the City of Valdez reports the current wage for marine operators as $26.47 per hour. About $2,100 per week or $104,000 annually would be paid in new direct employment wages. Other direct personnel changes are not expected after project completion. Direct, though temporary, employment can also be expected to occur during the construction of the project.

K. Indirect Employment and Tax Revenues

In addition to the direct employment at the harbor, the expanded harbor will allow more tourism related firms to enter the Valdez market. The employment and spending resulting from these expanded businesses and their households will also impact the local community. The expanded harbor will provide new economic activity within Valdez by boaters and other visitors utilizing the facility. These are some of the effects than can be expected:

- Boaters utilizing the facility will increase the business to grocery stores, accommodation businesses, fuel and marine service business, and others. The benefits will include direct sales and indirect employment supported by the increase in overall sales.
- The City of Valdez tax revenues from the 6 percent accommodation tax will increase as a result of new moorage slip renters utilizing hotels, motels, and other types of accommodations in Valdez.
- Restaurants and gift shops in the area will have increased sales as a result of improved conditions at the harbor.
- Charter vessel operators and excursion boat operators will experience greater efficiency and safety in their operations as a result of the new moorage provided by the proposed project.
- New charter and excursion boat operators will be able to enter the Valdez market as a result of the expanded harbor.
- A temporary surge of indirect impacts can be expected during the construction phase of the project, as the demand for local labor, materials, and services increases.

Recent data on the Port of Valdez's economic impacts to the community suggest that the expanded harbor will produce between 50 and 125 jobs and have total additional economic impacts of between $9 million and more than $13 million. Projections were made for the stated small project alternative of 125 new slips and the large project alternative of an additional 320 slips. Estimated employment, harbor revenue, and community impact are based on results from the harbormaster's use of the Alaska Department of Transportation's harbor economic modeling project developed by Northern Economics. Employment projections are based on the model estimates of between 8 and 11 jobs that can be expected for every additional million dollars of community impact that occurs. Table B-104 shows the estimated annual community impacts spurred from direct, indirect, and induced effects of the expanded harbor.

Table B-104. Estimated Annual Community Impacts from the Expansion of the Port of Valdez *

	# of Slips	Harbor Revenue	Community Impact	Employment	Payments to Labor
2004 Actual	500	$ 749,600	$ 24,086,400	269	$ 7,842,200
Small Project	625	$ 937,000	$ 30,108,100	317	$ 9,802,800
Large Project	820	$ 1,233,800	$ 39,646,300	393	$ 12,908,300

* Including direct, indirect and induced effects.
Source: Sorum, Alan J. "Social and Economic Impacts of Harbors in Alaska's Communities"; Estimates made for this study.

VIII. OTHER SOCIAL EFFECTS

The categories of effects in the OSE account include: urban and community effects, life, health and safety factors, displacement, long-term productivity, energy requirements and energy conservation. OSE can be either beneficial or adverse (positive/negative) depending on the standard being measured. Potential social effects from the Valdez Harbor expansion include changes to congestion, competing interests, tourism, seafood production, subsistence, and safety. Under all alternatives the changes to other social effects are the same and are summarized as follows:

A. Congestion Relief

Vessels using the Valdez Harbor during the busy summer season are basically tripping over one another. There is one entrance channel through which all vessels must traverse and one launch ramp that serves the harbor. Vessels unable to obtain permanent or transient moorage at the harbor must trailer their boats. Waits for the launch ramp are long on the landward side and when there is insufficient room in the harbor boat operators must continuously move their vessel while waiting to use the ramp. Congestion relief as a result of the improved harbor offers beneficial effects.

B. Competing Interests

Commercial fishing vessels, charterboat operators, subsistence vessels, and recreation boats all use the same harbor. Each of these vessel types has competing interests and needs. Commercial fishing vessels' operations are guided by fishery openings and closings and the need to meet schedules for delivery of product to the shore-based processors. Charterboat operators are governed by the weather, customer arrival and departure times, and the need to provide safe transport. Subsistence vessels are dependent on the weather conditions and harvesting schedules. Recreation vessels are often dependent on the weekend or vacation schedule. Subsistence and recreation vessels probably are more flexible in their operations while the commercial fishing vessels and the charterboat operators must stick to a stricter schedule. The expanded harbor will allow these vessels the opportunity to avoid interfering with each other's operations and provide beneficial effects to the harbor users.

C. Tourism Opportunities

It is anticipated that charterboat operations will increase with expanded moorage space. Prince William Sound is a very attractive recreation and fishing destination. Many tourists want to visit the community for the purpose of seeing the termination of the Trans-Alaska Pipeline System and will avail themselves of the tourist offerings. At present, the charterboat operations are constrained due to a lack of space at the harbor. There are 19 charterboats currently on the waitlist for permanent moorage and a total of 98 transient charter vessels using the harbor. These vessels will be able to expand their businesses with an improved harbor, particularly if the harbor becomes a friendlier environment with relieved congestion. Harbor users may also avail themselves of the helicopter/sightseeing or other tourism opportunities in Prince William Sound when they gain additional time to spend in Valdez. Tourism experiences and increased tourism opportunities are expected to create beneficial effects from an expanded harbor.

D. Seafood Production

There have been several years in recent history where the returns of salmon to Valdez outstripped the ability of harvesters to gather and deliver the fish. Improved infrastructure at the harbor will allow existing commercial fishing vessels to return to the fishing grounds sooner and thereby increase the overall catch for the region. In addition, with the advent of the Valdez Fisheries Development Association processing plant, small commercial operators may have the opportunity to freeze their product and allow them time to devote to value-added activities. It is anticipated that seafood production will enjoy increased employment and income as a result of an expanded harbor.

E. Subsistence

Expanding the small boat harbor is expected to increase opportunities for subsistence gathering. The improved harbor is not expected to stimulate growth in population but is expected to assist persons currently practicing a subsistence lifestyle to expand their harvest. Provided the sea mammals, fish, and plants in the region are at stable populations, the increased harvest will have limited ecological effects. If subsistence activity is already at its maximum, increasing the subsistence harvest could adversely affect the resource populations.

F. Safety

Congestion, competing vessel types, rafting, and general popularity of the Valdez Harbor indicate that more people are interacting in a close environment. Reports of accidents traversing rafted vessels and otherwise bumping into vessels that extend far out into the common lanes of the harbor have not been quantified. The expanded harbor will have beneficial effects on the safety of all harbor users.

G. Other Effects

No discernible adverse community effects such as increases in crime, health problems, administrative expense, or environmental problems are anticipated. A new harbor will also improve resident and visitor perception of the community and may increase the community's sense of well being.

IX. FOUR ACCOUNTS SUMMARY

USACE planning guidance establishes four accounts to facilitate and display effects of alternative plans. Previous studies have relied primarily on the use of the National Economic Development account showing the changes in economic value of the national output of goods and services. A benefit/cost ratio and an indication of the change in net benefits is the output of the NED evaluation and for this study forms the basis for the selected plan.

Included as part of this study are also evaluations of the Environmental Quality (EQ), the Regional Economic Development (RED) effects, and the Other Social Effects (OSE). Environmental Quality displays the non-monetary effects of the alternatives and natural and cultural resources and described more fully in the Environmental Assessment Appendix. Overall, there are moderate decreases in environmental habitat from all alternatives and mitigation at the Two Moon Bay will increase habitat in the region. In all cases, the environmental quality is left unchanged overall as a result of the Corps project. The regional economic development (RED) benefits result in increased employment and income for the region and the other social effects (OSE) are generally positive and beneficial.

Table B-105. Four Accounts Evaluation Summary

Alternative	NED Net Benefits (B/C Ratio)	EQ	RED	OSE
West Site Alternatives				
243-slip Wave Barrier	$(201,300) (0.96)	Positive	Increased employment and local income	Beneficial
320-slip Wave Barrier	$(200,700) (0.96)	Positive	Increased employment and local income	Beneficial
East Site Alternatives				
125-slip Rubblemound	$2,147,400 (2.92)	Positive	Increased employment and local income	Beneficial
200-slip Rubblemound	$2,510,200 (2.68)	Positive	Increased employment and local income	Beneficial
243-slip Rubblemound	$2,811,100 (2.69)	Positive	Increased employment and local income	Beneficial
320-slip Rubblemound	$3,318,800 (2.78)	Positive	Increased employment and local income	Beneficial
320-slip Rubblemound with cost updated to August 2010	$2,212,000 (1.75)	Positive	Increased employment and local income	Beneficial

Note: Environmental Quality assumes that beneficial use of dredge material at the Two Moon Bay site provides positive environmental impacts.

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EXHIBIT 1 – SUMMARY OF INTERVIEWS

Interview with Johnny Kerr, telephone (907) 457-2593 (H) – 9/6/00

Owner of the Glacier Fox (25' L, 9' B, 3' D) a charter vessel. Have two vessels with one permanent slip and one on the wait list for another slip. He has experienced vessel damage to the fiberglass of his vessel averaging $200-$300 due to congestion. Although he expressed delays of up to 10 minutes entering/exiting the Harbor during peak periods, he described the congestion as 'low.' However, when the larger fishing vessels (seiners) and tenders enter the Harbor during the Silver run, the congestion increases significantly.

Interview with Randal Whitley, telephone (907) 835-4994 (H) – 9/6/00

Owner of Flat Fun (34' L, 11' B, 3' D) a charter vessel. Although he doesn't have a permanent slip, he was able to use someone else's slip for the entire season. Although he hasn't experienced any damage to his vessels, he indicated that the potential for damage was there. He has experienced delays at the fuel docks at about 7 a.m. in the morning when everyone else is there fueling up before going out to fish. Congestion problems occur at A and B with the big salmon processors and the larger vessels. Delays, entering/exiting the harbor, have not been significant because he was able to obtain moorage.

Interview with Jeff Keller, telephone (907) 835-3809 (H) – 9/6/00

Owner of Prosperity (30' L, 12' B, 3' D) a commercial fishing vessel. He has an aluminum boat and hasn't experienced any damages to his vessel but many 'close calls'. He has been on the wait list for 4 years. To avoid time delays, he calls 45 minutes ahead for transient moorage space during peak periods. Described the scene as very congested and up to 3 to 4 boats abreast (deep).

Interview with Graydon Sodergren, telephone (907) 835-3834 (H) – 9/6/00

Owner of Gone Fishin' Charters (22' L, 8.5' B, 1.5' D) a charter vessel. Has permanent moorage for his 22' vessel and on the wait list for a 40' vessel. Most of the time delays occur during the peak period when the vessels are stacked up. Then, delays up to 10 minutes are common. No vessel damage to his boat due to rafting/congestion.

Interview with Mrs. Bob Muller, telephone (907) 835-2247 (H) – 9/6/00

Co-owner of A-1 Fishing Charters (28' L, 10' B, 0' D) a charter vessel. He has a permanent good spot at the end of the boat ramp. He is on the wait list for another slip. Delay problems are not significant. Has not experienced any rafting. Some congestion problems with the large salmon fishing vessels and kayaks. No vessel damage to her boat due to rafting/congestion.

Interview with Craig Price, telephone (907) 659-8000 (W) – 9/6/00

Owner of Choosey (custom Catamaran) (28' L, 9' B, 2.5' D) a charter. The only problem he has entering and exiting the Valdez Harbor is the kayaks that are difficult to see. But the Harbor is addressing the kayak problem. In addition, the existing harbor needs an inlet and outlet to flush the tide water; the water is stagnant and the water gets very dirty. No vessel damage to his boat due to rafting/congestion. No time delays to speak of.

Interview with Dennis Begen, telephone (907) 745-9841 (W) – 9/6 and 9/7/00

Owner of Mary L (34' L, 11.6' B, 4' D) a charter boat. Described the congestion as minimal. He usually calls (15 to 20 minutes) ahead for space; therefore, he has no problems securing transient moorage. Also when everyone else is fueling up at 7 a.m. he fuels up after the rush between 8 and 9 when everyone else is out fishing. No damage to his vessel because he uses fenders on his fiberglass boat. He has been on the wait list for 1-1/2 years. Dennis called me the following day to let me know about some of the boats in Cordova (about 30 to 40) were in Valdez all summer because F&G closed the Copper River. Therefore, the Cordova fleet went to Whittier and Valdez to fishing. Therefore, some of the congestion experienced in Valdez was due to the transient Cordova fleet (vessels ranging in size 28' to 50') temporarily visiting Valdez.

Interview with Marsha Sakalaskas, telephone (907) 883-5191 (H) – 9/7/00

Co-owner of Sea Sport (30' L, 8.5' B, 4' D) a commercial fishing vessel. However, recently sold their vessel and on the wait list for a slip. They are at the K dock (the last one). Describe the harbor dock conditions especially the cement as 'gorgeous' and A, B, C docks as working (maintaining) on the cement. The congestion was bad at minus tide and only has one fuel dock. (Later found out they have two fuel docks). The stagnant tides needs an outlet to drain and flow through the harbor. There is scum, fish parts, and the fish station dumps its waste in the area. Also the canneries 'hold in' brine. No vessel damage to her boat due to rafting/congestion.

Interview with Jason Wells, telephone (907) 835-4874 (W) – 9/7/00

Owner of PaPa Max (42' L, 15' B, 3' D) a commercial fishing vessel. Has not experienced any delay time entering and exiting the harbor; however, has spent about 1 hour waiting for fuel at the dock. At A and B docks and down near the haul-out (lift) area, fuel dock, it gets very crowded. Has experienced no vessel damages due to rafting or congestion.

Interview with Dan Ureda, telephone (907) 835-5711 (H) – 9/7/00

Owner of Corsair Charters (42' L, 12' B, 5' D) a charter vessel. During peak periods has experienced a delay time of 10 minutes. He observed a 60' ocean trawler hit a Catamaran causing $15,000 in damages to the vessel. He described the existing Valdez harbor as 'dirty'. With no protective moorage, the snow loads are significant. He has observed rafting at the seawalls at 5 deep. He has been on the wait list for years and expects to be on the list several more years before he can secure a permanent space. He has had damage to his vessels costing about $1,000 in fiberglass work. Also about $800 was spent on bent handrails. Another problem is electrolysis in the water.

Interview with Patty Wing, telephone (907) 835-2133 (H) – 9/7/00

Co-owner of Cap' N Patty Charters (38' L, 12.5' B, 3.5' D) a charter company. Has observed a lot of rafting of commercial vessels (seiners) stacked 3-5 deep. Takes up to 15-20 minutes to fuel up at the docks. Congestion at the processing docks of Peter Pan and Sea Hawk with slips inside off loading at A & B docks. In July and August there is a line ¼ of a mile lined up when the silvers are in and takes 5 to 10 minutes to get to their slip. They have been 'lucky' no vessel damages to report.

Interview with Bob Michel, telephone (907) 479-2222 (W) – 9/7/00

Owner of Sadan (38' L, 13.5' B, 4.5' D) was noted as a charter on the wait list but he is a recreational boater (not for hire). He is on the wait list for a larger slip. He has experienced time delays of up to 15 minutes, especially at the fuel docks. No rafting. No vessel damage to his boat due to rafting/congestion.

Interview with Dwight (Ike) King, telephone (907) 269-7341 (W) – 9/7/00

Owner of Lady Lyndsey (36' L, 12' B, 4' D) a charter vessel. Has observed rafting 4 deep and delays of up to 30 minutes. K and I docks are nice. The old wood docks need to be replaced; cleats are inadequate. No vessel damage to his boat due to rafting/congestion.

Interview with Tim Cook, telephone (907) 835-9149 (H) – 9/8/00

Lives in Valdez and has several commercial fishing boats in Bristol Bay and Norton Sound. Currently trailering a vessel in Valdez. Has name on the wait list for a permanent berth in Valdez. If he gets one, then he will permanently berth one of his vessels from Bristol Bay or Norton Sound. He said conditions at Valdez not 'too bad' and with a little planning such as calling ahead for a spot or fueling up during non-peak times.

Interview with Dave Tousignant, telephone (907) 835-4433 (H) – 9/8/00

Was owner of a 42' vessel but sold it. Had his name on the wait list. He is also on the Port and Harbor Commission in Valdez. All of his comments regarded the current conditions at Valdez. Concrete floats are a problem because of the freezing problems and the concrete is popping up. Suggested no concrete floats at the new harbor. Uplands and storage and parking are problems at the existing harbor. Lots of delays at the fishing docks because of the processors. Fish processors are in the center of the fairway and when they are in especially the smaller boats have problems getting around the processors. The gangways are congested and clearance and maneuverability is difficult for the smaller vessels (24') to clear the gangway.

Interview with Jim Johnson, telephone (907) 787-8315 (H) – 9/8/00

Respondent is on the wait list for a 30 to 32 ft. slip. He doesn't have a vessel yet. He wants a permanent slip before he purchases his vessel. He will wait for a permanent slip rather than use transient moorage.

Interview with Mike Wells, telephone (907) 835-5360 (H) – 9/8/00

Owner of the St. Elias (44' L, 14' B, 6' D) a commercial fishing boat. In the summer gets pretty congested because Valdez is very popular with the boaters from Fairbanks. Also, the fish canneries when off- loading their product, it gets very congested. The thoroughfares are pretty narrow and have to be careful in handling/maneuvering your vessel. Has rafted in the past but this season occupied a space previously held by a permanent berth holder whose vessel was put in dry dock. Therefore, he was able to occupy the space all season. Next year, he will occupy transient moorage. He hasn't experienced any time delays. Only damage, some broken cleats due to the congestion.

Interview with Gary Phillip, telephone (907) 835-4369 (H) – 9/8/00

Had a 24' boat slip and gave it up and now trailering a boat. Time delays not too bad (as in Cordova). When he had a slip, he did experience vessel damage to repair fiberglass damage (costing $300-$400) due to rafting two to three deep in transient moorage. Had a permanent slip but gave it up because someone was too frequently in his space even when he called ahead. Sometimes when he called the Harbormaster's office he got no answer for someone to move a transient vessel out of his permanent berth. Eventually, he gave up his permanent slips.

Interview with Bill Smith, telephone (907) 255-3925 (mobile phone) – 9/8/00

Have two slips in Valdez – one 16' skiff and one 26' vessel (TNT). Complained about the poor flushing conditions. Water has no way out to flush. Definitely need more slips especially when the commercial fleet comes in. Harbor is too small and filled to capacity. No damage or delays.

Interview with Mark Meadows, telephone (707) 279-0268 (H) – 9/8/00

Owner of the Ruth M (50' L, 15'B, 6' D). Lots of congestion at the fuel docks. Has rafted as many as three deep. Has experienced delays of 5 to 10 minutes. Especially congested when the pleasure crafts and tenders are in the Harbor in the summer. Doesn't call ahead to reserve space at the transient moorage. Usually takes his chances. If he knows another vessel's slip is unoccupied, then he will call ahead.

Interview with Connie Ballow, telephone (907) 835-4443 (W) – 9/11/00

Owner of the Connie B (28' L, 10' B, 3' D). No wait time (delays) and were able to get in and out because they occupied a slip for the entire season. She doesn't raft therefore, has not had any vessel damage. Does not operate vessel in snow/ice conditions.

Interview with Bob Zastrow, telephone (907) 835-5301 (W) – 9/11/00

Owner of two 50' vessels. Has a permanent slip and on the waiting list for another. He had his boat in dry dock for the most of the season so has not experienced any damages or delay times. One vessel on the wait list is for recreational use; the other is for commercial purposes. He is in the construction business; therefore, he uses his steel boat hull to transport/haul materials. Ice isn't a problem but has experienced safety complications from heavy snow loads.

Interview with Stacey Mitchell, telephone (907) 835-2140 Aurora Charters – 9/20/00

Respondent has had a permanent slip for the last seven years at Valdez harbor. This past summer a 40-ft Sea Hawk stripper barge was moored for a couple of weeks within the Harbor entrance. This created one-way traffic jams. The only damage observed was a Catamaran that has been in the Harbor (unoccupied) for the past several years. She has not experienced any time delays or damage to her 28-ft. charter boat. Respondent does not envision an increase in her business where she would buy another boat nor place her name on a wait list for a new permanent slip.

Interview with George Wise, telephone (907) 452-2968 Leisure Fishing Charters, 9/20/00

Respondent indicated that he has had problems with the large tenders in the harbor at the same time he was entering/exiting into his slip. He has experienced delays of up to 30 minutes. Lots of debris in the water and poor drainage. Water is not flushing out to sea. He has a 28-ft charter boat. No damages to report for his vessel. Occupies a permanent slip.

Interview with owner of Valhalla Charters (6-person capacity), telephone (907) 835-2073, 9/20/00

Respondent has a 33-ft. charter boat and occupies a permanent slip (J-4) four months out of the year. He trailers it out for the winter and puts it in covered storage located in Valdez. His major problem is the gunk and debris that accumulates in the water. He does not see a change in his operation if a new harbor is built. He has been operating in Valdez harbor for 23 years.

Interview with Mark Wartes, telephone (907) 456-2551 (W) Ivory Gull Charters – 9/20/00

Has a permanent slip at the Valdez harbor for his 34-ft. fishing vessel. With a new small boat harbor, he would save at least 5 minutes exiting and entering the Harbor. In addition, over the last 5 years he has spent about $2,000 repairing his vessels due to the congestion. He does not anticipate making any changes in the way he operates his business if the project goes forth.

Interview with Peggy, telephone (907) 488-9890 (W) Luck of the Irish Charters – 9/20/00

Respondent has experienced 10 to 15 minute delays in entering and exiting the Valdez harbor. She has a permanent slip for her 36-ft. boat and keeps her boat in Valdez only during the summer season. The congestion is noticeable when the tenders are in port. Tempers fly. Although her boat has not experienced any damage, it has had some near misses.

Interview with Bob Lizardi, telephone (907) 835-2941 (W) Bob's Charters – 9/20/00

He is currently looking into replacing his 22-ft. vessel for a larger boat. Therefore, he would be interested in a larger slip. He has one permanent slip at the Harbor. Bob has been in the business for 30 years and for the last 10, in Valdez. He has seen the constant growth of harbor users. At times, it can get very busy at the ramp locations. For two to three months (December through February) many of the slips are icebound. If spaces are available, he will move to another slips to avoid being icebound. The ice stacks up at the East end of the harbor. He needs to wait until the ice melts before he can remove his vessel. Over the years he had observed an influx of traffic especially during the Salmon Derby. Salmon fishing has been very good. His vessel has experienced many near misses; however, no damages. Delays of 10 minutes are common.

Interview with Cliff Chambers, telephone (907) 255-9340 (W) Vinny J. – 9/22/00

Respondent has used the harbor for the last 8 years; 3 years with a permanent berth. He has a 26-ft. charter/recreational vessel. He says it is congested at the fish and fuel docks and has experienced delays of 10 minutes or more. It is especially difficult to maneuver his vessel with the fish processors there. Respondent has had minor damages to his boat (amount not determined). Another congestion problem is when a commercial fishing boat has a jitney boat tied to its vessel; maneuvering around the extended vessel is difficult. He is also on the wait list for a larger slip (44-ft.). If one larger slip becomes available then he would sell his boat for a bigger one.

Interview with James Joy, telephone (907) 452-6287 (H) Pioneer – 9/22/00

Mr. Joy has a 41-ft. sailboat (catamaran) used for recreation only. Mr. Joy is also the treasurer of the Valdez Harbor Users Association with a membership of 425. The design of the harbor is out of date. Large fishing vessels (114 ft.) are coming into the harbor that far exceeds the original harbor designed for recreational use. It's too crowded at the entrance; the launch ramp is located at the far end of the Harbor. The mouth is where all the traffic and congestion is located. The Acurx a 40 ft tri-maran was hit in June 2000 causing an estimated $15,000 in damage. The vessel is still located at the Harbor.

Personal Interview at the Alaska District of the Army Corps of Engineers with Ken Larson, Charter Boat Business, Owner/Operator (fishing/kayaking) N'Sanity - 9/22/00

Owns a 34-ft vessel. He has used Valdez facilities since 1984. In 1992, respondent acquired a permanent slip. His vessel is larger than his slip; therefore, about 6 ft. of his vessel overhangs the slip and is unprotected. Has observed rafting up to 4 and 5 deep at the transient dock. He was incurred damage to his bowsprit when another vessel backed into his boat at the fuel dock causing $500 in damages. He has experienced time delays of 30 minutes due to congestion. He would like to see a move for a charter boat row and a fuel dock at the new small boat harbor. He is paying $1.35 for diesel fuel #2. Goes to Blane or Billingham, WA, for major repairs or boat upgrades.

Interview with Karl Amundsen, Email, kamundsen@mosquitonet.com – 9/22/00

Owner of a 26 ft. Bayliner used for both recreational and charter. He has used the Harbor for 1.5 years (on a transient basis). He was "real lucky!" and got permanent usage at Valdez Harbor for the last 6.5 years. He can only recall a couple of times that it took him no more than 10-15 minutes extra time due to the congestion. However, he has observed others getting impatient with large vessels attempting to turn around/maneuver around the processing plant, fuel docks, and Stan Stevens/A float (the big guys). His biggest complaint is waiting at the fuel docks to get fuel. Respondent was not able to provide a cost estimates as to damages because he never repairs the dings and scratches. However, he plans on doing some repair work and painting this winter. He learned a $7,000 lesson about 6 years ago from the so- called local talent and nobody does repair work on my vessel except for him. Most repair work out of the slip occurs up in the dry dock storage area. He was disappointed in the money spent to date on the floats and fish cleaning stations. As far as time delays, he has experienced minimal delays. Mostly when big vessels are maneuvering around the processing plant. There is on occasion heavy traffic outbound in the a.m. that may require increased vigilance and at most, a minute or two wait-time to enter outbound traffic.

Respondent is very interested in the small boat harbor development. During the past 8 seasons, he has operated there. He has received many bumps and bangs to his hull and bowsprit due to the narrow access to the floats. Mostly it is the result of overcrowding. The regular guys pretty well have it figured out, but due to the lack of slip availability, the transients spend a lot of time banging around in unfamiliar, tight environments. He knows his float is not the only one to suffer this problem.

He suggested considering all aspects of dockside life into account in the redesign. He believes that fishermen need more space. He suggests taking a look at the wind index for Valdez, and the current, both valid concerns for maneuvering in tight spaces. He was concerned with any planned increased slip fees two or three times, then he would prefer to leave it as it is. Modest increases are acceptable.

Interview with John Mize, Email, mize@alaskaalife.net – 9/22/00

Respondent indicated that the harbor is too small for all the fishing and private vessels. During the commercial fishing season the harbor is not only congested but there is very little room to pass or get by the commercial boats/ships docked at the processing plans. There is no flow through the harbor and it becomes very dirty and slimy from the commercial boats pumping their fish holds in the harbor. At low tides or minus tides, the water depth is 9 ft. or less at the mouth of the harbor. There is little room for error from mid channel when meeting a boat or ship that draws 5 or more feet. The space between docks are very close (Floats B, C, and D) for the boat to clear the slip and turn without bumping into other boats even when the wind is not blowing. When the charters boats leave around 7 AM, it can get tricky to get pass the fish processing plants with boats docked there and the fuel docks and tour boat area as everyone is jockeying to get out of the harbor.

The salmon season is a real hazard when you include all the private boats into the mix. Most of these boaters have no idea as to the boating rules and the threat of being injured when pulling in front of 40 foot charter vessels or try and hold their ground while in a 12 foot flat bottom jet boat. It is a zoo and real captains operating the larger vessels do a great job of not hurting these uneducated boat owners who don't know what they are doing. He suggested separating the two if possible. He added that many of the commercials fishing vessels do not have Coast Guard approved Captains. They have a big boat and an attitude that fishing vessels have the right of away at all time. Only when they are actively engaged in fishing (nets out). Just the growth of boaters needing slips in Valdez is an indications of the

need for more harbor space, better facilities for the charter fleet, and separation of the commercial fleet. If the present harbor serves the requirement of the commercial fleet, then the new harbor should be for the private boaters and charter boats. When rafting prior to getting his own slip, respondent was 3 deep and experienced the usual paint scrapes and dents. He supports a new or expanded harbor.

Interview with Dennis Petre, Email, d_petre@yahoo.com, – 9/22/00

Respondent has a 30-ft boat, the North Country and a 21-ft. boat, Seventh Day. It took him 2 years to get a permanent slip. He has been using the small boat harbor since 1985. Respondent has been running a charter boat since 1990. The small boat harbor has seasonal congestion. Delay times are estimated at 10 minutes. When the commercial boats are fishing pinks at the end of June and the first couple weeks of July, it gets a little congested at the fuel docks. But it has gotten better because another gas station was added this year. He has no damage to report. He does his own repairs and his boats are trailerable. (Respondent said you have to be a boat mechanic if you want to be a charter boat owner). The first couple weeks of August, there is a lot of traffic because of all the small boats from Fairbanks are in Valdez for the silver salmon. The main problem is parking space and lack of manners on the part of the boaters. He supports a bigger harbor with more slips and two entrances. He does not want to see a Charter Boat row because it would cause congestion on its own. Also, he does not want to pay super high rent fees.

Interview with Joe Kilian, telephone (907) 835-5002, Alaskan Angler Charters – 9/27/00

Respondents has a fleet of 10 charter fishing vessels (two at 16 ft., 3 at 18 ft., 2 at 21 ft., and one each: 24 ft., 28 ft., and 32 ft.). Has had permanent moorage at Valdez for 8 years. Has experienced minor damage to his vessels due to congestion (amount minimal because he does not make repairs; mostly cosmetic damages). If the new small boat harbor is built, he would consider doubling his smaller vessel fleet (8 vessels under 24 ft.). He moors year-round, taking his smaller vessels out of the water and put it in dry dock. He has observed rafting as many as 4 and 5 deep when the pinks (salmon) are in. During the winter the ice can build up where his vessels are icebound. He has not experienced any time delays; however, when the larger boats are in, it does slow down getting in/out of harbor.

Interview with Dave Clemens, telephone (907) 349-5958 (H), Ariel – 9/29/00

Mr. Clemens is a transient vessel owner with a 50-ft. commercial fishing vessel. He has used the Valdez harbor for the last 11 years. The only time he has experienced delays getting into and out of the harbor is when the two large tenders are in Valdez. Because his vessel is large he has not experienced any damages to his vessel because his boat is usually rafted with another boat about the same sizes. He does not have his name on the wait-list for permanent moorage.

Interview with Patrick Day, telephone (907) 835-4404 (W), Alaskan Spirit – 9/29/00

Respondent has had permanent moorage at Valdez for the past 25 years. He has a commercial fishing boat 53-ft. length in a 48-ft. slip. He had a 36-ft. boat but sold it 5 years ago to purchase his 53-ft. vessel. If a new small boat harbor were constructed then he would consider purchasing another boat about 36 ft. and have it permanently moored at the new harbor. He has previously seen vessels 6-7 deep and more recently, rafting 3 to 4 deep. He has not experienced any time delays or damage to his boat. There is congestion at the existing harbor especially at the Sea Hawk dock. He mentioned that the existing harbor has shallow water and is well-protected from the weather.

Interview with Bill Crump, telephone (907) 835-5656, Lady Sandy – 9/29/00

Owner of a 53 ft.-commercial fishing boat. Respondent has had permanent moorage at Valdez for 8 years. He has experienced up to 2-hour delays waiting to load and unload his fish because of congestion. Another congestion problem is at the Sea Hawk dock where there is a bottleneck when

the tenders are at the docks. In addition, he has had problems (time delays) associated with crane usage. At times, one of the two cranes is not operable; therefore, he has experienced some delays because he had to wait to use a crane. He has seen rafting up to four deep. As a permanent user year round, he has had his vessel icebound in the winter. Respondent hasn't had any damages to his vessel.

Interview with Ed Pyle, telephone (253) 582-6092, Northern Comfort Charters – 10/03/00

Owner of three vessels: 34 ft., 43 ft., and 44 ft. He uses transient moorage for the 34 ft and the other two have permanent slips at Valdez. He has had minor damage to his vessel ($50) due to the congestion. He has observed rafting up to two and three deep. Delay time is minimal. It gets extremely congested during the salmon season; especially when the boats from Fairbanks trailer to Valdez. Another bottleneck is at the Peter Pan docks. His vessels are at Valdez year-round. He pays someone to look after his vessels because of the snow build up. He may consider increasing his fleet and/or renting an additional slip or obtain a bigger slip if a new harbor is built.

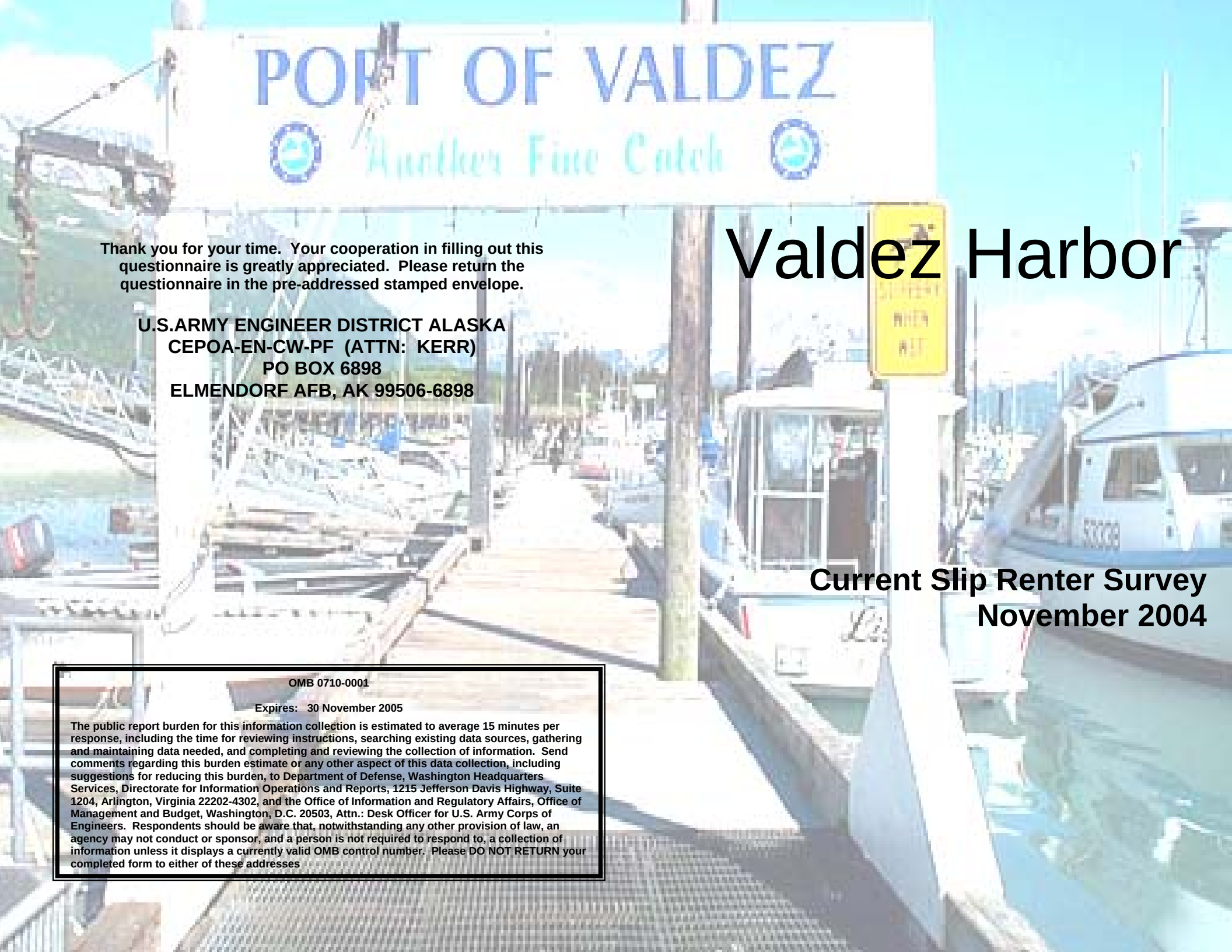
Interview with Ted Mattson, telephone (907) 745-7744, Skookumchauck – 10/03/00

He is on the wait list for permanent moorage at Valdez. He has been on the list for 5 years. He also has another boat moored in Bristol Bay. His 53-ft. boat is now moored in Sitka. When he gets a permanent slip at Valdez, he will move his boats from Sitka to Valdez. He has not used Valdez moorage; he is in and out of the Harbor in the same day. Most of the conversation was his experience at Sitka. He does not want to see the same design features (mistakes) in Valdez as those made in Sitka. According to respondent, the Corps spent $7.5 million in 1995 and phone lines were not included in the design. Telephone lines were added after the project was completed. Boat owners had to fight the City for the phone lines. The causeway was not designed properly. There is a 3-ft. wave surge. During a big storm, expect the causeway to be damaged. There are two big (brass or metal) grounding rods sticking inside the dock. This is a potential hazard because there should not be rods sticking inside the dock where a boat is moored. The design of the dock is marginal. The pilings are located in the middle of the dock so a couple (two people) cannot walk together down the dock without bumping into the piling. All the Corps had to do is to the stagger the pilings – one left, then one on the right side. Also the lighting is all down one side. The same design criteria, by staggering the lights, would have been a better design.

Interview with Hunter Cranz, telephone (907) 831-0351 (mobile phone), Polar Prince (tender) – 10/04/00

He has a permanent slip at Valdez for his 72 ft. (10 ft. draft) commercial fishing vessel. Has moored at Valdez for 18 years with 29 years of fishing experience. No delays entering or exiting the harbor. No time delays. However, he identified problems with larger vessels with 11 – 13 ft. drafts maneuvering (getting stuck) in the shallow waters of the harbor.

EXHIBIT 2 – CURRENT SLIP RENTER SURVEY – NOVEMBER 2004



Valdez Harbor

Thank you for your time. Your cooperation in filling out this questionnaire is greatly appreciated. Please return the questionnaire in the pre-addressed stamped envelope.

U.S.ARMY ENGINEER DISTRICT ALASKA
CEPOA-EN-CW-PF (ATTN: KERR)
PO BOX 6898
ELMENDORF AFB, AK 99506-6898

Current Slip Renter Survey
November 2004

OMB 0710-0001

Expires: 30 November 2005

The public report burden for this information collection is estimated to average 15 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this data collection, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, Virginia 22202-4302, and the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, D.C. 20503, Attn.: Desk Officer for U.S. Army Corps of Engineers. Respondents should be aware that, notwithstanding any other provision of law, an agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. Please DO NOT RETURN your completed form to either of these addresses

October 20, 2004

Dear Boater:

The City of Valdez, in partnership with the U.S. Army Corps of Engineers, is studying the feasibility of constructing a new small boat harbor to provide additional access for boaters. We need information from boaters to determine the benefits of adding slips in the proposed new harbor. You can help by completing the enclosed questionnaire about your recent boating experiences and your estimate of the value of boat slips at Valdez harbor.

You are receiving one questionnaire for each recreational boat for which you rent, or are on the wait list to rent, a slip at Valdez Harbor. Your responses will be kept confidential. The results of this survey will not be used or considered by the City in future slip rental fees.

Because your views represent future use of the existing and proposed new harbor, your participation is very important. Your participation is entirely voluntary. Please answer all the questions to the best of your ability and return the questionnaire as soon as possible in the enclosed pre-addressed, stamped envelope.

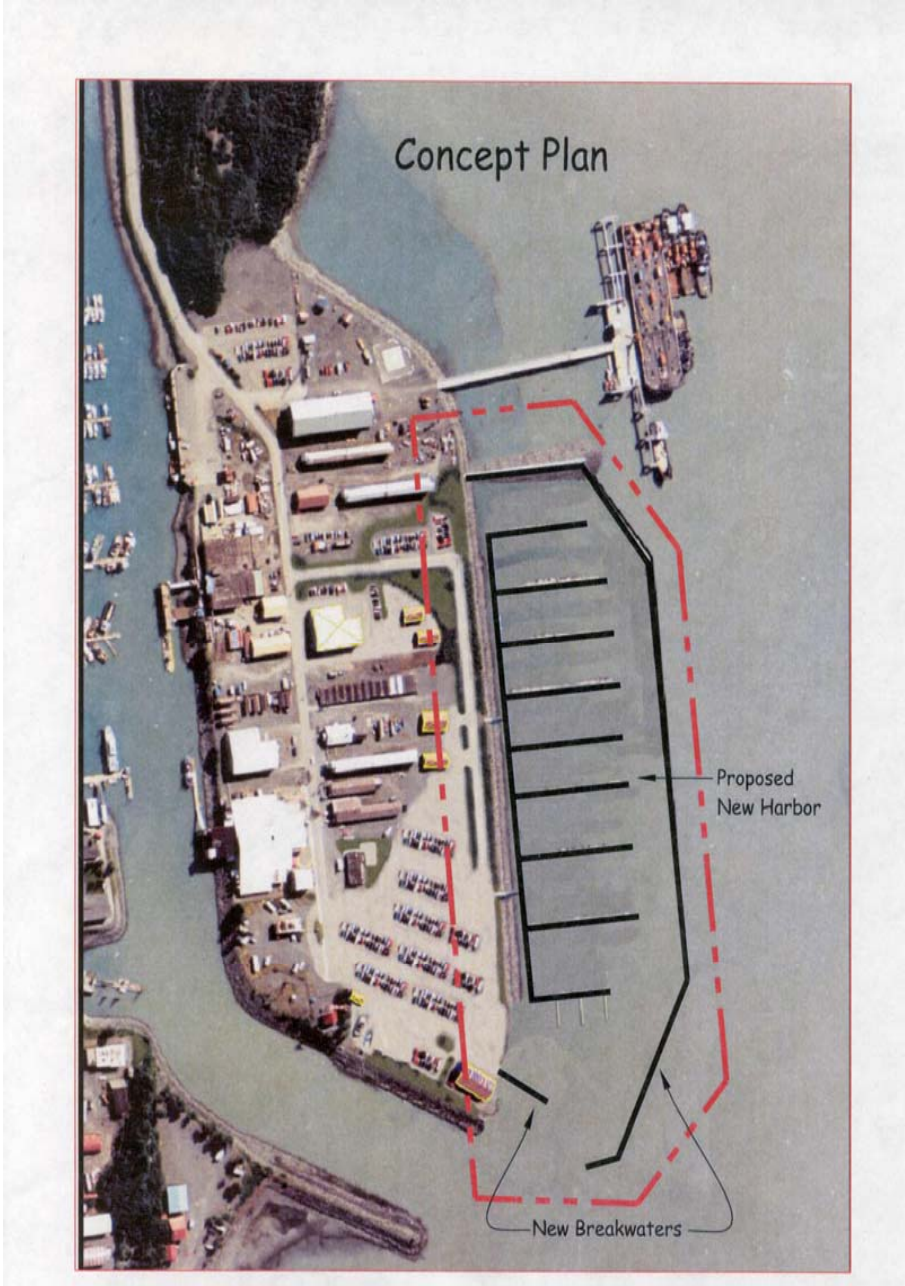
The identification number printed on the questionnaire is only for follow-up contacts to non-respondents. When your completed questionnaire is returned, you will be crossed off the mailing list so you will not receive a "reminder" letter or telephone call.

Thank you for your assistance.

Sincerely,

Bert Cottle, Mayor
City of Valdez, Alaska

P.O. BOX 307 • VALDEZ, ALASKA 99686
TELEPHONE (907) 835-4313 • FAX (907) 835-2992



Do you think you would benefit from the proposed new harbor at Valdez (for example, fewer delays, fewer damages, etc.)?_____Yes_____ No

12. **If yes**, with the proposed new harbor in place, how much **more** would you be willing to pay per year **above your combined current annual slip rental fee and the amount you bid in question 10b?** This could be for a slip in the new harbor **or** to retain your existing slip. The additional amount should consider the value to you from potential reduced overcrowding in Valdez Harbor resulting from having the proposed new harbor in place (for example, fewer delays, fewer damages, etc.).

Circle the highest additional amount you would pay per year from the list below.

$ 3000	$ 2500	$ 2000	$ 1800	$ 1600	$ 1400
$ 1200	$ 1000	$ 900	$ 800	$ 700	$ 600
$ 500	$ 450	$ 400	$ 350	$ 325	$ 300
$ 275	$ 250	$ 225	$ 200	$ 175	$ 150
$ 125	$ 100	$ 75	$ 50	$25	$0

13. With the proposed new harbor in place, do you think you would use your boat more often than you do under the present conditions?___ Yes___ No

14. **If yes,** please estimate how many more **additional** days you think you would use your boat annually. _____ Days

We are interested in your thoughts about the proposed project at Valdez and your comments about this questionnaire. Please write any comments below or attach an additional sheet._____
_____
_____
_____
_____
_____
_____
_____
_____
_____

1. Do you EITHER currently rent a recreational slip in Valdez Harbor **OR** did you rent a recreational slip in Valdez Harbor during the 2004 boating season? _____ Yes _____ No*

*IF YOU ANSWERED ***NO*** TO THE ABOVE, PLEASE RETURN THE QUESTIONNAIRE WITHOUT COMPLETING THE REMAINDER.

2. How many years have you rented a slip at Valdez Harbor? _____ Years

3a. What is the length of your recreational boat (overall) that was berthed in the slip that you rented in Valdez Harbor in 2004? _____Feet

3b. How much is your current annual slip rental cost at Valdez Harbor? $_____

(If you rented slips for **more** than one recreational boat in 2004, please complete a **separate** questionnaire for EACH recreational boat.)

4. Since you have rented a slip, approximately how many times do you use your boat in a typical year?

Number of times boat left slip in a typical year: _____Times

5. Since you have rented a slip, approximately how many days per year do you use your boat completely outside the Valdez area? _____Days

6. Please write the number of recreational boating trips out of Valdez Harbor for a typical year that corresponds with each trip-duration category below. (A day trip counts as one day. An overnight trip would be two days, and so on.)

Duration	No. trips	Duration	No. trips	Duration	No. trips	Duration	No. trips
1 day		2 days		3 days		4-5 days	
6-12 days		13-17 days		18-26 days		more than 26 days	

7. How many people go with you on a typical boating trip? ____ People (including yourself)

8. What problems have you personally experienced in Valdez Harbor during the years you have boated there? **(Mark an "X" on the blank in front of each that applies.)**

(1) ____ Damage to boat or equipment
(2) ____ Inadequate parking
(3) ____ Overcrowding
(4) ____ Poor water quality
(5) ____ Inadequate protection for boats during storms
(6) ____ No Problems
(7) ____ Other (specify):_____
_____

9. If your boat or equipment was damaged in Valdez Harbor during the years you have rented a slip there, please give the approximate dollar cost of damages you incur in a typical year in the categories provided below. Do not include damages incurred away from Valdez Harbor. If you experienced damages to your boat but did not have repairs made or did the repairs yourself, please estimate the commercial cost of repairs. **This information is confidential.**

Description of Damages	Cost of Repairs ($)	Description of Damages	Cost of Repairs ($)
Hull punctures		Broken Cleats	
Hull scratches		Line damage	
Other (describe)			
Other (describe)			

10a. Do you plan to rent a slip at Valdez Harbor next year? ___Yes___ No

10b. **If yes**, suppose that all recreational slip spaces in the existing harbor (with conditions unchanged) were going to be auctioned off to boaters who bid the highest dollar amount annually to rent a slip.

What is the highest amount you would be willing to pay **annually** (above your current annual slip rental fee) to retain your recreational slip in Valdez Harbor, knowing that if you bid too low you could lose your slip?

Your estimate should provide the value of ALL benefits resulting from having a slip as compared with your boating situation without a slip. Examples of potential benefits include reduced expenses for trailering, timesavings, longer boating outings, convenience, reduced delay in accessing the Valdez boating areas, and reduced boat damage.

Circle the highest additional amount you would pay per year from the list below.

$ 3000	$ 2500	$ 2000	$ 1800	$ 1600	$ 1400
$ 1200	$ 1000	$ 900	$ 800	$ 700	$ 600
$ 500	$ 450	$ 400	$ 350	$ 325	$ 300
$ 275	$ 250	$ 225	$ 200	$ 175	$ 150
$ 125	$ 100	$ 75	$ 50	$ 25	$ 0

If the amount you would pay per year is not shown on the list above, please write in the amount here. $ _____

Please mark the answer that best describes your reason for answering the previous question the way you did.

____ I didn't want to place a dollar value.
____ That's what it's worth to me.
____ It's worth more to me, but it's all I can afford to pay.
____ I object to the wording of the question.
_____Not enough information is provided.
____ Other (Please specify):___
_____ _____.

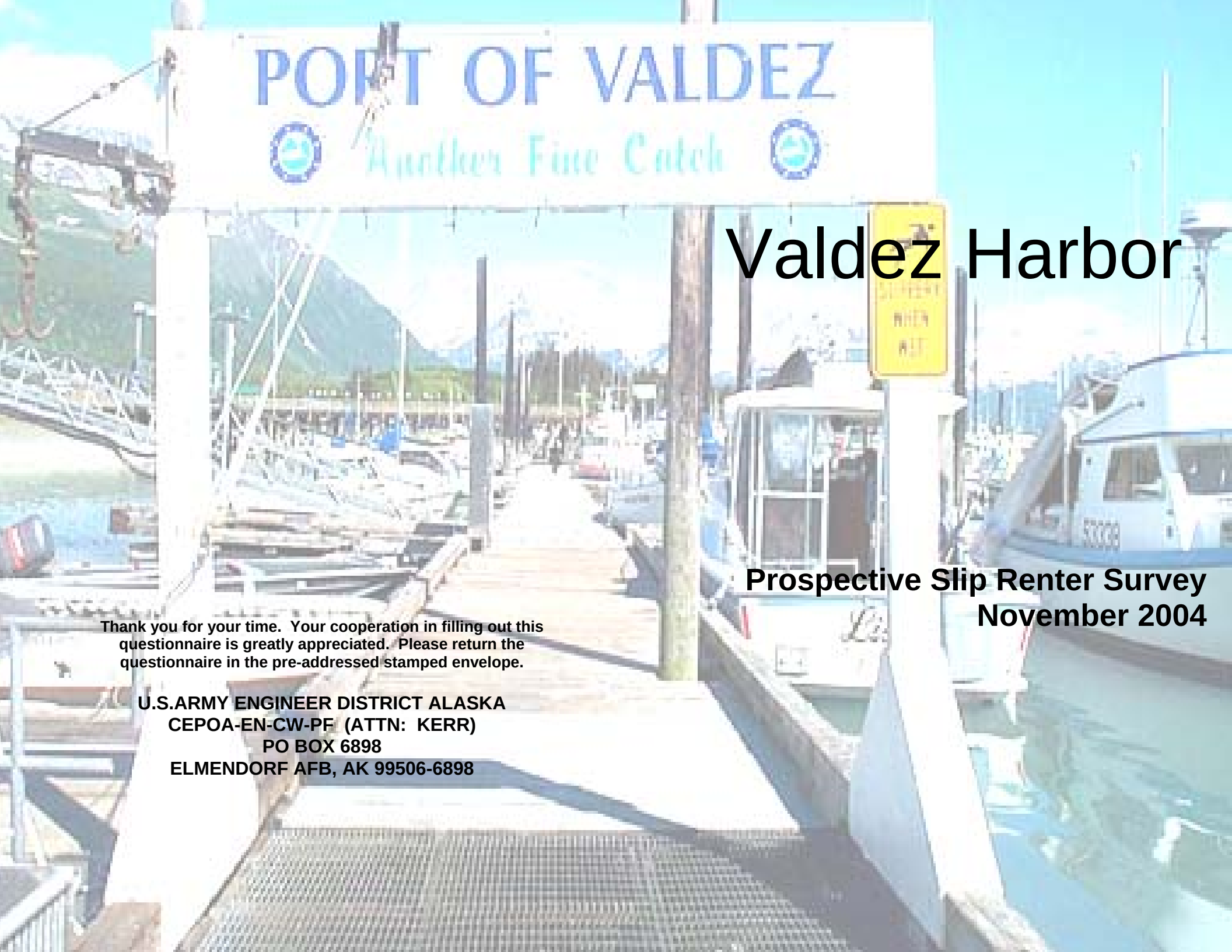
11. Construction of a new small boat harbor near the existing harbor is being considered to address the existing overcrowding situation in Valdez Harbor. The proposed new project will be similar to the concept plan illustrated on the following page. Your answers to the next questions will help us determine how this new harbor may impact existing slip renters.

The "Proposed Harbor" is planned to include:

- Rubblemound or Wave Barrier Breakwater Design
- Waves in Basin Reduced to 1 foot or Less
- Separate Protected Entrance Channel
- Moorage Basin for 230 to 330 New Slips
- Adjacent Harbor-User Upland Parking/Staging Area

OMB 0710-0001 Expires: 30 November 2005

EXHIBIT 3 – PROSPECTIVE SLIP RENTER SURVEY – NOVEMBER 2004



Valdez Harbor

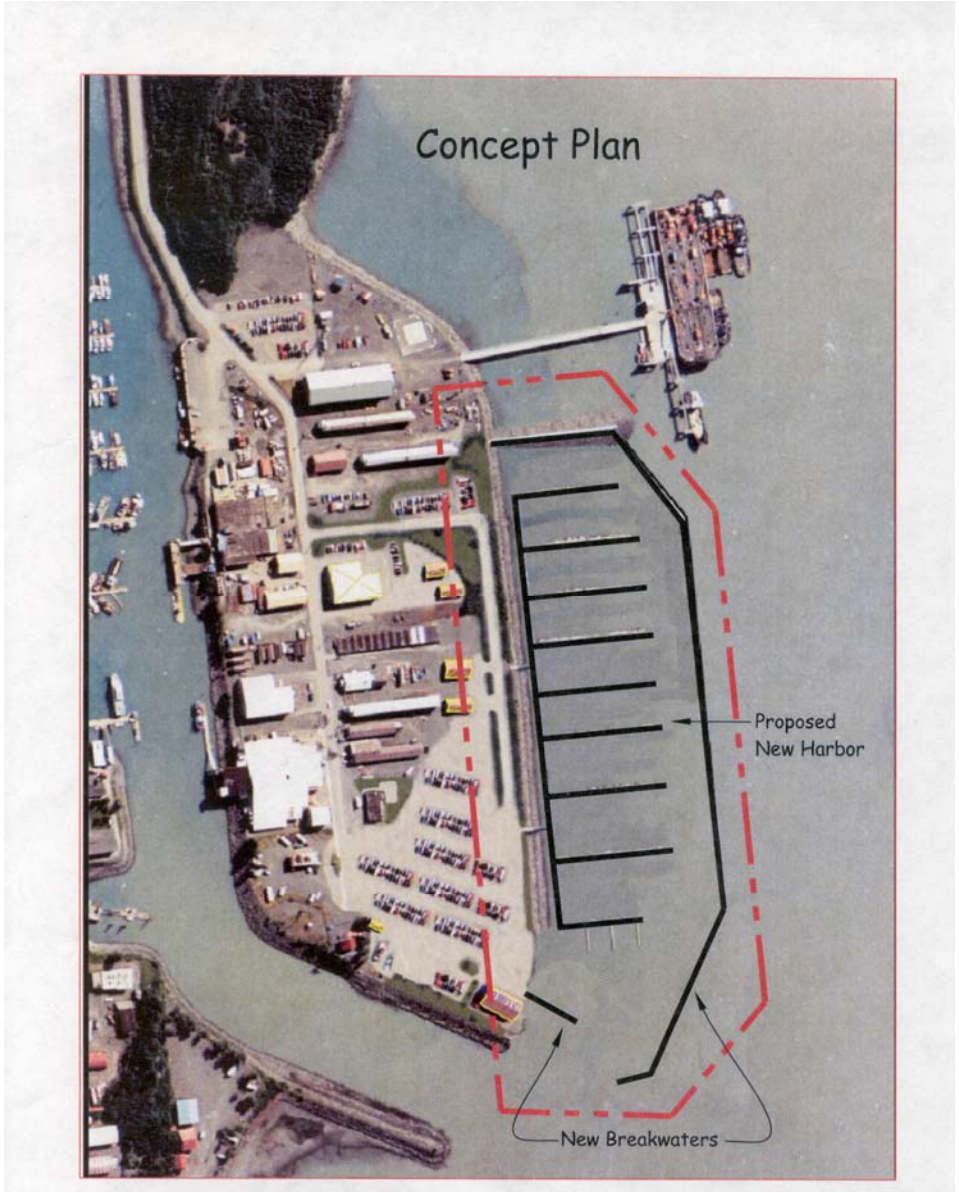
Prospective Slip Renter Survey
November 2004

Thank you for your time. Your cooperation in filling out this questionnaire is greatly appreciated. Please return the questionnaire in the pre-addressed stamped envelope.

U.S.ARMY ENGINEER DISTRICT ALASKA
CEPOA-EN-CW-PF (ATTN: KERR)
PO BOX 6898
ELMENDORF AFB, AK 99506-6898

OMB 0710-0001

Expires: 30 November 2005



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Circle the highest additional amount you would pay per year from the list below.

$ 3000	$ 2500	$ 2000	$ 1800	$ 1600	$ 1400
$ 1200	$ 1000	$ 900	$ 800	$ 700	$ 600
$ 500	$ 450	$ 400	$ 350	$ 325	$ 300
$ 275	$ 250	$ 225	$ 200	$ 175	$ 150
$ 125	$ 100	$ 75	$ 50	$ 25	$ 0

If the amount you would pay per year is not shown on the list above, please write in the amount here. $ _____

Please mark the answer that best describes your reason for answering the previous question the way you did.

____ I didn't want to place a dollar value.

____ I object to the wording of the question.

____ That's what it's worth to me.

____ Not enough information is provided.

____ It's worth more to me, but it's all I can afford to pay.

____ Other (Please specify)_____

_____

9. If you were selected to rent a slip at the new harbor, please estimate how many days you think you would use your boat there annually. _____ Days

We are interested in your thoughts about the proposed project at Valdez and your comments about this questionnaire. Please write any comments below or attach an additional sheet.

_____

_____

_____

_____

_____

_____

_____

CITY OF VALDEZ, ALASKA
GATEWAY TO THE INTERIOR

October 20, 2004

Dear Boater:

The City of Valdez, in partnership with the U.S. Army Corps of Engineers, is studying the feasibility of constructing a new small boat harbor to provide additional access for boaters. We need information from boaters to determine the benefits of adding slips in the proposed new harbor. You can help by completing the enclosed questionnaire about your recent boating experiences and your estimate of the value of boat slips at Valdez harbor.

You are receiving one questionnaire for each recreational boat for which you rent, or are on the wait list to rent, a slip at Valdez Harbor. Your responses will be kept confidential. The results of this survey will not be used or considered by the City in future slip rental fees.

Because your views represent future use of the existing and proposed new harbor, your participation is very important. Your participation is entirely voluntary. Please answer all the questions to the best of your ability and return the questionnaire as soon as possible in the enclosed pre-addressed, stamped envelope.

The identification number printed on the questionnaire is only for follow-up contacts to non-respondents. When your completed questionnaire is returned, you will be crossed off the mailing list so you will not receive a "reminder" letter or telephone call.

Thank you for your assistance.

Sincerely,

Bert Cottle, Mayor
City of Valdez, Alaska

P.O. BOX 307 • VALDEZ, ALASKA 99686
TELEPHONE (907) 835-4313 • FAX (907) 835-2992

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1. Are you EITHER currently waitlisted to rent a recreational slip in Valdez Harbor **OR** were you waitlisted to rent a recreational slip in Valdez Harbor during the 2004 boating season?

_____ Yes _____ No*

*IF YOU ANSWERED ***NO*** TO THE ABOVE, PLEASE RETURN THE QUESTIONNAIRE WITHOUT COMPLETING THE REMAINDER.

2. What is the length of the recreational slip that you would like to rent in Valdez? _____ Feet

(If you were waitlisted for MORE than one recreational boat in 2004, please complete a SEPARATE questionnaire for EACH recreational boat.)

3. Did you own and use a boat in 2004? _____ Yes _____ No

4. **If yes**, please mark the box which best describes your boating situation in 2004.

If no, please go to question 8a.

Use & Location of Boat in 2004	In Valdez	In another Alaskan Harbor	In Harbor Outside Alaska
Berthed in Slip or Mooring			
Trailered to Boat Ramp			

5. In 2004, how many days did you use your boat? Days in Valdez area_____. Days outside Valdez area____.

6. If you have used Valdez Harbor for recreational boating**,** what problems have you personally experienced in Valdez Harbor during the years you have boated there? If you have never boated in Valdez Harbor, please skip ahead to question 8a.

(Mark an "X" on the blank in front of each that applies.)

(1) ____ Damage to boat or equipment

(2) ____ Inadequate parking

(3) ____ Overcrowding

(4) ____ Poor water quality

(5) ____ Inadequate protection for boats during storms

(6) ____ No Problems

(7) ____ Other (specify): _____

_____

_____

_____

7. If your boat or equipment was damaged in Valdez Harbor during the years you have boated there, please give the approximate dollar cost of damages you incur in a typical year in the categories provided below. **Please do not include damages incurred away from Valdez Harbor.** If you experienced damages to your boat but did not have repairs made or did the repairs yourself, please estimate the commercial cost of repairs. **This information is confidential.**

Description of Damages	Cost of Repairs ($)	Description of Damages	Cost of Repairs ($)
Hull punctures		Broken Cleats	
Hull scratches		Line damage	
Other (describe)			
Other (describe)			

8a. Construction of a new small boat harbor near the existing harbor is being considered to address the overcrowding situation in Valdez Harbor. The proposed new harbor will be similar to the concept plan illustrated on the next page. Your answers to the next questions will help us determine how this new harbor may impact new slip renters.

The "Proposed Harbor" is planned to include:

- Rubblemound or Wave Barrier Breakwater Design
- Waves in Basin Reduced to 1 ft or Less
- Separate Protected Entrance Channel
- Moorage Basin for 230 to 330 New Slips
- Adjacent Harbor-User Upland Parking/Staging Area

Do you want to rent a slip at the new harbor in Valdez? __ Yes __No

8b. **If yes,** suppose that all recreational slip spaces in the new harbor were going to be auctioned off to boaters who bid the highest dollar amount annually to rent a slip. Considering the annual slip rental fee is currently about $16/ft of boat length, what is the highest amount you would be willing to pay annually (above the annual slip rental fee) for a recreational slip in the new harbor, knowing that if you bid too low you would not get a slip? Your estimate should provide the value of **all** benefits resulting from having a slip as compared with your boating situation without a slip. Examples of potential benefits include reduced overcrowding, reduced expenses for trailering, timesavings, longer boating outings, convenience, reduced delay in accessing the Valdez boating areas, and reduced boat damage.

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